Apprenticeship Curriculum Standard

Arborist/Utility Arborist Common Core Level One: 444A/444B

Arborist Level 2 Trade Code: 444A

Utility Arborist Level 2 Trade Code: 444B

Date: 2008
Please Note: Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the Trades Qualification and Apprenticeship Act (TQAA) or the Apprenticeship and Certification Act, 1998 (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the Ontario College of Trades and Apprenticeship Act, 2009 (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College’s website (http://www.collegeoftrades.ca) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: http://www.collegeoftrades.ca/about/legislation-and-regulations
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INTRODUCTION

This new curriculum standard for the Arborist and Utility Arborist trades is designed down from the learning outcomes, which were in turn developed from the industry-approved training standard.

The curriculum is organized into 2 levels of training, each including reportable subjects containing like or similar learning outcomes to reflect the units of the training standard. The hours charts indicates how the curriculum can be delivered in the current block release format and summarizes the hours of training for each reportable by level. Since the reportable subjects are all divisible by three they can be adapted to accommodate a more flexible training delivery other than block release.

The reportable subjects are cross-referenced to the training standard for ease of comparison.

Each reportable subject and learning outcome identifies a recommended number of training hours. This hour allotment is broken into hours for instruction in theory and practical application. The division of the curriculum into reportable subjects that follow a natural progression of learning through the levels and branches of training will allow training centres and apprentices' flexibility in program delivery while still observing the importance of sequencing learning in a logical progression.

The curriculum is framed by and includes specific references to terminal performance objectives in the Apprenticeship Training Standards for Utility Arborist. However, it identifies only the learning that takes place off the job, in a training centre. The in-school program focuses primarily on the theoretical knowledge required to master the performance objectives of the Training Standards. Employers are expected to extend the apprentice's knowledge and skills through appropriate practical training on the work site. Regular evaluations of the apprentice's knowledge and skills is conducted throughout training to assure that all apprentices have achieved the learning outcomes identified in the curriculum standard. The balance between theoretical and practical evaluation is identified for each unit of learning outcomes.

Implementation date:

September, 2009
## Program Summary

<table>
<thead>
<tr>
<th>Unit of Learning</th>
<th>Duration (hours)</th>
<th>Level 1 Arborist/Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>S0246 Arborist Workplace Health and Safety I</td>
<td>39</td>
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</tr>
<tr>
<td>S0247 Arborist Theory I</td>
<td>57</td>
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<tr>
<td>S0248 Arborist Practices I</td>
<td>0</td>
<td>156</td>
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<tr>
<td>S0249 Arborist Hand Tools I</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>S0250 Arborist Equipment I</td>
<td>0</td>
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</tr>
<tr>
<td>S0251 Arboricultural Sciences I</td>
<td>33</td>
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</tr>
<tr>
<td>S0252 Arborist Tree Identification I</td>
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</table>

<table>
<thead>
<tr>
<th>Unit of Learning</th>
<th>Duration (hours)</th>
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<tbody>
<tr>
<td>S0401 Arborist Theory II</td>
<td>24</td>
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<td>S0402 Arborist Practices II</td>
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<td>156</td>
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<tr>
<td>S0403 Plant Health Care - Pest Management</td>
<td>48</td>
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<tr>
<td>S0404 Arboricultural Science II</td>
<td>36</td>
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</tr>
<tr>
<td>S0405 Tree Identification II</td>
<td>36</td>
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<td>S0406 Crane Assisted Rigging</td>
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<td>S0407 Arborist Equipment II</td>
<td>8</td>
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<td>S0408 Arborist Calculations</td>
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<table>
<thead>
<tr>
<th>Unit of Learning</th>
<th>Duration (hours)</th>
<th>Level 2 Utility Arborist</th>
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<tbody>
<tr>
<td>S0259 Utility Arborist Workplace Safety II</td>
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<td>S0260 Utility Arborist Theory II</td>
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<tr>
<td>S0261 Utility Arborist Practices II – Tree Climbing</td>
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<td>144</td>
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<td>S0262 Utility Arborist Practices II – Aerial Device</td>
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<td>24</td>
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<td>S0263 Utility Arborist Equipment II – Brush Chippers and Aerial Devices</td>
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<td>6</td>
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<tr>
<td>S0264 Utility Arboricultural Sciences II</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>S0265 Utility Arborist Hand Tools II</td>
<td>6</td>
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</tr>
<tr>
<td>S0266 Utility Arborist Tree Identification II</td>
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<tr>
<td>S0267 Utility Arborist Transmission Line Clearing II</td>
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</table>
# Level 1 Arborist/Utility Arborist

