

ita
YOUR TICKET.



PROGRAM OUTLINE

Climbing Arborist



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CLIMBING ARBORIST PROGRAM OUTLINE

APPROVED BY INDUSTRY

NOVEMBER 2010

**Developed by
Industry Training Authority
Province of British Columbia**



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Section 1

INTRODUCTION

Climbing Arborist



Foreword

The Arboriculture Trade for British Columbia includes three distinct and progressive Apprenticeship Training Programs – Arborist Technician, Climbing Arborist and Field Arborist. The three separate Arboriculture Trade Provincial Certificates of Qualification (C of Q's) have been defined as follows:

Arborist Technician

In this entry level training the apprentice is primarily performing work on the ground or within 3 meters of the ground on ladders. Successful completion of training and assessments will result in Arborist Technician C of Q.

Climbing Arborist

In Climbing Arborist training the focus is on the climbing and technical skills used while working in trees. Successful completion of training and assessments will result in Climbing Arborist C of Q.

Field Arborist

The Field Arborist training covers the skills involved in advanced tree management, including: development of pest management plans, tree and site assessment and office management skills. Successful completion of training and assessments will result in Field Arborist C of Q.

Note 1: *The **Arborist Technician** and the **Climbing Arborist** Apprenticeship Training Programs recommend the apprentice obtain their Level 1 First Aid certification.*

Note 2: *Falling and Bucking is a separate endorsement from the Arboriculture Training Programs. The **Arborist Technician** technical training, as outlined in that program, covers the required knowledge and practical requirements of the **WorkSafeBC Faller Training Standard**.*

Note 3: *To obtain certification as a **Climbing Arborist** the Apprentice must successfully complete the **Climbing Arborist** Standardized Practical Assessment which may only be taken after successful completion of the Apprenticeship Training Program, the ITA written exam, and the required workplace hours.*

This Program Outline details the new **Climbing Arborist** Apprenticeship Training Program for British Columbia.

The Outline is to be used as a guide for all Instructors in classroom, field and work experience components of the **Climbing Arborist** Apprenticeship Training Program. It also provides direction for the written and practical evaluations conducted during the technical training and workplace based training components of the program.

The Outline includes training provider standards for instructors, equipment and materials, and the facility requirements. The Outline is based on an 8 week training delivery program run with 2 Instructors and 20 students per class.

The development team for the **Climbing Arborist** Apprenticeship Training Program has collectively an extensive background in all arboriculture workplaces, including private sector climbing and consulting, municipal/urban tree management, utility arboriculture, and botanical gardens. Organizations and individual subject matter experts involved are listed on the proceeding pages.



Safety

The development team recognized that safety is of paramount importance in the arboriculture industry and that trained arborists are critical in ensuring workplace safety. It is imperative that arborists are aware of circumstances that may lead to injury to themselves, others, and surrounding trees or properties. It is generally recognized that a safety conscious attitude and work practices contribute to a healthy, safe and accident free working environment, and it is the responsibility of the Arborist to ensure the safety culture on the job site. It is imperative that Arborists are very familiar with and apply occupational health and safety rules and best practices as an integrated part of their job functions. As well, it is essential to identify hazards and take necessary measures to protect oneself, coworkers, the public, property, and the environment. The Program Outline provided incorporates safety as a thematic element through all competency areas, to reinforce the need and value of safe work practices in this trade.

Climbing Arborist Job Description

A Climbing Arborist is a certified tradesperson who cares for and maintains trees and other woody shrubs. Climbing Arborists may prune and remove trees at heights. Climbing Arborists must perform their tree-climbing methods in such a manner as to prevent unnecessary damage to the tree. Typical tasks for the Climbing Arborist include:

- Tree Risk Assessments
- Aerial work with lift truck
- Tree climbing and pruning at heights
- Identifying and remediating mechanical injuries, drought damage and other abiotic tree disorders
- Identifying common root and crown disorders.

This trade engages in a range of outdoor work activities in varying weather conditions.

Climbing Arborists work year round; however, longer hours may be required in spring and summer or following storms and other weather emergencies.

Tasks are primarily performed in urban settings, usually in crews of two to six people, using hand and power tools and power equipment. This occupation is physically demanding. Knowledge of safety regulations and required workplace precautions are essential in this occupation.

To perform the work of a Climbing Arborist, the tradesperson must be able to:

- Work safely and effectively at heights
- Ensure regulatory compliance
- Demonstrate knowledge of stem and root crown disorders of woody plants
- Structurally support trees
- Understand and be able to initiate and support aerial rescue procedures
- Use effective written and verbal communication skills
- Conduct site inspections
- Develop and communicate a safe job plan and perform pre-job preparation



These workers may be employed by:

- Government departments dealing with environment, lands, and parks
- Institutions or facilities with extensive grounds (public and private)
- Private firms providing services in tree care and landscape management
- Utilities and private utilities contractors
- Tree nurseries
- Orchards
- Golf courses
- Private estates

General Aptitudes and Skills:

Climbing Arborists must enjoy working outdoors, have an interest in natural environments and trees, be physically fit, have good physical coordination and be comfortable working at heights. They must work well in a team environment and have good problem solving and critical thinking skills. They must have situational awareness, positive response to change, the ability to remain level headed, as well as the ability predict and plan for safe work practices.

Pre-requisites:

- Arborist Technician – Certificate of Qualification
- Ability to obtain driver's license
- Ability to obtain Level One First Aid

SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website:

<http://www.worksafebc.com>. Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.



Acknowledgements

The Program Outline was prepared with the advice and direction of an industry steering committee convened initially by the HortEducationBC training organization. Members include:

- Kyle Banks Davey Tree Expert Company of Canada
- Paul Buikema Progress Landscaping
- Mark Brown District of North Vancouver
- Thor Clausen Arbortech Tree Services
- Heath Czypionka City of Vancouver
- Rupert Evans The Butchart Gardens
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Industry subject matter experts retained to assist in the development of Program Outline content:

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- Thor Clausen Arbortech Tree Services
- Heath Czypionka City of Vancouver
- Hud Elwood Branching Out Tree Service
- Rupert Evans The Buchart Gardens
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- Pat Perry Davey Tree Expert Company of Canada
- Aidon Pyne Davey Tree Expert Company of Canada
- Brent Ritson District of Saanich
- Ryan Senechal Bartlett Tree Experts Company of Canada
- Jason Timmis Cedar Ridge Tree Care
- Gareth Tudor-Jones Bartlett Tree Experts Company of Canada
- Alex Thorburn City of Richmond
- Blair Veitch Davey Tree Expert Company of Canada
- Bill Wilde Arbor Vitae Tree Consultants
- Russel Wilson Davey Tree Expert Company of Canada



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The Industry Training Authority would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Climbing Arborist occupation.



How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
OAC	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measurable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels



Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment



Section 2

PROGRAM OVERVIEW

Climbing Arborist

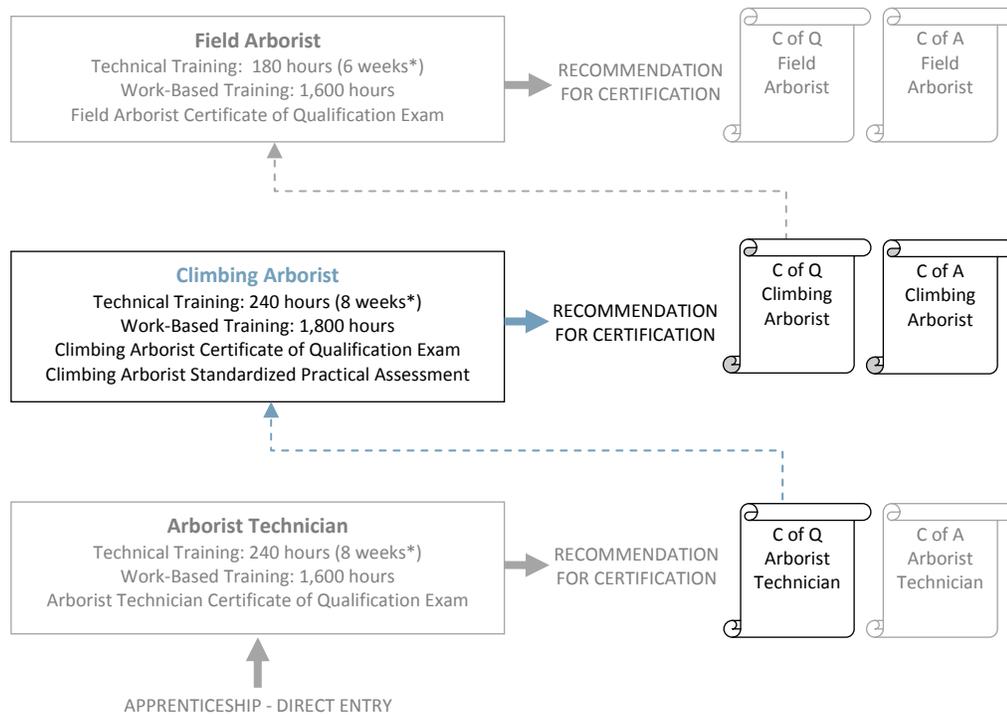


Program Credentialing Model

Apprenticeship Pathway

This graphic provides an overview of the Climbing Arborist apprenticeship pathway.

C of Q = Certificate of Qualification
C of A = Certificate of Apprenticeship



*Suggested duration based on 30-hour week

CROSS-PROGRAM CREDITS

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

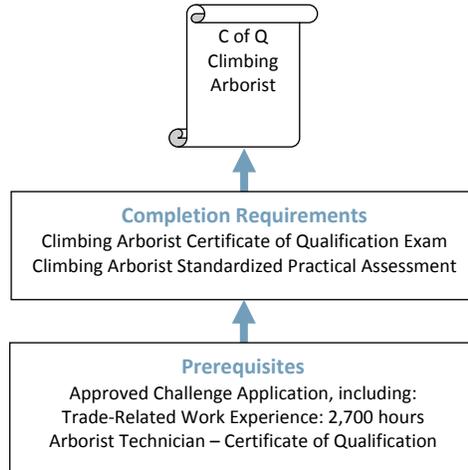
C of Q Utility Arborist	Technical Training: None Work-Based Training: 800 hours
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Challenge Pathway

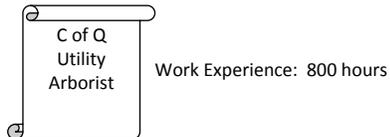
This graphic provides an overview of the Climbing Arborist challenge pathway.

C of Q = Certificate of Qualification



CREDIT FOR PRIOR LEARNING

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program





Occupational Analysis Chart

ARBORICULTURE TRADE – ARBORIST TECHNICIAN, CLIMBING ARBORIST & FIELD ARBORIST

Occupation Description: An Arborist is a certified tradesperson working in the Arboriculture trade. Arborists manage and maintain trees and shrubs in the urban forest, focusing on the health and safety of trees and the urban landscape. Typical duties include identifying trees and shrubs; pruning trees and shrubs (both on the ground and aloft); implementing Integrated Pest Management methods; and operating equipment such as chainsaws and chippers.

Regulations and Other Occupational Skills A	Identify relevant legislation and regulations A1 1	Explain Musculoskeletal Injury (MSI) and Repetitive Strain Injury (RSI) A2 1	Describe electrical systems and hazards A3 1	Identify work site hazards and develop and implement safe work plan A4 1	Apply regulations to the job site A5 2	Describe workplace leadership and communication A6 2	
	Write a variety of technical reports A7 3						
	Power Equipment B	Use chipper in a safe and effective manner B1 1	Work safely and effectively on ground operations while using an aerial lift truck B2 1	Operate a single axle non-air brake dump truck B3 1	Operate a stump grinder B4 1	Work safely and effectively during aerial operations with aerial lift device B5 2	
		Hand Tools and Small Power Tools C	Use and maintain hand tools C1 1	Operate a variety of small power tools C2 1	Use and inspect ladders C3 1		



Tree Work and Management
D

Identify common trees in British Columbia D1	Identify common shrubs in British Columbia D2	Describe basic tree biology and its importance to good arboriculture practices D3	Safely prune trees to appropriate Industry standards D4	Safely prune shrubs to appropriate Industry standards D5	Safely plant trees to Industry standards D6
1		1		1	

Identify common trees in British Columbia D7	Identify common stem and root crown diseases in British Columbia D8	Identify common woody plant pests and diseases in British Columbia D9	Assess trees on site D10	Perform appropriate actions to solve abiotic tree disorders D11	Safely prune trees to appropriate Industry standards D12
2	2	2	2	2	2

Select trees for site conditions D13	Structurally support trees D14	Identify common trees in British Columbia D15	Identify common quarantine pests of trees in Canada D16	Develop and implement integrated pest management plans for trees in urban setting D17	Diagnose and treat insects and diseases D18
2	2	3	3	3	3

Inspect, assess and identify a variety of risks to trees D19	Inventory trees D20	Preserve and retain trees D21	Examine tree value appraisal D22
3	3	3	3

Falling and Bucking
E

Demonstrate safe chain saw use E1	Describe and demonstrate the process of falling E2	Practice falling a tree E3	Manage falling hazards E4	Recognize hazardous weather conditions E5	Recognize dangerous falling practices E6
1	1	1	1	1	1

Identify special falling techniques E7	Plan for limbing and bucking E8
1	1



Rigging F	Describe rigging concepts including selection and use of ropes F1	Select and use knots, hitches and slings in rigging F2	Use various types of hardware in rigging systems F3	Select and use friction control devices for rigging F4	Select and use appropriate rigging techniques F5	Perform cuts for various situations F6
	1	1	1	1	2	2
Climbing G	Select and inspect basic climbing gear G1	Conduct pre-climb assessment G2	Select and inspect climbing gear G3	Climb using various techniques G4	Conduct advanced post-climb job and gear inspection G5	
	1	2	2	2	2	
Emergency Response H	Evacuate worker H1	Review and describe First Aid certification requirements H2	Describe precautions and procedures to prevent and suppress fires H3	Implement spill response H4	Perform aerial rescue H6	
	1	1	1	1	2	
Job Planning and Risk Assessment I	Conduct site inspections. I1	Develop and communicate safe job plan I2	Conduct pre- job preparation I3	Ensure regulatory compliance I4		
	2	2	2	2		
Arboriculture Soil Science J	Examine soil chemistry and biology J1	Examine soil physics and hydrology J2	Develop and implement soil remediation strategies J3			
	3	3	3			



Occupational Analysis Chart

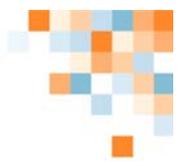
CLIMBING ARBORIST

Occupation Description: A “Climbing Arborist” is a certified tradesperson who cares for and maintains trees and other woody shrubs. Climbing Arborists perform tasks such as tree risk assessments, pruning and removal of trees. In their work they use both climbing and aerial lift devices, rope and rope tools for rigging. They also identify and remediate mechanical injuries, damage, other abiotic tree disorders, and common root and crown disorders.

Regulations and Other Occupational Skills A	Apply regulations to the job site A5	Describe workplace leadership and communication A6																																		
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Power Equipment B	Work safely and effectively during aerial operations with aerial lift device B5																																			
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Tree Work And Management D	Identify common trees in British Columbia D7	Identify common stem and root crown diseases in British Columbia D8	Identify common woody plant pests and diseases in British Columbia D9	Assess trees on site D10	Perform appropriate actions to solve abiotic tree disorders D11	Safely prune trees to appropriate industry standards D12																														
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Rigging F	Select and use appropriate rigging techniques F5	Perform cuts for various situations F6																	
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Climbing G	Conduct pre-climb assessment G2	Select and inspect climbing gear G3	Climb using various techniques G4	Conduct advanced post-climb job and gear inspection G5															
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Job Planning And Risk Assessment I	Conduct site inspections I1	Develop and communicate safe job plan I2	Conduct pre-job preparation I3	Ensure regulatory compliance I4															
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Training Topics and Suggested Time Allocation

CLIMBING ARBORIST

		% of Time	% of Time Allocated to:		
			Theory	Practical	Total
Line A	Regulations and Other Occupational Skills	6%	100%	0%	100%
A5	Apply regulations to the job site		✓		
A6	Describe workplace leadership and communication		✓		
Line B	Power Equipment	8%	20%	80%	100%
B5	Work safely and effectively during aerial operations with aerial lift device		✓	✓	
Line D	Tree Work And Management	50%	40%	60%	100%
D7	Identify common trees in British Columbia		✓	✓	
D8	Identify common stem and root crown diseases in British Columbia		✓	✓	
D9	Identify common woody plant pests and diseases in British Columbia		✓	✓	
D10	Assess trees on site		✓		
D11	Perform appropriate actions to solve abiotic tree disorders		✓		
D12	Safely prune trees to appropriate industry standards		✓	✓	
D13	Select trees for site conditions		✓		
D14	Structurally support trees		✓	✓	
Line F	Rigging	11%	20%	80%	100%
F5	Select and use appropriate rigging techniques		✓	✓	
F6	Perform cuts for various situations		✓	✓	
Line G	Climbing	12%	20%	80%	100%
G2	Conduct pre-climb assessment		✓	✓	
G3	Select and inspect climbing gear		✓	✓	
G4	Climb using various techniques			✓	
G5	Conduct advanced post-climb job and gear inspection		✓	✓	
Line H	Emergency Response	8%	10%	90%	100%
H6	Perform aerial rescue		✓	✓	
Line I	Job Planning and Risk Assessment	5%	60%	40%	100%
I1	Conduct site inspections		✓	✓	
I2	Develop and communicate safe job plan		✓	✓	
I3	Conduct pre-job preparation		✓	✓	
I4	Ensure regulatory compliance				
Total Percentage for Climbing Arborist		100%			



Section 3

PROGRAM CONTENT

Climbing Arborist



Climbing Arborist



4. Describe training strategies

- Training plans
- Tailgate/tailboard training
- New, young and transferred employees
- Coaching and mentoring employees
- Performance review and recommendations
- Training opportunities

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on workplace leadership and communication, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Effective communication
2. Conflict resolution
3. Supervisory role
4. Training strategies



Line (GAC): **B** **POWER EQUIPMENT**
Competency: **B5** **Work safely and effectively during aerial operations with aerial lift device**

Climbing Arborists use an aerial lift truck to access trees to perform a variety of tree care activities. Normally, the Climbing Arborist is working from the bucket of the lift truck; however they may also be the truck operator.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	4

Objectives

To be competent in this area, the individual must be able to:

- Work safely at a number of tasks while in the bucket of an aerial lift truck, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Describe hazards including electrical 2. Explain the body harness requirements for operation of a lift truck 3. Discuss the maximum weight allowed for each model of lift 4. Discuss and explain the types of hydraulic controls most commonly found on lift trucks used for arboriculture 5. Discuss the correct way to use the controls for full movement and to "feather" the controls for fine movements 6. Explain what obstacles must be watched for while elevating or descending (i.e. - rotating into oncoming trucks or damaging service wires etc.) 7. Discuss the advantages and disadvantages of 2 man buckets 8. Discuss the advantages of over-center booms and booms with higher reaches | <ul style="list-style-type: none"> • Electrical and other common hazards • Body harnesses • Lift weights and angles • Common controls and their use • Control use • Lifting and descending objects • Importance of clearance distances • Traffic • Electrical hazards • 2 man bucket operations, advantages and disadvantages • Boom types, advantages and disadvantages |
|--|---|

**Achievement Criteria:*****Theoretical evaluation***

Given a series of multiple-choice questions on working safely and effectively during aerial operations with an aerial lift truck, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Knowledge of WorkSafeBC work related regulations
2. Knowledge of hazards abatement procedures
3. Knowledge of risks associated with work zones
4. Explain the over-center travel of the lower boom

Performance evaluation

Performance Given an aerial lift truck, the apprentice should be able to:

1. Perform pre-use inspection
2. Perform a site assessment to identify potential hazards particularly electrical hazards
3. Establish a safe work zone
4. Establish an emergency procedure
5. Communicate verbally and with hand signals
6. Wear appropriate PPE
7. Demonstrate upper then lower boom operation to lift off cradle
8. Demonstrate feathering controls
9. Demonstrate conventional boom travel
10. Demonstrate over-center boom travel compared to conventional boom travel

Conditions Given an aerial lift truck in an on-site situation.



Line (GAC): D TREE WORK AND MANAGEMENT
Competency: D7 Identify common trees in British Columbia

A Climbing Arborist has a working knowledge of a variety of different tree species and can identify them using a variety of different methodologies. They use this knowledge to make decisions on a variety of arboriculture tasks, such as pruning, site selection, and disease and pest management.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	4

Objectives

To be competent in this area, the individual must be able to:

- Identify a variety of tree species common to British Columbia, using several different methodologies.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Identify trees during all seasons of the year 2. Describe the characteristic parts of trees to help correctly identify them 3. Use of dichotomous keys for field study purposes | <ul style="list-style-type: none"> • Binomial nomenclature and general tree taxonomy to Family • Morphological characteristics of a variety of common trees, including buds, leaf scar, stems, bark, inflorescences, leaf arrangement and morphology, growth habit • Native conifer and deciduous dichotomous key for native species tree identification |
|--|---|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on a variety of tree species common to British Columbia, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify trees species common to British Columbia
2. Describe growth habit
3. Describe morphological characteristics
4. Match tree species to site conditions

Performance evaluation

Performance Given samples of twigs, leaves and or photos, the apprentice will correctly identify 10 native woody plants (at Instructor’s discretion and/or as availability dictates).
Conditions An on-site situation.



Line (GAC): D TREE WORK AND MANAGEMENT
Competency: D8 Identify common stem and root crown diseases in British Columbia

The Climbing Arborist will occasionally have to identify common stem and root crown diseases in trees. This is an important task as these diseases can increase risk while in the trees, and the Climbing Arborist must make decisions on effective means to remove diseased tree parts.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	3

Objectives

To be competent in this area, the individual must be able to:

- Identify and diagnose common stem and root crown diseases in British Columbia, according to Industry standards.

LEARNING TASKS

1. Identify common root disease
2. Identify common heart rots
3. Identify common sap rot
4. Identify common canker diseases

CONTENT

- Armillaria
- Laminated root rot
- White butt rot
- Hardwood trunk rot (Phellinus Annosus)
- Butt rot
- Silver leaf disease
- Phomopsis
- Cytaspora
- Nectria

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on identifying common stem and root diseases in British Columbia, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify common disease symptoms

Performance evaluation

Performance Diagnose common disease damage to plant material including:

1. Anthracnose
2. Nectria canker
3. Armillaria
4. Verticillium wilt
5. Sudden Oak Death Syndrome (SODS)

Conditions An on-site situation.



Line (GAC): D **TREE WORK AND MANAGEMENT**
Competency: D9 **Identify common woody plant pests and diseases in British Columbia**

The Climbing Arborist will occasionally have to identify common plant pests and diseases in trees. This is an important task as pests and diseases can increase risk while in the trees, and the Climbing Arborist must make decisions on effective means to remove diseased tree parts and deal with pest issues.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	2

Objectives

To be competent in this area, the individual must be able to:

- Identify and diagnose common woody plant pests and diseases in British Columbia, according to Industry standards.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Identify common boring insects of deciduous and conifer species 2. Identify common phytophthora symptoms 3. Identify common disease symptoms 4. Identify other common insects and their signs | <ul style="list-style-type: none"> • Bronze birch borer • Cherry bark tortrix • Pine bark beetles • Sudden oak death species • Cupressaceae species • Anthracnose • Wilt • Powdery mildew • Fire blight • Aphids • Adelgids • Scales • Leaf miner • Tent caterpillars • Fall webworm • Douglas fir silver spotted tiger moth • Sawfly |
|---|--|

**Achievement Criteria:*****Theoretical evaluation***

Given a series of multiple-choice questions on identifying common woody plant pests and diseases in British Columbia, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify common pests, signs and symptoms
2. Identify common disease symptoms

Performance evaluation

Performance Diagnose common pest or disease damage to plant material including:

1. Anthracnose
2. Bronze birch borer
3. Aphids
4. Scales
5. Cherry bark tortrix
6. Powdery mildew
7. Pine beetle
8. Tent caterpillar
9. Adelgids
10. Leaf miner

Conditions An on-site situation.