Summary of Total Program In-School Training Hours Level 1

<table>
<thead>
<tr>
<th>Reportable Subjects</th>
<th>Total</th>
<th>Theory</th>
<th>Practical</th>
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<tbody>
<tr>
<td>S0246 Arborist Workplace Health and Safety I</td>
<td>39</td>
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<tr>
<td>S0247 Arborist Theory I</td>
<td>57</td>
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<td>0</td>
</tr>
<tr>
<td>S0248 Arborist Practices I</td>
<td>156</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>S0249 Arborist Hand Tools I</td>
<td>36</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>S0250 Arborist Equipment I</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>S0251 Arboricultural Sciences I</td>
<td>33</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>S0252 Arborist Tree Identification I</td>
<td>33</td>
<td>33</td>
<td>0</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>360</strong></td>
<td><strong>162</strong></td>
<td><strong>198</strong></td>
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</tbody>
</table>
Number: S0246

Title: Arborist Workplace Health and Safety I

Duration: 39 Total
Theory: 39 Hours Practical: 0 hours

Prerequisites: N/A

Cross-reference to training standard: U6040.01 - .14, U6041.01 - .11, U6042.02, .04, .07, .09, .11, .13 - .16, U6043.05, U6044.05, U6045.01, .02, .11, .12, .20, .23, .24, U6046.02, .03, .05 - .07, .10, .14 - .16, U6047.05, .06, .09, .11, U6048.01, .10, .11, .14, U6050.01, .02, .08, U6051.07 - .10, U7160.01, .10, .13; U7161.01-.11; U7162.02, .04, .05, .08, .09

General Learning Objective:

Demonstrate a working knowledge of pertinent safety and related legislation as they apply to Utility Arboricultural safe workplace practices; and deal with potentially dangerous on-site conditions, emergencies, hazards and materials.

Learning Outcomes and contents:

S0246.1.1 Describe the requirements of federal, provincial and municipal legislation and regulations governing all aspects of the Arboricultural industry.

### Occupational Health and Safety Act

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<thead>
<tr>
<th>Description</th>
<th>Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>4, 3, 50, 51, 52</td>
</tr>
<tr>
<td>Internal Responsibility System</td>
<td></td>
</tr>
<tr>
<td>Right to know</td>
<td>37, 38</td>
</tr>
<tr>
<td>Right to participate</td>
<td>8, 9, 10</td>
</tr>
<tr>
<td>Right to refuse unsafe work</td>
<td>43, 44, 45, 46, 47, 48, 49</td>
</tr>
<tr>
<td>Duties of employer</td>
<td>25, 26, 29</td>
</tr>
<tr>
<td>Duties of worker</td>
<td>28</td>
</tr>
<tr>
<td>Duties of supervisor</td>
<td>27</td>
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<tr>
<td>Duties of Suppliers of equipment</td>
<td>31</td>
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<tr>
<td>Penalties</td>
<td>54, 55, 56, 57, 58, 62, 66</td>
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### Criminal Liability Of Organizations

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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<tbody>
<tr>
<td>Criminal Liability Of Organizations</td>
<td>C-45</td>
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Ontario College of Trades ©
### Construction Regulation 213

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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<tbody>
<tr>
<td>Alternate methods and materials</td>
<td>3</td>
</tr>
<tr>
<td>Accident reporting</td>
<td>11, 12</td>
</tr>
<tr>
<td>General</td>
<td>14, 15, 16, 17, 18</td>
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<tr>
<td>PPE</td>
<td>21, 22, 23, 24, 25, 26, 26 (3), 26 (4), 26.2, 27, 43, 47</td>
</tr>
<tr>
<td>Fire requirements</td>
<td>52, 53, 54, 55</td>
</tr>
<tr>
<td>Traffic control</td>
<td>67, 68, 69, 69.1</td>
</tr>
<tr>
<td>Ladders</td>
<td>78, 81</td>
</tr>
<tr>
<td>Electrical</td>
<td>181, 182, 183, 187, 191, 192, 193, 194</td>
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**Industrial Regulation 851**

<table>
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<tr>
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<td>4, 5, 6, 11, 22, 23, 24, 25, 26, 27, 29</td>
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<td>Chainsaw</td>
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<tr>
<td>Electrical</td>
<td>42.2, 43, 44, 44.1, 44.2</td>
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<td>Material Handling</td>
<td>45, 46, 51, 52, 54, 55, 56, 57, 59, 60, 61, 66</td>
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<tr>
<td>Ladders</td>
<td>73</td>
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<tr>
<td>PPE</td>
<td>79, 80, 81, 82, 83, 84, 85, 86, 139</td>
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<tr>
<td>Logging</td>
<td>103, 104, 107, 109, 110, 111</td>
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**Electrical Utility Safety Rules**

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Authorization for work</td>
<td>106</td>
</tr>
<tr>
<td>Authorized Worker – defined</td>
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</tr>
<tr>
<td>Competent Worker – defined</td>
<td></td>
</tr>
<tr>
<td>Controlling Authority – defined</td>
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<tr>
<td>Proximity – defined</td>
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</table>

**MTO Book 7 Traffic Control**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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<tbody>
<tr>
<td>Entire Book</td>
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**WHMIS**

<table>
<thead>
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<tr>
<td>Designation of Hazardous Material</td>
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<tr>
<td>Application of WHIMS</td>
<td>4, 6, 7</td>
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</table>

**First Aid Requirements under Workplace Safety and Insurance Act 1997**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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<tbody>
<tr>
<td>General</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
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<tr>
<td>Requirements</td>
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**Dangerous Goods Transportation Act**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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</thead>
<tbody>
<tr>
<td>Application of Act</td>
<td>2, 3</td>
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### Municipal Bylaws

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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</thead>
<tbody>
<tr>
<td>Unique to various regional and local municipalities Tree bylaws:</td>
<td>• Right-of-way and public lands</td>
</tr>
<tr>
<td></td>
<td>• Tree preservation</td>
</tr>
<tr>
<td></td>
<td>• Tree removal</td>
</tr>
<tr>
<td></td>
<td>• Wood lots</td>
</tr>
<tr>
<td></td>
<td>• Pesticide bylaws</td>
</tr>
<tr>
<td></td>
<td>• Municipal property standards</td>
</tr>
<tr>
<td></td>
<td>• Hazards</td>
</tr>
<tr>
<td></td>
<td>• Nuisance trees</td>
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### Forest Fire Prevention Act

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Regulation 207/96</td>
<td>9 (1-3), 10 (1-4), 11 (1-4), 12</td>
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### Highway Traffic Act

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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</thead>
<tbody>
<tr>
<td>License requirements</td>
<td>32</td>
</tr>
<tr>
<td>Inspection of vehicle</td>
<td>82, 84,</td>
</tr>
<tr>
<td>Circle checks</td>
<td>107</td>
</tr>
<tr>
<td>Maintenance Logs</td>
<td></td>
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<tr>
<td>Trip log</td>
<td>190</td>
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<tr>
<td>Dimension limits</td>
<td>108, 109, 110, 111,</td>
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<tr>
<td>Weight Limits</td>
<td>120, 121, 122, 123, 124, 125, 126, 127</td>
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<tr>
<td>Off road vehicles on highways</td>
<td>191.8</td>
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<tr>
<td>CVOR</td>
<td>16, 17, 18, 19, 20, 21, 22, 23</td>
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### Ontario Regional Common Ground Alliance (Best Practices Version 1.0)