Line (GAC): **D TREE WORK AND MANAGEMENT**
Competency: **D10 Assess trees on site**

Climbing Arborists occasionally assess trees for common abiotic and biotic tree disorders. This includes assessment of on-site soils and tree structural conditions.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
3	3

Objectives

To be competent in this area, the individual must be able to:

- Assess trees for common abiotic tree disorders, including assessment of soils and tree structural conditions, according to Industry standards.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Identify common abiotic tree disorders including drought, frost injury, winter kill, basal and trunk scars, sunscald and cedar flagging | <ul style="list-style-type: none"> • Knowledge of common tree morphological characteristics • Conditions and susceptible species for drought, frost injury, basal and trunk scars, sunscald and cedar flagging |
| <ol style="list-style-type: none"> 2. Visually inspect soil texture and moisture conditions | <ul style="list-style-type: none"> • Compacted and saturated soil characteristics • Root shear (anchoring) • Soil grading and drainage • Impact on tree growth and health |
| <ol style="list-style-type: none"> 3. Take soil samples and prepare them to be sent for laboratory analysis | <ul style="list-style-type: none"> • Field soil texture analysis • Soil sampling techniques |
| <ol style="list-style-type: none"> 4. Describe soil fertility and its impact on tree growth and health | <ul style="list-style-type: none"> • Macro and micro nutrients and soil pH and their impact on tree growth and health |
| <ol style="list-style-type: none"> 5. Visually inspect trees for structural issues | <ul style="list-style-type: none"> • Common structural issues that are specific to specific tree species, inherent tree failure patterns infrastructure and root interference • Recognition of root damage due to construction, irrigation installation trenching or other activities |



Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on assessing trees on site, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Common wood decaying fungi in British Columbia
2. Decay and rot in wood
3. Structural problems in trees
4. Root damage
5. Saturated soil
6. Soil nutrients and pH
7. Recognize root damage due to construction, irrigation installation trenching or other activities



Line (GAC): D TREE WORK AND MANAGEMENT
Competency: D11 Perform appropriate actions to solve abiotic tree disorders

Climbing Arborists occasionally assess options and apply appropriate actions to solve abiotic disorders of trees in a safe and effective manner.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	3

Objectives

To be competent in this area, the individual must be able to:

- Apply basic actions such as pruning, wound tracing and treatments to mitigate abiotic tree disorders, according to Industry standards.

LEARNING TASKS

1. Trace bark wounds
2. Prune to remove damaged parts of the tree

CONTENT

- Wound tracing
- Basic tree anatomy and morphology
- Pruning techniques for removal of dead or damaged parts (ABIOTIC)

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on performing appropriate actions to solve abiotic tree disorders, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify proper pruning methods to remove damaged wood
2. Identify proper method of tracing wounds



Line (GAC): D TREE WORK AND MANAGEMENT
Competency: D12 Safely prune trees to appropriate industry standards

A Climbing Arborist regularly prunes a wide variety of trees using appropriate techniques and tools.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Prune a wide variety of trees using appropriate techniques and tools, according to Industry standards.

LEARNING TASKS

1. Safely and effectively utilize appropriate tools
2. Use proper pruning cuts and principles
3. Assess tree and site for hazards
4. Use approved pruning practices for specific outcomes

CONTENT

- BC Landscape Standard and ANSI
- Basic tree anatomy
- Various tree pruning cuts
- Tree pruning principles
- Hazard assessment in and around trees including insects, electrical, objects, terrain
- Reduce the size of the crown
 - Crown reduction
- Crown thin trees
 - Crown thinning
- Crown raise trees
 - Crown raising
- Shorten limbs
 - Headback or shorten limbs to a lateral
- Structural prune trees
 - Structural pruning
- Restoration pruning
- Rejuvenation pruning
- Hedge trimming
 - Hedge trimming techniques
- Fruit production pruning
 - Fruit production pruning techniques
- Pollarding
 - Pollarding techniques

**Achievement Criteria:*****Theoretical evaluation***

Given a series of multiple-choice questions on safely pruning trees to appropriate standards, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Basic tree anatomy
2. Tree hazards
3. Identification of various pruning techniques and when they are appropriate to use

Performance evaluation

Performance The apprentice should be able to:

1. Assess a tree for hazards
2. Safely and correctly perform cleaning, thinning, raising, reducing, and reduction to the canopy

Conditions An on-site situation.



Line (GAC): **D TREE WORK AND MANAGEMENT**
Competency: **D13 Select trees for site conditions**

A Climbing Arborist will occasionally have to make decisions on the selection of appropriate trees for planting on a variety of sites.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
2	2

Objectives

To be competent in this area, the individual must be able to:

- Select appropriate trees for site conditions and assess the trees prior to installation to ensure they are healthy, according to Industry standards.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Identify and select appropriate trees for the site
 2. Inspect plants prior to installation to ensure they are healthy and meet standards | <ul style="list-style-type: none"> • BC Landscape Standard • Common trees of BC and their cultural growth requirements
 • Plant inspection techniques • BC Landscape Standard • Common problems with trees when arriving on a job site |
|--|--|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting trees to site conditions, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Correctly identify tree defects
2. Given a set of landscape plans, identify tree specifications
3. Given two to three site condition scenarios identify the appropriate trees for site

Performance evaluation

Performance The apprentice should be able to:

1. Select appropriate trees for the site
2. Select trees that are healthy and free of defects
3. Prepare site
4. Install trees
5. Support trees

Conditions An on-site situation.



Line (GAC): D TREE WORK AND MANAGEMENT
Competency: D14 Structurally support trees

A Climbing Arborist selects and installs structural supports in trees to reduce tree failure, reduce tree hazards, improve structure and for tree restoration purposes.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	3

Objectives

To be competent in this area, the individual must be able to:

- Select and install structural supports in trees to reduce tree failure, reduce tree hazards, and improve structure for tree restoration purposes, according to Industry standards.

LEARNING TASKS

CONTENT

1. Ascend tree to cabling or bracing point	<ul style="list-style-type: none"> • Safe tree climbing • Safe aerial lift operation
2. Determine appropriate location in canopy for support	<ul style="list-style-type: none"> • Tree structure
3. Decide what type of support system to use	<ul style="list-style-type: none"> • Tree species and the appropriate use of structural support for given species • Static and dynamic support systems and the limitations of each • The climate impact on supports (ice, snow, wind, heavy rain)
4. Determine appropriate tools and materials	<ul style="list-style-type: none"> • Support materials • Tools used for installation of cabling and bracing
5. Install static support system	<ul style="list-style-type: none"> • Static support systems
6. Install dynamic support system	<ul style="list-style-type: none"> • Dynamic support systems
7. Inspect existing structural support systems	<ul style="list-style-type: none"> • Various structural support systems and their application
8. Inspect for structural issues e.g. wasps nests, cavities, hollows	<ul style="list-style-type: none"> • Various structural support systems and their application

**Achievement Criteria:*****Theoretical evaluation***

Given a series of multiple-choice questions on structurally supporting trees, improve structure for tree restoration purposes, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Given a variety of tree species and described scenarios, the apprentice will be able to identify correct support systems
2. Identify appropriate tools for support systems
3. Testing procedures for existing support systems

Performance evaluation

Performance The apprentice should be able to:

1. Select appropriate system
2. Compile appropriate equipment
3. Safely and effectively install support system

Conditions An on-site situation.



Line (GAC): F RIGGING
Competency: F5 Select and use appropriate rigging techniques

Climbing Arborists use rigging techniques to remove large trees or portions of trees in confined locations or when surrounded by obstacles with a low impact focus.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	4

Objectives

To be competent in this area, the individual must be able to:

- Use rigging techniques to remove large trees or portions of trees in confined locations or when surrounded by obstacles, with a low impact focus, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Design and use rigging systems in a safe manner 2. Use of tag (guide) line 3. Use butt-hitching appropriately 4. Implement natural-crotch rigging 5. Implement false crotch rigging 6. Use butt-tied, tip-tied and balanced rigging techniques in a safe and effective manner | <ul style="list-style-type: none"> • Shock loading • Limitations of basic rigging system • Tag lines • Butt-hitching • Crotch rigging • False crotch rigging • Application of rigging in practical situations |
|---|--|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting and using appropriate rigging techniques, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.



Evaluation content to include, but not limited to:

1. Describing shock loading
2. Explaining different rigging systems for a variety of situations
3. Dynamic load vectors, angles of incidence, force of mass and impact

Performance evaluation

Performance The apprentice should be able to:

1. Develop a rigging plan for a number of different situations
2. Perform a site assessment
3. Secure a safe work zone
4. Set-up a lift
5. Demonstrate butt-hitching
6. Demonstrate the use of a drift line
7. Demonstrate the use of a controlled speedline
8. Perform butt-tied, tip-tied and balanced rigging techniques
9. Demonstrate the use of a tagline for rigging
10. Demonstrate natural and false crotch rigging techniques
11. Lower the object using a specified rigging technique to the target point

Conditions An on-site rigging situation.

NOTE: The performance evaluations for F5 and F6 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): F RIGGING
Competency: F6 Perform cuts for various situations

A Climbing Arborist regularly uses a wide variety of cutting techniques and tools to safely remove tree parts.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Safely use various cutting techniques in aerial situations to remove tree parts, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Identify risk factors to be aware of 2. Climbing trees with power saws 3. Cut tree parts with a chain saw while aloft | <ul style="list-style-type: none"> • Dangers of cutting above your head • Swing potential • Kickback • Load shifting • Safe work positioning (i.e. not directly underneath the suspended load) • Safe ascent and descent • Rope safety • Safe use of chain saw use in aerial situations • Types of cuts: <ul style="list-style-type: none"> ○ Jump cut ○ Snap cut (Bypass cut) ○ Hinge cut ○ Bore cut • Safe use of a variety of hand cutting tools in aerial situations • Dynamic load vectors, angles of incidence, force, mass and impact • Application and limitations of cutting techniques |
|--|---|



Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on performing cuts for various tree parts, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Knowledge of dynamic load vectors, angles of incidence, force, mass and impact
2. Identifying situations that require drop cut
3. Identifying situations that require a snap cut
4. Identifying situations that require a hinge cut
5. Sequencing and explaining the different procedures to make each cut
6. Identifying the potential hazards of each cut
7. Explain the safe procedure for bore cutting
8. Selecting the appropriate face notch angle for specific tree conditions
9. Describing procedures and methods to secure the hinge
10. Developing a safety plan for limb removal

Performance evaluation

Performance	The apprentice should be able to:
	<ol style="list-style-type: none">1. Communicate a safety plan for limb removal2. Secure the work zone3. Communicate with hand and voice4. Climb a tree with chain saw5. Demonstrate safe chain saw use6. Safely execute a hinge cut7. Safely execute a drop cut8. Safely execute a jump cut9. Safely execute a snap cut10. Secure hinge with webbing
Conditions	An on-site aerial rigging situation.

NOTE: The performance evaluations for F5 and F6 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

**Achievement Criteria:*****Theoretical evaluation***

Given a series of multiple-choice questions on conducting a pre-climb assessment, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Explaining risk in climbing situations
2. Identify a variety of weather conditions and the risks that they generate
3. Identify site conditions that can generate risk
4. Develop a job plan that mitigates risk relative to ID hazards

Performance evaluation

Performance The apprentice should be able to:

1. Assess trees for potential risk
2. Assess the site for potential risk
3. Develop a job plan that mitigates risk relative to identified hazards

Conditions An on-site site situation.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): **G** **CLIMBING**
Competency: **G3** **Select and inspect climbing gear**

The Climbing Arborist regularly selects the appropriate equipment for climbing and always inspects it for safety prior to entering the tree.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Select the appropriate climbing equipment and inspect it for safety, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Select ropes
 2. Select saddle
 3. Select other equipment | <ul style="list-style-type: none"> • Ropes and their uses • Working load and stretch of various ropes • Inspection criteria when examining ropes • Maintenance
 • Types of climbing saddles, fasteners, hardware • Inspection criteria when examining gear • Maintenance
 • Functions of carabineers, micro-pulleys, ascenders/descenders • Functions of friction savers, throw lines, figure 8's • Inspection criteria when examining gear • Maintenance and storage |
|--|--|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting and inspecting climbing equipment, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify a variety of ropes
2. Identify a variety of knots
3. Identify points of attachment, saddles, fasteners, hardware
4. Describe the functions of carabineers, micro-pulleys, ascenders/descenders
5. Describe the functions of friction savers, throw lines, figure 8's
6. Identify defects in rope

**Performance evaluation**

- Performance The apprentice should be able to:
1. Select appropriate ropes for the job
 2. Select appropriate gear for the job
 3. Identify wear and defects in ropes and equipment
- Conditions An on-site site situation.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): **G** **CLIMBING**
Competency: **G4** **Climb using various techniques**

The Climbing Arborist regularly selects and uses the appropriate climbing techniques for the job.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Select and use the appropriate climbing techniques for the job.
- Demonstrate safe climbing techniques including body thrust and foot locking.

LEARNING TASKS

1. Climb trees using spurless and spur techniques

CONTENT

- Tie in points
- Line installation
- Climbing system advancement
- False crotches
- Advance work positioning lanyard
- Limb walking
- Work positioning redirects
- Controlled movement & descent
- Use spurless techniques
- Use spur technique
- Attach, sharpen and maintain spurs
- Appropriate knots

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on climbing using various techniques, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify a variety of tie points & appropriate knots
2. Identify rope advancement, friction hitch techniques
3. Identify crotching techniques
4. Describe the techniques of line installation, limb walking, work positioning
5. Describe the techniques of redirects, controlled movement and descent
6. Describe spur and spurless techniques
7. Describe spur use and maintenance
8. Identify defects in rope

**Performance evaluation**

- Performance The apprentice should be able to demonstrate:
1. Safe climbing of trees using spurless technique
 2. Safe climbing of trees using spur technique
 3. Tie points, rope advancement and friction hitches
 4. Ability to redirect, control movement and descend
 5. Ability to install lines, limb walk, and demonstrate safe work positioning
 6. Ability to attach, sharpen and maintain spurs
- Conditions An on-site situation, with a variety of trees.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): **G** **CLIMBING**
Competency: **G5** **Conduct advanced post-climb job and gear inspection**

After each climb, the Climbing Arborist inspects the job site for any post-climb safety issues such as on site debris; and inspects all equipment to ensure its safety for re-use.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	4

Objectives

To be competent in this area, the individual must be able to:

- Inspect the job site and equipment to ensure its safety for re-use, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Inspect job site after climb 2. Inspect equipment after climbing 3. Store climbing equipment in an appropriate manner | <ul style="list-style-type: none"> • Post-job hazards, such as hanger • Client concerns re: lawn divots, property damage, debris & clean-up • How to do a post-job walk around to identify hazards • Client communication • Acceptable wear levels • Wear points • Correct equipment storage conditions • Wear & tear on all equipment components |
|--|---|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting advanced post-climb job and equipment inspections, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identification of post-job hazards, such as hangers
2. Identify lawn divots, property damage
3. Describe debris & clean-up
4. Recognition of visual signs of gear wear

**Performance evaluation**

Performance The apprentice should be able to:

1. Identify types of post-job hazards, such as hangers
2. Identify potential client concerns re: lawn divots, property damage, debris & clean-up
3. Identify acceptable equipment wear levels
4. Demonstrate correct gear storage
5. Demonstrate the ability to communicate effectively with the client

Conditions A post-climb situation.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): H **EMERGENCY RESPONSE**
Competency: H6 **Perform aerial rescue**

A Climbing Arborist will occasionally have to perform an emergency aerial evacuation procedure for themselves or others in a safe and effective manner. Although this is an occasional activity, the Climbing Arborist's or another's life may depend on their ability to properly respond.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	2

Objectives

To be competent in this area, the individual must be able to:

- Perform an aerial position emergency rescue in a safe and effective manner, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Describe steps to check and perform to ensure no danger to the rescuer before performing an attempt at rescue 2. Rescue from a spar tree demonstrating the rescue 3. Practice with an unconscious victim and an injured victim who is conscious but cannot climb or rappel down 4. Practice emergency response plan 5. Discuss rescue using false crotches | <ul style="list-style-type: none"> • Site and tree hazards • SRT rescue and double rope system, bowlines, rescue climbing kit • Ascending on own rope • Ascending on injured climber's rope • Assess injured person's condition • Determine appropriate action • Conditions and procedures for emergency assistance • Single-stem rescue (spar pole) |
|---|--|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on performing an aerial rescue, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify operating and safety components of lift-truck
2. Awareness of hazards and approaches to minimizing risk
3. Knowledge of WorkSafeBC regulations and workplace requirements
4. Knowledge of required safety equipment for worksites
5. Knowledge of how a person may require rescue while rappelling and not be easily reached



Performance evaluation

Performance	The apprentice should be able to: <ol style="list-style-type: none">1. Wear appropriate PPE2. Execute the ERP3. Safely secure the work zone4. Assess the situation for hazards5. Decide if to call for emergency assistance6. Ascend to rescue7. Assess the injured person8. Safely bring the climber down9. Administer patient care until EMS takes over
Conditions	An aerial situation.



Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**
Competency: I1 **Conduct site inspections**

The Climbing Arborist will often carry out a site inspection as part of the job site risk assessment. They must understand factors and associated risks influencing the safe execution of the job and then use this understanding to develop safe procedures while working on the site.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Identify and understand all factors and associated risks influencing the safe execution of the job, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Identify tree and site risks 2. Identify appropriate methods & techniques for abatement 3. Identify equipment needed 4. Identify workers needed 5. Identify applicable regulation | <ul style="list-style-type: none"> • Assessment procedures for tree risks • Assessment procedures for site risks • Knowledge of tree care methods and techniques • Equipment capabilities and applications • Appropriate equipment for specific jobs • Assessment of staff competencies • Verify job qualifications • Applicable regulations and labour standards |
|--|---|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting site inspections, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Appropriate equipment
2. Staff competencies
3. Risk mitigation
4. Types of risks

Performance evaluation

Performance The apprentice should be able to demonstrate the ability to identify a wide variety of risks and describe how to mitigate the risk.

Conditions An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**
Competency: I2 **Develop and communicate safe job plan**

Climbing Arborists regularly develop safety plans for their job sites and instruct others on how these plans must be implemented.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Develop a safe job plan and communicate it to workers and sub-contractors, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Select techniques to address risk 2. Develop procedures to plan and implement and evaluate a job plan 3. Schedule appropriate equipment 4. Document the plan 5. Communicate job plan to the crew | <ul style="list-style-type: none"> • Risk mitigation options • Risk analysis • Appropriate methods and techniques for risk • Mitigation for specific site conditions • Risk exposure • Climbing Arborists' equipment • Scheduling procedures • Risk plan development and documentation • Methods of conducting site meetings • Perform risk analysis • Verbal and written communication techniques |
|---|---|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on developing and communicating safe job plans, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Risk assessment
2. Risk mitigation
3. Scheduling
4. Site meetings
5. Risk plan development



Performance evaluation

Performance The apprentice should be able to develop and document an appropriate risk management plan for the site and communicate it to all affected parties.

Conditions An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**
Competency: I3 **Conduct pre-job preparation**

On a regular basis, Climbing Arborists carry out pre-job inspections to ensure that all equipment is safe to use, foreseeable regulations are met and that all required tools and equipment are transported to the job site.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
3	5

Objectives

To be competent in this area, the individual must be able to:

- Select the appropriate resources to undertake a tree care assignment, based on the job estimate and according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Conduct pre-trip inspection 2. Inspect tools 3. Identify resources required 4. Acquire needed resources | <ul style="list-style-type: none"> • Pre-trip inspection procedures and decals check • Boom inspection procedure • WorkSafeBC regulations and company safety procedures • Logbooks and vehicle inspection checklists • Equipment manufacturer (OEM) manual review • Tool inspection procedures • Tools and attachments for specific jobs • Typical resources needed for climbing jobs |
|---|---|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting pre-job preparation, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Pre-trip inspection procedures
2. Boom inspection
3. Maintenance Log Book(s)
4. Tools and equipment



Performance evaluation

Performance The apprentice should be able to carry out a pre-job inspection.
Conditions An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**
Competency: I4 **Ensure regulatory compliance**

It is often the Climbing Arborists' job to ensure that there is on site compliance to all appropriate regulations.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

To be competent in this area, the individual must be able to:

- Ensure that activities at the job site comply with all standards and regulations, according to the authorities having jurisdiction.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Plan for compliance 2. Inspect for compliance 3. Conduct post-job review and follow-up 4. Prepare reports as needed | <ul style="list-style-type: none"> • Application of safety compliance to job activities • Application of environmental compliance to job activities • Application of permitting and licensing compliance to job activities • Liability issues/responsibilities • Record keeping requirements • WorkSafeBC accident and near miss reporting procedures • Accident investigation plans • Preparedness and risk mitigation procedures • Emergency response, clean up and emergency procedures • Assessment procedures for job practices to ensure compliance with procedure • Document practices • Write reports • Ability to communicate effectively |
|---|---|

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on ensuring regulatory compliance, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.



Evaluation content to include, but not limited to:

1. Environmental compliance
2. Safety compliance
3. Emergency response procedures
4. Accident investigation
5. Liability issues

Performance evaluation

Performance The apprentice should be able to:

1. Plan for compliance
2. Inspect for compliance
3. Conduct post-job review and follow-up
4. Prepare reports as needed

Conditions An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.



Section 4

TRAINING PROVIDER STANDARDS



Facility Requirements

Climbing Arborist Apprenticeship Training Facilities must have a comfortable classroom space and a training area for practical assignments capable of facilitating 2 instructors with 20 students per class, in addition to:

- Internet access
- Library resources
- Laboratory facilities for teaching basic tree biology
- Storage facility for tools and equipment
- Workshop area for tool maintenance
- Large secure site for training, operations, demonstrations, and practice including a parking lot for vehicles

REQUIREMENT/GUIDELINES FOR SPECIFIC GENERAL AREA OF COMPETENCIES:

B – Power Equipment

- Large secured site with variable terrain and mature trees conducive to lift truck practice

D – Tree Work and Management

- Access to large range of trees common to the area
- Sites with multiple plant choices of genera, age and condition of trees and shrubs for assessment
- Site locations requiring various tree selections
- Site location suitable for ‘mock’ or real practice supporting trees; newly planted and mature trees in need of support

F – Rigging

- Large secured site with variable terrain and trees conducive to multiple removals, rigging and cutting practice

G - Climbing

- Large secured site with variable terrain and mature trees conducive to climbing practice

H – Emergency Response

- Variety of trees appropriate to demonstrate aerial rescue



Tools and Equipment

Apprentices must provide their own Personal Protective Equipment and climbing equipment.

PPE to include:

- ANSI approved hard hat or helmet with 4 point chin strap and visor
- Hearing protection (muffs or plugs)
- CSA approved safety glasses
- WorkSafeBC approved (3600 fpm) chainsaw pants or chaps
- CSA approved boots with ankle support
- Leather gloves for rigging
- Rubber gloves for climbing
- Class 2 hi-viz apparel

Climbing equipment to include:

- 12' 8 to 10mm, Prusik cord
- Single eye split tail
- Eye to eye split tail (optional)
- Saddles (ANSI approved Arborist Saddle)
- Approved lanyard and adjuster
- Tree climbing spurs
- Personal first aid kit with pressure bandage
- 2 – Double auto-locking carabiners 23 kN
- Climbing rope 150' x ½" 6000 lbs tensile
- Micro pulley with utility carabiner
- Figure 8 descender

The material and equipment list for the Training Provider is based on a class of 20 apprentices with 2 Instructors. Where applicable, power equipment may be rented for instructional purposes.

Power Equipment

- 1 – Over-center truck mounted aerial lift
- 2 – Non-air brakes single axle dump trucks

Hand and Small Power Tools

- 4 – Climbing chain saws
- 4 – Saw lanyards
- 4 – Mid size bucking chain saws
- 8 – Chain saw tool kits
- 10 – Wedges
- 10 – Hand saws
- 2 – Sounding mallet
- 2 – Shovel
- 1 – Mini mattock
- 2 – Pocket knife
- 2 – Increment bore
- 2 – Hammer
- 2 – Wood chisel
- 2 – Pole saw / pruner
- 4 – Bypass pruner
- 1 – Dolly
- 1 – Drill and drill bits
- 2 – Adjustable wrenches
- 1 – Hacksaw with extra blades
- 2 – Wire cutters
- 2 – Locking pliers
- 1 – Bolt cutters
- 2 – Gaff gauge

Rigging and Climbing Gear

- 2 – Fall arrest harnesses and lanyard
- 6 – 10' loopies (1/2" or 5/8")
- 2 – 12' whoopies (1/2" or 5/8")
- 4 – Spider legs
- 4 – Eye-and-eye split tails
- 4 – One eye slings (2 x 18', 2 x 12')
- 2 – 10 ton Arborist rigging blocks
- 4 – Pulleys
- 4 – CMI pulley
- 2 – Micro pulleys
- 12 – Steel double auto locking carabiners
- 1 – Mechanical advantage kit
- 2 – Port-a-wraps (large steel)
- 1 – Hobbs or GRCS rigging device
- 2 – 36" steel ring friction saver
- 2 – Adjustable friction saver
- 1 – Static Bracing System and associated hardware
- 1 – Dynamic Bracing Systems and associated hardware
- 1 – Petzl Rad system



Materials

Barrier/caution tape
 16 – Traffic cones
 3 – Gasoline cans
 8 – 150 ft lengths 1/2 inch rigging lines
 4 – 150 ft lengths 5/8 inch rigging lines
 Samples of various rope construction types, materials and condition
 2 – Climbing lines 150 feet
 4 – Throw lines 200 feet
 4 – Throw bags 8 oz to 14 oz
 1 – Pair binoculars
 8 – Hand lens (10x min)
 2 – Microscopes and applicable slides
 Plant models (samples of twigs, leaves, driftwood)
 Soil
 2 – Spill kits
 1 – Rescue dummy
 Printed copies of all applicable regulations for student reference in the classroom
 Trees and/or sections as required
 Mixed gas and bar oil as required
 Dichotomous keys for student reference
 Camera
 Litmus paper
 Stakes as required
 Tree staking straps as required
 2 – Tree guying anchors
 2 – Tree stands
 Checklist / job plan
 Log Books
 Boom inspection sheets
 Manufacturer's manuals
 Vehicle inspection sheets
 Case studies / scenario
 Job site checklists



Reference Materials

Required Resources for Apprentices:

- *Arborist Technician Apprenticeship Training Program – Apprentice Manual*
- *Climbing Arborist Apprenticeship Training Program – Apprentice Manual*
- *American National Standard for Arboricultural Operations – Pruning Standard, ANSI A-300 – 2001*
- *American National Standard for Arboricultural Operations – Safety Requirements, ANSI Z133.1-2006*
- *Arborist Equipment: A Guide to the Tools and Equipment of Tree Maintenance and Removal.* Blair, Donald F. 2nd Ed. ISA Publication
- *BC Landscape Standard, 7th Ed, BCLNA, 2008*
- *InfoFlips – BC Faller Training Standard, WorkSafeBC*
- *Safe Work Practices for Utility Arborists (Tree care work near power lines), WorkSafeBC (2005)*
- *The Art and Science of Practical Rigging, ISA Publication, 2001*
- *Tree Climbers Companion.* Jepson, J. 2nd Ed. Beaver Tree Publications
- *Trees in Canada, John Farrar, Fitzhenry & Whiteside Publishing, 1995*

Required Resources for Instructors:

- *Arborist Technician Apprenticeship Training Program – Apprentice Manual*
- *Climbing Arborist Apprenticeship Training Program – Apprentice Manual*
- *BC Faller Training Standard, WorkSafeBC*

Recommended Resources:

- *A New Tree Biology Dictionary, Alex L. Shigo, Shigo and Trees, Associates, 1986*
- *An Illustrated Guide to Pruning, 2nd edition, Edward F. Gilman, Delmar, 2002*
- *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 4th edition, Harris, Clark and Matheny, Prentice Hall, 2004*
- *Arborists' Certification Study Guide, ISA Publication*
- *Arborists' Knots for Climbing and Rigging, ISA Publication, 2006*
- *Basic Training for Tree Climbers, ISA Publication*
- *Chain Saw Safety and Field Maintenance, Kevin K. Eckert, ISA*
- *Common Tree Diseases of British Columbia, Eric Allen, Duncan Morrison and Gordon Wallis, Natural Resources Canada, Canadian Forest Service, 1996*
- *Evaluating Tree Defects, Field Guide, Ed Hayes, 2nd edition*
- *Hardy Trees and Shrubs: An Illustrated Encyclopedia, Dirr, Michael, Timber Press, 2009*
- *Manual of Woody Landscape Plants, 9th edition, Michael A. Dirr, Stipes Publishing Co., 2009*
- *Native Trees of BC. Halter, Reese & NJ Turner, Crown Publication, 2003*
- *Taylor's Guide to Trees, Houghton Mifflin, 1988*
- *The Tree Climbers Knots, Lingens, D.*
- *Tree Climbers' Guide. Lilly, S. 3rd Ed. ISA Publication*
- *Western Trees, George A. Petrides / Olivia Petrides, Houghton Mifflin, 1992*

Additional Audio/Visual Resources:

- *Aerial Rescues, National Arborist Association*
- *Bucket Truck Rescue, BC.Hydro*
- *The Path of Least Resistance, WorkSafeBC*

**Website Resources:**

- A Tree Story
http://www.youtube.com/watch?v=5-GUggGMmM&feature=player_embedded#!
- Arboriculture Canada Training
<http://www.arborcanada.com/>
- Arbor Rigging Operations
<http://arbormaster.com/uploads//pdfs/Arborist%20Rigging%20Operations.pdf>
- BC Forest Safety Council
http://www.bcforestsafec.org/training/faller_certification/resources.html
- BC Faller Training Standard, *InfoFlips*
Part one
http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/bc_faller_training_standard_1.pdf
Part Two
http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/bc_faller_training_standard_2.pdf
- BC Hydro
<http://www.bchydro.com/safety/>
- BC Ministry of Environment (MOE)
http://www.env.gov.bc.ca/lowermainland/ecosystems/restrictive_covenants/management_hazard_trees.htm
- BC One Call
<http://www.bconecall.bc.ca>
- BC Provincial Emergency Program
<http://www.pep.bc.ca/index.html>
- BC Ministry of Environment
<http://www.gov.bc.ca/env/>
- British Columbia Motor Vehicle Act and Other Statutes and Regulations
http://www.icbc.com/about%20ICBC/company_info/corporate_governance/statutes-regulations
- British Columbia Outdoor Wilderness Guide –The Trees of British Columbia
<http://bcadventure.com/adventure/wilderness/forest/>
- British Columbia Workers Compensation Act
http://www.bclaws.ca/Recon/document/freeside/--%20w%20--/workers%20compensation%20act%20rsbc%201996%20c.%20492/00_act/96492_00.htm
- CSA Standards
<http://www.csa.ca/cm/ca/en/standards>
- Canadian Environmental Protection Act
<http://www.ec.gc.ca/alef-ewe/default.asp?lang=En&n=2140D763-1>
- Canadian Food Inspection Agency
<http://www.inspection.gc.ca/english/plaveg/pestrava/phyram/sodmsce.shtml>
- Commercial Vehicle Safety and Enforcement (CVSE)
<http://www.th.gov.bc.ca/cvse/>
- E-Flora – Electronic Atlas of Plants of British Columbia
<http://www.geog.ubc.ca/biodiversity/eflora/E-FloraTreesofBritishColumbia.html>
- Environment Canada, Acts, Regulations and Agreements
<http://www.ec.gc.ca/default.asp?lang=En&n=48d356c1-1>



- Environment Canada, Acts
<http://www.ec.gc.ca/default.asp?lang=En&n=E826924C-1>
- Fisheries Act
<http://laws.justice.gc.ca/en/F-14/index.html>
- Insurance Corporation of BC
<http://www.icbc.com>
- Links to the British Columbia Motor Vehicle Act and other statutes and regulations
http://www.icbc.com/about%20ICBC/company_info/corporate_governance/statutes-regulations
- Ministry of Forest and Range – Tree Book: Learning the Trees of British Columbia
<http://www.for.gov.bc.ca/hfd/library/documents/treebook/>
- Ministry of Transportation and Infrastructure, *Traffic Control Manual for Work on Roadways*
http://www.th.gov.bc.ca/publications/eng_publications/TCM/Traffic_Control_Manual.htm
- OHS Standards
<http://www2.worksafebc.com/Publications/OHSRegulation/Home.asp>
- Product Instruction Guide – Miller by Sperian
<http://www.millerfallprotection.com/pdfs/ProdInspecGuide.pdf>
- Provincial Regulations
<http://www.bclaws.ca/>
- Rigging Knots
<http://www.arbormaster.org/uploads//pdfs/Rigging%20Knots.pdf>
- Spill Reporting Amendments
<http://www.env.gov.bc.ca/epd/codes/spill-reporting/index.htm>
- TDG
<http://www.tc.gc.ca/eng/tdg/clear-schedule2-81.htm>
- Traffic Control Manual for Work on Roadways
http://www.th.gov.bc.ca/publications/eng_publications/TCM/Traffic_Control_Manual.htm
- Tree Care Industry Association (TCIA)
<http://www.treecareindustry.org/index.aspx>
- Tree Rigging Concepts
<http://www.treemettlenexus.com/pdfs/article4.pdf>
- Wildlife Act
<http://laws.justice.gc.ca/en/W-9/>
- WorkSafeBC
<http://www.worksafebc.com>
- WorkSafeBC First Aid Certification
<http://www2.worksafebc.com/topics/firstaid/home.asp>
- WorkSafeBC OHS Guidelines
<http://www2.worksafebc.com/publications/OHSRegulation/Home.asp>
- WorkSafeBC Guidelines Part 19 Electrical Safety
<http://www2.worksafebc.com/publications/OHSRegulation/Part19.asp>
<http://www2.worksafebc.com/Publications/OHSRegulation/Part19.asp?ReportID=18571>



- WorkSafeBC Guidelines Part 26, Forestry Operations and Similar Activities (including arboriculture)
<http://www2.worksafebc.com/Publications/OHSRegulation/GuidelinePart26.asp>
- WorkSafeBC, *Safe Work Practices for Certified Utility Arborists*
http://worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/cert_utilityarborist.pdf
- WorkSafeBC, *Working Safely Around Electricity*
http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/electricity.pdf

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.



Instructor Requirements

Occupation Qualification

The instructor must possess:

- Climbing Arborist – Certificate of Qualification

Work Experience

A minimum of 5 years trade experience in at least 75% of the General Areas of Competency.

Instructional Experience and Education

It is preferred that the instructor also possesses one of the following:

- Provincial Instructor's Diploma Program Certificate or be registered in the Program
- Bachelors or Masters degree in Education

Instructor(s) for Specific General Areas of Competency

A – Regulations and Other Occupational Skills

- Diploma in business or equivalent
- A minimum of 5 years practical supervisory experience

B – Power Equipment

- A minimum of 5 years trade experience – operation of power equipment including stump grinder
- A minimum of 5 years lift truck operations, with proven safe work record
- Class one drivers' license

D – Tree Work and Management

- A minimum of 5 years experience
- ISA Certified Tree Risk Assessor

F – Rigging

- A minimum of 5 years trade experience

G – Climbing

- A minimum of 5 years experience
- ISA Certified Tree Worker/Climber Specialist preferred

I – Job Planning and Risk Assessment

- A minimum of 5 years practical climbing experience
- ISA Certified Tree Worker/Climber Specialist
- Broad knowledge of safety issues

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.



Appendices



Appendix A

Glossary



ARBORICULTURE TRADE GLOSSARY

3-strand rope – type of rope construction in which three strands are twisted together

7-strand rope, common-grade cable – type of cable, often used to cable trees

12-strand rope – braided rope construction used for climbing and rigging lines; the 12-strand construction is not easily spliceable

16-strand rope – braided rope construction with a cover and a core

abiotic disorders – plant problems caused by non-living agents

abscissic acid – plant growth substance that triggers leaf or fruit drop

abscission – leaf or fruit drop

abscission zone – area at the base of the petiole where cellular breakdown leads to leaf drop

absorbing roots – fine, fibrous roots that take up water and minerals; most of them are within the top 12 inches (30 centimeters) of soil

absorption – taking up

access line – a second climbing line hung in a tree as a means of reaching a victim in an emergency

access route – means of entering and leaving a property during a construction operation

acclimation – process by which plants and other living organisms adapt physiologically to a climate or environment different than their own

acuminate – leaf shape having an apex the sides of which are gradually concave and taper to a point

acute – disorder or disease that occurs suddenly or over a short period of time

adaptability – genetic ability of plants and other living organisms to adjust or accommodate to different environments

addressed – in close, tight proximity

adventitious bud – bud that arises from a place other than a leaf axil

aeration – provisions of air to the soil to alleviate compaction and improve its structure

aeration system – the set of holes or trenches created in a tree's root area to improve oxygen availability to the roots

aerial device – truck with booms and bucket used to place a worker in proximity of to a tree's crown

aerial rescue – method used to bring an injured worker down from a tree or aerial lift device

aesthetic – artistic or pleasing characteristics

aggregate – close cluster or mix

air excavator – device that blows air at high force; used to remove soil from the root of trees

allelochemicals – naturally produced substances in plants that serve as part of the plant's defense

against pests and that may have effects on the growth and development of other plants

allelopathy – chemical effect or inhibition of the growth or development of plants introduced by another plant

alternate – having leaves situated one at each node and alternating positions on the stem; this arrangement means the leaves are not across from each other

amon-eye nut – specialized nut used in cabling trees; has a large eye for attachment of the cable

anatomy – study of the structure and composition (of plants)

angiosperm – plants with seeds borne in an ovary; consisting of two big groups, monocotyledons and dycotyledons

anion – an ion that carries a negative charge

annual rings – see *growth rings*

ANSI A300 standards – industry-developed standards for the practice for tree care; acronym for American National Standards Institute

ANSI Z133.1 – safety standards for tree care operations

anthocyanins – red, purple, or blue pigments; responsible for those colours in some parts of trees and other plants

antigibberellin – plant growth regulator that inhibits the action to the plant hormone gibberellin

antitranspirant – substance sprayed on plants to reduce water loss through the foliage

apical – having to do with the tip

apical bud – terminal bud on a stem

apical dominance – condition in which the terminal bud inhibits the growth and development of lateral buds on the same stem

apical meristems – the growing points at the tips of shoots

appropriate response process (ARP) – method of systematically assessing plant health and client needs to determine which course of action, if any, is recommended

approved – acceptable to federal, state, provincial, or local enforcement authorities

arboriculture – the study of trees and other plants



arborist block – heavy-duty pulley with two attachment points and extended cheek plates; used in rigging operations

artificial respiration – forcing air into the lungs of a person who has stopped breathing

auxin – plant hormone or substance that promotes or regulates the growth and development of plants; it is produced at sites where cells are dividing, primarily in the shoot tips

available water – the water remaining in the soil after gravitational water has drained and before the wilting point has been reached

axial transport – movement of water, minerals, or photosynthate longitudinally within a tree

axillary bud – bud in the axil of a leaf; lateral bud

back cut – cut made on opposite side of a log toward the notch cut or face cut

backfill – soil (and amendments) put back into the hole when planting a tree

balance – in rigging, a technique used to lower a limb without allowing either end to drop

balled and burlapped (B & B) – having the root system and soil wrapped in burlap for moving and planting a tree or other plant

barber chair – dangerous condition created when a tree or branch splits vertically up from the back cut

bare root – tree or other plant taken from the nursery with exposed root system, without soil

bark – protective covering over branches and stem that arises from the cork cambium

bark tracing – cutting away torn or injured bark to leave a smooth edge

barrier – fences or other means used to establish a protection zone around trees on construction sites

belay – securing a climber's rope using wraps around a cleat, carabiner, or other device

bend – type of knot used to join two rope ends together

bend ratio – ratio of the diameter of a branch, sheave, or other device to the rope that is wrapped on it

bight – a curve or arc in the active part of a rope between the working end and the standing part

biodegradable – capable of decaying and being absorbed by the environment

biological control – method of controlling plant pests through the use of natural predators, parasites, or pathogens

biotic – pertaining to a living organism

biotic disorders – disorders caused by a living agent

bipinnate – double pinnate; see *pinnate*

blade – the expanded body of a leaf

Blake's hitch – a climber's friction knot sometimes used in place of the tautline hitch or Prusik knot

blight – any disease, regardless of the casual agent, that kills young, plant-growing tissues

block – a pulley used in rigging

body thrust – method of ascending a tree using a rope

bollard – a post on which wraps can be taken with a rope

boom – long, moveable arm of a bucket truck

botanicals – pesticides that are made from plants

bowline – looped knot used to attach items to a rope

bowline on a bight – knot that can be used as a makeshift saddle in an emergency situation

box cable system - tree cabling system that forms closed polygons; used to join together more than three branches

bracing – installation of metal rods through weak portions of a tree for added support

bracing rod – metal rod used to support weak sections or crotches of a tree

branch bark ridge – top area of a tree's crotch where the growth and development of the two adjoining limbs push the bark into a ridge

branch collar – area where a branch joins another branch or trunk created by the overlapping xylem tissues

branch protection zone – tissues inside the trunk or parent branch at the base of a subordinate branch that protect against the spread of decay

branch union – point where a branch originates from the trunk or another branch; crotch

breaking strength – The load rating at which a device will fail. Some manufacturer's of rope or hardware supply an Average Breaking Strength (ABS) for their products, which is the average load at which the rope or device fails. Others will provide a Maximum Breaking Strength (MBS). Keep in mind that factors such as shock loading will exert many times the weight of the load in force on the product.

Example: *Braid 1/2" Rope has an average breaking strength of 10,400 lb.*

broadcast fertilization – application of fertilizer over the soil surface

bud – small lateral or terminal protuberance on the stem of a plant that may develop into a flower or shoot; undeveloped flower or shoot



buffering capacity – ability of a soil to maintain its pH

bulk density – mass of soil per unit volume; often used as a measure of compaction

butt-hitching – method of lowering pieces when the rigging point is below the work

butt-tying – tying off a limb at the butt end of for rigging

buttress roots – roots at the base of the trunk; trunk flare

CPR – cardiopulmonary resuscitation

CSA – Canadian Standards Association

cable aid – device used to tighten lags and to aid in cable installation

cable clamp – a double-bolted, U-shaped clamp used to secure tree cables

cable grip – device used to attach extra-high-strength cable to lag hooks or eye bolts

cabling – installation of hardware in a tree to help support weak branches or crotches

cambium – layer(s) of meristematic cells that give rise to the phloem and xylem and allow for diameter increase in a tree

canker – localized diseased area, often shrunken and discoloured, on stems or branches

carabiner – oblong metal ring used in climbing and rigging that is opened and closed by means of a spring-loaded gate

carbohydrate – compound, combining carbon and water, produced by plants during photosynthesis

cardiopulmonary resuscitation – procedure used to force air into the lungs and to force blood circulation in a person who has suffered cardiac arrest

carotenoid – a yellow, orange, or red pigment responsible for those colours in some parts of trees and other plants

cation – a positively charged ion

cation exchange capacity (CEC) – ability of a soil to adsorb and hold cations

cavity – an open wound or hollow within a tree, usually associated with decay

cell – smallest unit of an organism that is capable of self-reproduction

cellulose – complex carbohydrate found in cellular walls of the majority of plants, algae, and certain fungi

central leader – the main stem of a tree, particularly an excurrent specimen

chaps – a form of leg protection; worn when operating chain saws

chlorophyll – green pigment of plants, found in chloroplasts; it captures the energy of the sun and is essential in photosynthesis

chloroplast – specialized organelle found in some cells; the site of photosynthesis

chlorosis – whitish or yellowish discolouration caused by lack of chlorophyll; often used in referring to a plant's foliage

chronic – disorder or disease occurring over a long period of time

class – taxonomic group below the division level but above the order level

climbing hitch – knot used as the primary friction knot (tie-in knot) in climbing

climbing line – a rope that meets specifications for use in tree climbing

climbing saddle – a harness designed for climbing trees

climbing spurs – sharp devices that can be strapped to a climber's lower legs to assist in climbing poles or trees being removed

clone – asexually produced organisms that are genetically identical

clove hitch – knot used to secure an object to a rope

CODIT – Compartmentalization Of Decay In Trees

codominant branches/codominant stems – forked branches of nearly the same size in diameter and lacking a normal branch union

come-along – portable cable winch used to draw two things closer together

command and response system – a system of vocal communication convention used in tree care operations

compaction – compression of soil resulting in the loss of macropores

companion cell – parenchyma cells associated with sieve tube members

compartmentalization – natural process of defense in trees by which they wall off decay in the wood; see *CODIT*

complete fertilizer – fertilizer that contains nitrogen, phosphorus, and potassium

complex – a combination of factors that contribute to the stress or decline of a tree

compound leaf – a leaf with two or more leaflets

compounding of forces at the suspension point – This term refers to the fact that if a load is suspended from a rope running over a suspension point (limb of a tree, pulley, etc.), then an equal amount of force must be applied to the other end of the rope to keep the load from moving. This means that the suspension point carries *double* the weight of the load on one end of the rope

conduction – carrying water or nutrients

conifer – a cone-bearing tree or other plant that has its seeds in a structure called a cone



conk – the fruiting body of a fungus, often associated with decay

contact insecticides – materials that cause injury or death to an insect after coming in contact with the pest

container grown – tree or other plant that has been grown in a container

containerized – plant available from the nursery with its root mass in a container

controlled-release fertilizer – slow-release or slowly soluble form of fertilizer

conventional notch – 45-degree notch with a horizontal bottom cut; used in felling trees

cordate – heart-shaped

cork cambium – meristematic tissue from which cork and bark develop to the outside

cracks – defects in trees that, if severe, may pose a risk of tree or branch failure

crenate – leaf margin with rounded teeth

cross section – section cut perpendicular to the axis of longitudinal growth

crown – the above ground portion of a tree

crown cleaning – removal of watersprouts and dead, dying, diseased, crossing, and hazardous branches from a tree

crown reduction – method of reducing the height or spread of a tree by performing appropriate pruning cuts

crown restoration – method of restoring the natural growth habit of a tree that has been topped or damaged in any other way

crown rot – disease or decay at the base of a tree or root flare

cultivar – a cultivated variety of a plant

cultural control – method of controlling plant pests by providing a growing environment favourable to the host plant and/or unfavourable to the pest

cuticle – waxy layer outside the epidermis of a leaf

cytokinin – plant hormone involved in cell division

D-rings – D-shaped metal rings on a climber's saddle used to attach ropes and snaps

dead-end grips – cable termination devices that must be used with extra-high-strength cable

dead-end hardware – cabling, bracing, or guying hardware that is terminated by screwing into the tree

deadwooding – removal of dead and dying limbs from a tree

decay – decomposition of woody tissues by fungi or bacteria

deciduous – tree or other plant that loses its leaves sometime during the year and leafless generally during the cold season

decurrent – rounded or spreading growth habit of the crown of a tree

deficiency – lack or insufficient quantity of a required element

defoliation – loss of leaves from a tree or other plant by biological or mechanical means

dehiscent – opening spontaneously at maturity to release seeds

dentate – having marginal teeth that are perpendicular to the leaf margin

desiccation – total drying out

design criteria – aspects of the site and required functions to be served by the plant that must be considered in plant selection

design factor – factor by which the tensile strength of a rope or piece of hardware is reduced to arrive at the working-load limit for a given application

dicot – see *dicotyledon*

dicotyledon – plant with two cotyledons in its embryo

dieback – condition in which the ends of the branches are dying

differentiation – process in the development of cells in which they become specialized for various functions

diffuse porous – pattern of wood development in which the vessels are distributed evenly throughout the annual ring

dioecious – plant with unisexual flowers with each sex confined to separate plants

direct cable system – simple tree cabling system to join two branches

direct contact – when any part of the body touches an electrical conductor

division – taxonomic division below kingdom level but above class level

dormant – state of reduced physiological activity in the organs of a plant

double braid – rope construction that consists of a braided rope within a braided rope

double crotch – climbing technique consisting of tying into two places in a tree

double serrate – toothed margin of a leaf with smaller teeth within

downy mildew – white fungal growth emerging from water-soaked tissue, usually on the underside of the leaf

drill-hole method – applying fertilizer by drilling holes in the soil occupied by the roots or surrounding them

drip irrigation – method of watering in which water evaporation and runoff are minimized

drip line – perimeter of the area under a tree delineated by the crown



drop-crotch pruning – method of reducing the height of a tree; see *reduction*

drop cut – branch-removal technique consisting of an undercut and a top cut farther out on the branch

drop zone – area where cut branches or wood sections will be dropped from a tree

drum lace – method of tying a balled-and-burlapped tree root ball for moving

dynamic loading – forces created by a moving load; load that changes with time

electrical conductor – body or medium that allows the passage of electricity; while working on trees, generally this will be any overhead or underground electrical device, including communication cables and power lines that have electricity or the potential to have it

emergency response – predetermined set of processes by which emergency situations are assessed and handled

entire – leaf margin without teeth

epicormic – arising from latent or adventitious buds

epidermis – outer tissue of leave, stems, roots, flowers, and seeds

epinasty – distortion of growth

espalier – specialized technique of pruning and training plants to grow within a plane

essential elements – the 17 minerals essential to the growth and development of trees

ethylene gas – naturally occurring plant growth substance that triggers fruit ripening

evapotranspiration (ET) – moisture lost by evaporation of the soil's water and transpiration of the plant

evergreen – tree or plant that keeps its needles or leaves year round; this means for more than one growing season

excurrent – tree growth habit with pyramidal crown and central leader

exfoliating – peeling off in shreds or layers

extra-high-strength cable – type of cable used in supporting trees; stronger but less flexible than standard wrapped cable

exudation – oozing out

eye bolt – a drop-forged, closed-eye bolt installed in trees attach cable

eye splice – technique used to attach common-grade cable to eye bolts or lags

eyesplice – termination in a rope forming an eye and made by splicing the rope back upon itself

face cut – a notch cut used in felling trees or limbs

fall protection – equipment and techniques designed to ensure a climber will not fall from a tree

false crotch – device installed in a tree to set ropes during climbing or rigging when there is not a suitable natural crotch available

family – the taxonomic division under the order level and above the genus level

fermentation – incomplete path of respiration in the absence of sufficient oxygen

fertilizer – substance added to a plant or the surrounding soil to supplement the supply of essential elements

fertilizer analysis – the percentage of nitrogen, phosphorus, and potassium in a fertilizer

fertilizer burn – injury to plants resulting from excess fertilizer salts in the surrounding soil

fiber – elongated, tapering, thick-walled cell that provides strength

field capacity – the point at which soil becomes saturated and cannot absorb any more water.

figure-8 descender – metal device used in rigging

figure-8 knot – safety knot or stopper tied in the climbing knot

first aid – emergency care or treatment of the injuries or illnesses of a person to stabilize his or her condition before medical help is available

foliage – the leaves of a plant

foliar analysis – laboratory analysis of the mineral content of foliage

foliar application – application of fertilizer or other substance by direct spray on the foliage

footlocking – method of climbing a rope by wrapping the rope around one's feet

friction device – device used to take wraps in a load line; provides friction for controlled lowering

friction hitch – any of several friction knots used in climbing trees or rigging

fronds – large, divided leaves, as in palms

fruiting bodies – the reproductive structures of fungi, the presence of which may indicate decay in a tree

fungicides – chemical compounds that are toxic to fungi

gall – swelling of plant tissues; frequently caused by insects, nematodes, fungi, or bacteria

genus – a group of species having similar fundamental traits; botanical classification under the family level and above the species level

geotropism – plant growth produced as a response to the force of gravity; it can be



positive as in the roots, or negative as in the trunk
gibberellin – a plant growth substance involved in cell elongation

girdling – inhibition of the flow of water and nutrients in a tree by choking vascular elements

girdling root – root that grows around a portion of the trunk of a tree, causing inhibition of the flow of water and nutrients by choking the vascular elements

glaucous – having a somewhat glaucous appearance or nature; becoming glaucous

glaucous – covered with a grayish, bluish, or whitish waxy coating or bloom that is easily rubbed off: glaucous leaves

gravitational water – water that drains from the soil's larger macropores under the force of gravity

ground rod – 10-foot (3-meter) metal rod used in grounding a lightning protection system

grounded – electrically connected to the earth

growth rate – speed at which something grows

growth rings – rings of annual xylem visible in a cross section of the trunk of some trees

guard cells – pair of cells that regulate the opening and closing of a stomate due to a change in water content

gummosis – exudation of sap or gum, often in response to disease or insect damage

guying – securing a tree, if needed, with ropes or cables fastened to anchors in the ground or another tree

gymnosperm – plant with seeds exposed

half hitch – simple wrap of a rope used to secure a line temporarily

hardened off – acclimated to the cold or to a new environment

hardiness – ability of a plant to survive low temperatures

hazard assessment – process by which the risk potential or a tree is determined

heading back – topping; cutting limbs back to buds, stubs, or lateral branches not large enough to assume apical dominance

heartwood – inner, nonfunctional xylem tissues that provide structural resistance to the trunk

hinge – a strip of wood fibers created between the notch and the back cut that help control direction in tree felling

hinge cut – sequence of cuts used to control the direction of a limb being removed

hitch – a knot made when a rope is secured around an object or its own standing part

hollowed braid – rope construction characterized by a braided rope with no core

honeydew – substance secreted by certain insects when feeding upon plants

horizon – layer of soil within the soil profile

horticultural oils – highly refined petroleum oils used to smother insects and disrupt their membranes

Humboldt notch – a felling notch that is horizontal on the top and angled on the bottom

IPM – see *Integrated Pest Management*

identification key – aid used to help identify plants

imbricate – where one tepal is outside all others, one is inside all others, and the others are outside on one margin and inside on the other

implant – device, capsule, or pellet that can be inserted into a tree to treat disorders

included bark – bark that becomes embedded in a crotch between branch and trunk or between codominant stems and causes a weak structure

increment borer – device used to take core samples from trees for the purpose of determining age or detecting problems

indirect contact – touching any conductive object that is in contact with an electrical conductor

infectious – capable of being spread from plant to plant

infiltration – downward entry of water into the soil

infiltration rate – speed at which water soaks into the soil

inorganic fertilizer – mineral fertilizer, not coming from plant or animal

insect growth regulators – substances, naturally occurring in insects, that affect growth and development

insecticidal soaps – mild salts of fatty acid that disrupt insect life process

insecticides – substances that are toxic to insects

Integrated Pest Management (IPM) – method of controlling plant pests combining biological, cultural, and chemical controls

internodal – between two nodes on a stem

internode – the region of the stem between two successive nodes

interveinal tissue – leaf tissue between the veins or vascular bundles

introduced species – plant species that are not native to a region

involucre – a series of bracts beneath or around a flower or flower cluster. The cupule, the cuplike structure holding an oak acorn, is a modified, woody involucre

ion – one atom or group of atoms with a positive or negative charge



job briefing – brief meeting of a tree crew at the start of every job to communicate the work plan, responsibilities and requirements, and any potential hazards

jump cut – branch-removal technique consisting of an undercut and a top cut closer in on the branch

kerf – slit or cut in a log made by a saw

kernmantle – rope manufactured to have a core and woven sheath

key – plant identification tool used to determine a plant species

kickback – sudden backward or upward thrust of a chain saw

kickback quadrant – upper quadrant of the tip of a chain saw bar

kingdom – the primary division in taxonomy, separating plants from animals

lag eye – lag-threaded cable anchor with a closed eye

lag hook/J-hook – J-shaped bolt used to attach cables to trees

lag-threaded rod – steel bracing rod used to screw into pre-drilled hole to provide added support to a tree

landing zone – predetermined area where parts will be brought down in a rigging operation

landscape function – the environmental, aesthetic, or architectural functions that a plant can have

lanyard – a short rope equipped with snaps or carabiners; work-positioning lanyards are used for temporarily securing a climber in one place

larva – immature life stage of an insect

lateral – secondary or subordinate branch

lateral bud – vegetative bud on the side of a stem

lateral root – side-branching root that grows horizontally

leach/leaching – tendency for elements to wash down through the soil

leader – the primary terminal shoot or trunk of a tree

leaf apex – tip of the leaf blade

leaf base – bottom part of the leaf blade

leaf blotch – irregularly shaped areas of disease on plant foliage

leaf margin – outer edge of the leaf blade

leaf scar – scar left on the twig after a leaf falls

leaf spot – patches of disease or other damage on plant foliage

leaflet – separate part of a compound leaf blade

leg protection – chaps or other protective clothing worn over the legs when operating a chain saw

lenticel – opening in the bark that permits the exchange of gases

liability – something for which one is responsible; legal responsibility

lignin – substance that impregnates certain cell walls

lion tailing – poor pruning practice in which limbs are thinned from the inside of the crown to a clump of terminal foliage

liquid injection – method of injecting liquid forms of fertilizer into the surrounding soil of a tree

load line – rope used to lower a tree branch or segment that has been cut

lobe – projecting segment of a leaf blade

lowering device – instrument attached to the base of a tree in rigging; used to take wraps with the load lines

machine-threaded rod – steel rod used in cabling and bracing; must be terminated with washers and nuts

macronutrient – any of the essential elements required by plants in relatively large quantities

macropore – larger spaces between soil particles that are usually air-filled

main conductor – primary conductor cable of a lightning protection system; standard down conductor

mature height – the maximum height that a plant can reach if the conditions of the planting site are favourable

meristem – undifferentiated tissue in which active cell division takes place

microinjection – method used to introduce chemicals directly into the xylem of trees

micronutrient – any of the essential elements required by plants in relatively small quantities

micropore – space between soil particles that is relatively small and likely to be water filled

micropulley – small pulley used by tree climbers

minimum irrigation – the practice of minimal irrigation through the use of drought-tolerant plants and watering only when necessary due to reduced rainfall

mismatch cut – cut type used in branch removal in which offset, overlapping cuts allow the section to be manually broken off; snap cut

mitigation – process of reducing damages or risk

monitoring – keeping a close watch; performing regular checks or inspections

monocot – see *monocotyledon*

monocotyledon – a plant whose embryo has one seed leaf (cotyledon)



monoecious – a plant with both sexes on the same plant

morphology – study of the form and structure of living organisms; in this case, of plants

mortality spiral – sequence of events causing the decline, and eventually death, of a tree

mycorrhizae – a symbiotic naturally attaches itself to fine feeder roots and grows its own roots, hyphae which mine the soil for minerals and water to bring into the feeder roots

native species – indigenous to a region

natural crotch – Natural Crotch is the term used for the crotches in trees where branches meet the trunk. These can be useful places to install a climbing or rigging line, though both the rope and tree will experience more abrasion and wear, in comparison to a False Crotch. Example: *5/8" rope is a good natural crotch rigging line because of its ability to stand up to increased abrasion.*

naturalize species – a non-native species that has become established in a region

necrosis – localized death of a tissue in a living organism

needle – slender conifer leaf

negligence – failure to exercise due care

nematode – microscopic roundworm; some feed on plant tissues and may cause disease

node – slightly enlarged portion of a stem where leaves and buds arise

nomenclature – scientific naming system for living organisms; scientific names are written in Latin, the genus first (starting with capital letter), followed by the species (always with lowercase letter)

notch – a wedge cut into a log or tree for felling

nutrient cycling – movement of mineral nutrients within an ecosystem as organic matter decomposes and is recycled in plants

oblique – lop-sided, one side larger than the other

obtuse – rounded, approaching semi-circular

Occupational Safety and Health Act (OSHA) – in the United States, the legislative act dealing with health and safety in the work place; administered by the Occupational Safety Administration; Occupational Health and Safety Administration (OHSA) in Canada

oedema (edema) – watery swelling in plant tissue

oils – highly refined petroleum oils used to smother insects and disrupt their membranes

open-face notch – wedge-shaped cut (commonly about 70 degrees) used in felling or removing tree sections

opposite – opposite leaf arrangement; leaves situated two at each node, across from each other on the stem

order – taxonomic division below class level but above family level

organic fertilizer – fertilizer derived from plants or animals

organic layer – layer of organic matter at the soil's surface

osmosis – diffusion of water through a semi-permeable membrane from a region of higher water potential to a region of lower water potential

outriggers – projecting structures on boom trucks

pH – a measure of acidity or alkalinity of a medium

palmate – radiating in a fanlike manner; type of compound leaf

parasite – organism living in or on another organism from which it derives nourishment

parenchyma cells – thin-walled, living cells essential in photosynthesis

parent material – soil bedrock material from which the soil's profile develops

pathogen – casual agent of disease

perched water table – accumulation of water in an upper soil layer

percolation – movement of water through the soil

permanent branches – branches that will be left in place, often forming the initial scaffold framework of a tree

permanent wilting point – point at which a plant cannot pull any more water from the soil

personal protective equipment (PPE) – personal safety gear such as hard hats, safety glasses, and hearing protection

pest resistance – in plants, the tendency to withstand, or not to get, certain pest problems

pesticides – chemicals used to kill unwanted organisms such as weeds, insects, or fungi

pest resurgence – increase in the population of a pest following a reduction in the population of natural predators or parasites of that pest

petiole – the stalk of a leaflet

phenols – naturally produced organic alcohols with acidic properties; one of several chemical defense compounds in trees

pheromone – chemical substance produced by insects that serves as a stimulus to other insects of the same species

ploem – plant vascular tissue that conducts photosynthates; situated to the inside of the bark



photoperiod – length of daylight required for certain developmental processes and growth of a plant

photosynthate – general term for the products of photosynthesis

photosynthesis – the process in green plants (and in some bacteria) by which light energy is used to form organic compounds from water and carbon dioxide

phototropism – influence of light on the direction of plant growth

phylum – primary taxonomic division within a kingdom; the plural is phyla

physiological disorder – in plants, a disorder not caused by an insect, pathogen, or injury

physiology – the study of the life function (of a plant)

phytotoxic – a term used to describe a compound that is poisonous to plants

pigment – substance that appears coloured due to the absorption of certain light wavelengths

pinnate – compound leaf with leaflets along each side of a common axis

pioneer tree – is of the pioneer species which colonize previously uncolonized land, usually leading to ecological succession. They are the first organisms to start the chain of events leading to a livable biosphere or ecosystem. Since uncolonized land may have thin, poor quality soils with few nutrients, pioneer species are often hearty plants with adaptations such as long roots, root nodes containing nitrogen-fixing bacteria, and leaves that employ transpiration. They will die and break down after some time, making new soil for secondary succession, and nutrients.

plant growth regulator – a compound, effective in small quantities, that affects the growth and development of plants

plant growth substance – a naturally produced compound, effective in small quantities, that affects the growth and development of plants; see *plant hormone*

Plant Health Care (PHC) – a holistic and comprehensive program to manage the health, structure, and appearance of plants in the landscape

plant hormone – substance produced by a plant that affects physiological processes such as growth; see *plant growth substance*

planting specifications – detailed plans and statements of particular procedures and standards for planting

pole pruner – long-handled tool used to make small pruning cuts that cannot be reached with hand tools

pole saw – long-handled tool with a pruning saw on the end

pollarding – a specialty pruning technique used on large-maturing trees that results in the development of callus at the cut ends of the branches

positive-locking – unable to be opened unintentionally; locks automatically and requires two or more motions before opening

powdery mildew – white or grayish fungal growth on the surface of stems or foliage

preformed tree grip – device used to attach extra-high-strength cable to lag hooks or eye bolts

prescription fertilization – philosophy of basing fertilization recommendations on plant needs

pruning – cutting away unwanted parts of a plant

Prusik hitch – type of multi-wrapped friction hitch used in climbing and rigging; used to attach the Prusik loop to the climbing line when footlocking

Prusik loop – loop of rope, smaller in diameter than the climbing line, used for the secured footlock method of ascending a rope

radial aeration – means of aerating the soil in the root zone of a tree by removing and replacing soil in a spokelike pattern

radial transport – movement of substances in a tree perpendicular to the longitude axis of the tree

radial trenching – method of improving aeration in the root zone of a tree; radial aeration

raising – removing lower limbs from a tree to provide clearance

ray – tissues that extend radially across the xylem and phloem of a tree

reaction wood – wood formed in leaning or crooked stems, or on lower or upper sides of branches

reaction zone – a natural boundary formed by a tree to separate wood infected by disease organisms from healthy wood; important in the process of compartmentalization

reactive forces – the forces generated in operating a chain saw

redirect rigging – changing the path of a rigging line to modify the forces or the direction of limb removal

reduction – pruning to decrease the height and/or spread of a branch or crown

rescue kit – climbing gear and emergency equipment that should be set out on every



job site so that it is available in an emergency situation

rescue pulley – light-duty pulley used in rigging operations

resistance – in plants, the tendency to withstand, or not to get, certain diseases

resistance varieties – plants that are tolerant of, or not susceptible to, certain disease or pest problems

resource allocation – distribution and use of photosynthate for various plant functions and processes

respiration – process by which carbohydrates are converted into energy by using oxygen

restoration – pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged

rhizosphere – immediate environment of roots where biological activity is high

rigging – method of using ropes and hardware to remove large limbs or take down trees

rigging line – rope used in rigging operations; usually the load-bearing line

rigging point – the place in a tree (natural or false crotch) that the load line passes through to control limb removal in rigging operations

ring porous – pattern of wood development in which the large-diameter vessels are concentrated in the earlywood

risk assessment – process of determining the level of risk posed by a tree or group of trees on a property

risk management – process of assessing and controlling risk in tree management

root ball – containment of roots and soil of a tree or other plant

root crown – the upper-most portion of the root system where the major roots join together at the base of the stem or the trunk

root hair – modified epidermal cells of a root that aid in the absorption of water and minerals

root pruning – in transplanting, the process of pre-digging a root ball to increase the density of root development within the final ball

rope sling – a section of rope, usually with at least one eyesplice, used to secure equipment or tree sections in rigging operations

running bowline – knot often used to tie off limbs for removal

rust – disease caused by a certain group of fungi and characterized by reddish brown spots

sanitation – practice of removing dead or diseased plant parts to reduce the spread of disease

sapwood – outer wood that actively transports water and minerals

scabbard – sheath for a pruning saw

scaffold branches – the permanent or structural branches of a tree

scale – one of a group of insects that attach themselves to plant parts and suck the sap

scorch – browning and shrivelling of foliage, especially at the leaf margin

screw link – connecting device with a threaded closure mechanism; used in rigging operations

secondary nutrients – nutrients required in moderate amounts by plants

secondary pest outbreak – increase in secondary pest population following a reduction in the population of natural predators or parasites

secured footlock – method of ascending a rope in which the climber is secured against a fall

serrate – sawtooth margin of a leaf with the teeth pointed forward

shackle – a U-shaped fitting with a pin run through it; clevis

shakes – separation of the growth rings in wood

shall – the word that designates a mandatory requirement in the ANSI standards

sheave – the inner fitting within a block over which the rope runs

ship auger – type of drill bit used to drill holes in trees for cable installation

shock-loading – the dynamic load placed on a rope or rigging apparatus when a moving log is stopped

should – the word that designates an advisory recommendation in the ANSO standards

sieve cells – long, slender phloem cells in gymnosperms

sieve tube elements – specialized phloem cells involved in photosynthate transport

sign – the physical evidence of a casual agent

simple leaf – a single, one-part leaf; not composed of leaflets

sink – a plant part that uses more energy than it produces

sinker roots – downward-growing roots that take up water and minerals; most are in the top 12 inches (30 centimeters) of soil

sinus – space between two lobes of a leaf

site analysis – determination of the conditions, environment, and needs of a planting site



site considerations – the factors that must be taken into account when assessing a planting site to select plant species

skeletonized – leaves that have had the tissue removed from between veins by insects

sling – device used in rigging to secure equipment or pieces being rigged

slowly soluble fertilizer – a fertilizer that has some particles coated to delay the dissolving of the minerals

snap – connecting device used by tree climbers primarily for connecting the climbing line to the saddle

snap cut – cut type used in branch removal in which offset, overlapping cuts allow the section to be manually broken off; mismatch cut

soil amendment – material added to soil to improve its physical or chemical properties

soil analysis – analysis of soil to determine pH, mineral composition, structure, and other characteristics

soil auger – device for removing cores of soil for inspecting or testing

soil compaction – compression of the soil resulting in reduction of the total pore space, especially the macropores

soil profile – vertical section through a soil, through all of the horizons

soil structure – the arrangement of soil particles

soil texture – the relative fineness or coarseness of a soil due to a particle size

source – plant part that produces carbohydrates; mature leaves are sources

species – a group of organisms composed of individuals of the same genus name that can reproduce among themselves and have similar offspring

specific epithet – the classification name that follows the genus name in scientific nomenclature

specifications – detailed plans and statements of particular procedures and standards

speed lining – a method of lowering tree segments past obstacles below

speedline – rigging line strung in such a way as to slide tree segments to the ground

splits – open cracks or fissures in tree trunks or branches

split-tail – tree climbing system in which the climbing hitch is formed with a separate, short length of rope

square knot – a knot used to tie together two ropes of equal diameter

staking – supporting a newly planted tree with stakes

standard down conductor – length of copper cable used in lightning protection systems on trees

standing part – the inactive part of a rope, as opposed to the working end

stippling – speckled or dotted areas on foliage

stomata – small pores between two guard cells on leaves and other green plant parts through which gases are exchanged

stopper knot – knot tied in the end of line to keep the tail from passing through the climbing hitch

stress – factor that negatively affects the health of a tree

structural defects – flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure

structural pruning – pruning to establish a strong branch scaffold system

stunting – growth reduction of organisms, in this case, plants

subordinate – pruning to reduce the size and growth of a branch in relation to other branches or leaders

subsurface application – placement of fertilizer below the soil surface

sucker – shoot arising from the roots

surface application – placement of fertilizer or other material on the soil surface

symbiosis – a mutually beneficial association of two different types of living organisms

symbiotic – a mutually beneficial association

symbiotic relationship – association between two organisms that is mutually beneficial

symptom – a plant's reaction to a disorder

systemic – substance that moves throughout and is absorbed by the entire organism, in this case, by the roots, leaves, or both

tagline – rope used to control the swing and direction of drop of a limb being removed

tannins – organic substances produced by trees; believed to be involved in the tree's chemical defense processes

tap root – central, vertical root that grows right below the trunk and is often choked off by the development of other roots

taper – the change in diameter over the length of trunks and branches

target – person, object, or structure that could be injured or damaged in the event of tree or branch failure

tautline hitch – type of climbing hitch used by climbers to tie in



taxonomy – science that studies the description, denomination, and classification of living organisms, based on their similarities and differences

temporary branches – branches left in place when training young trees; such branches will be removed later

tensile strength – the breaking strength of a rope under load

tensiometer – instrument used to measure soil moisture

terminal bud – the bud on the end of a twig or shoot

terracing – method used to lower the soil grade in stages

thimble – device used in cabling to form the loop in the cable

thinning – selective removal of unwanted branches and limbs to provide light or air penetration through the tree or to lighten the weight of the remaining branches

threaded rod – metal rod used for support bracing of trees

thresholds – pest population levels requiring action

through-hardware – anchors or braces that pass completely through a trunk or branch and are secured with washers and nuts

throwing ball – device used to set a rope in a tree

throwing knot – a series of loops and wraps tied in a rope to form a weight for throwing

throwline – device consisting of a small weight attached to a thin, lightweight cord; used to set climbing ropes in trees

tie in – to secure a climber's rope in a tree with a tautline hitch

timber hitch – knot consisting of a series of wraps on a rope; used to secure the rope to a limb or tree

tip tying – tying a rope on the tip (brush) end of a limb or tree

topping – cutting back a tree to buds, stubs, or lateral not large enough to assume apical dominance

torts – wrongful acts, other breach of contract, for which civil action may be taken

tracheid – elongated, tapering xylem cell, adapted for support

translocated – movement of sugars in the phloem

transpiration – water vapour loss through the stomata of leaves

vigor – overall health; capacity to grow and resist stress

vista pruning – selective pruning to allow a view from a predetermined point

vitality – overall health; a plant's ability to deal effectively with stress

transplant shock – stress following transplant in which growth is reduced and the tree may wilt or drop foliage

transplanting – moving a plant to a new location

tree island – soil or landscape surrounding a tree, such as within a paved area

tree spade – mechanical device used to dig and move trees

tree well – wall constructed around a tree when the soil grade is raised to maintain the original soil level and provide oxygen to the root zone

tree wrap – material used to wrap the trunks of newly planted trees

trenching – digging to install utilities; of concern due to root damage

triangular cable system – tree cabling that forms a triangular shape

tropism – growth movement or variation of a plant as a response to an external stimulus such as light or gravity

tunneling – alternate means to trenching for installation of underground utilities

turgid – fully hydrated to a normal state of distension

undercut – a cut on the underside of a limb to be removed to prevent unwanted tearing as the limb falls

utility pruning – pruning around or near utility facilities with the object of maintaining safe and reliable utility service

variety – subdivision of a species having a distinct difference, and breeding true to that difference

vascular discolouration – darkening of the vascular tissues of woody plants in response to disease

vascular tissue – tissue that conducts water or nutrients

vector – organism that transmits a pathogen

venation – arrangement of veins

vertical mulching – filling vertical drilled holes in the soil with materials such as gravel, perlite, peat, or sand

vessels – stacked, tubelike, water-conducting cells in the xylem

water shoot – a secondary, upright shoot arising from the trunk, branches or roots of a plant

water-holding capacity – ability of a soil to hold moisture

water-insoluble nitrogen (WIN) – nitrogen fertilizer in a form that is not soluble in water



watersprout – an upright, adventitious shoot arising from the trunk or branches of a plant; although incorrect, it is also called a sucker

webbing sling – length of sewn webbing, often formed into a loop, used as an attachment in rigging

whorled – leaves arranged in a circle around a point on the stem

wilt – loss of turgidity and subsequent drooping of leaves

wire basket – type of metal basket used to support the root ball of balled-and-burlapped plants

witch's broom – plant disorder in which large number of accessory shoots develop

work plan – predetermined, orderly means for job completion

working end – the part of a rope terminated for use

working-load limit (WLL) – tensile strength divided by design factor; load limit for a rope or piece of equipment

work-positioning lanyard – rope or strap designed to aid in climbing and tree work; secondary means of attachment

wound dressing – compound applied to tree wounds or cuts, if necessary

xylem – main water- and mineral-conducting tissue in trees and other plants; provides structural support and becomes wood after lignifying