<table>
<thead>
<tr>
<th>Description</th>
<th>Sections</th>
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<tbody>
<tr>
<td>Location and Marking</td>
<td>3</td>
</tr>
<tr>
<td>Excavation</td>
<td>4</td>
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<tr>
<td>Compliance</td>
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### Off Road Vehicle Act

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Application of Act</td>
<td>2, 3</td>
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### Pesticides Act – Ontario

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Prohibition to exterminations</td>
<td>5, 7</td>
</tr>
</tbody>
</table>
S0246.1.2 Identify the hazards of working in an energized environment.

Electrical Theory
- Ohm’s Law
- Relationships between: Resistance, Voltage, Current and the - work performed and tools used
- Utility Hazards
- Generation process
- Generation voltage to transmission voltage
- Transmission voltage to distribution voltage
- Second point of contact
- Backfeed
- Touch potential – ground gradients
- Step potential – ground gradients
- Induction –electrostatic and electromagnetic
- Flashover

Electricity and the Body
- Minimum current for injury to human

Shock damage – inadvertent movement contacting
- Damage resulting in human contact with electrical circuits severity factors, physiological effects, internal burns and heart problems,
- What to do if electrical contact – contact EMS, ensure hospital treats according to electrical contact accident
- Proximity to other workers/equipment

Circuit Identification
- Transmission circuit identification
- Distribution circuit identification - tree barrier conductor, underground conductor found overhead
- Service wire identification - triplex, open bus
- Underground hardware identification – pad mounted transformers, pole markers
- Electrical System Configuration
- Loop feeds
- Radial feeds
- Communications conductors – overhead
- Television conductors – overhead
- Underground utilities - natural gas markers, communication pedestals

Electrical Equipment Identification
- Switches
- Reclosures
- Capacitors
- Insulators
- Transformers
• Light standard transformers
• Lightening arresters
• Pole anchors
• Guy wires
• Underground Hardware
• Electrical transformers
• Natural gas markers
• Water line markers

Barriers to Electrical Energy Overhead
• Electrical Safety Rule Book
• Application of proximity to electrical conductors for unauthorized workers
• Notification Controlling Authority
• Requesting isolation and de-energization from Controlling Authority
• Barriers to Electrical Energy Underground
• Ontario Regional Common Ground Alliance Best Practices

Barriers to Electrical Energy Overhead (continued)
• Requesting locates from One Call
• Requesting locates from local utilities

S0246.1.3 Identify all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; hazards to the public.

Environmental hazards
• Darkness
• Wet/ice/snow conditions
• Wind
• Thunder & lightning
• Temperature extremes
• Ice

Tree hazards
• Hangers and split branches
• Deadwood
• Compression and tension wood
• Spring poles
• Barber chair
• Chicot
• Widow maker
• Free-standing tree
• Wind-thrown trees
• Storm damage
• Falling debris
• Wildlife
• Severed limbs
• Adjacent trees
• Excessive fill over root zone
• Root, stem/trunk and branch rot and cavities
• Cracks, seams and ribs

Ground hazards
• Debris
• Unstable ground
• Slippery ground
• Slopes/uneven ground
• Wildlife, holes and dens
• Trip hazards
• Deep snow

Underground Hardware
• Natural gas markers
• Water line markers

Electrical transformers
• Septic systems, wells
• Communication lines

Poisons Plants
• Poison Ivy
• Poison Oak
• Poison Sumac
• London Plane Tree
• Poison Parsley

S0246.1.4 Identify potential fire hazards in the workplace and describe preventative measures and the required procedures to follow in the event of a fire occurrence.

Sources of ignition
• Open flame
• Spontaneous combustion
• Electricity
• Sources of high temperature, e.g.: hot muffler
• Combustible materials

Types of hazards
• Explosion
• Ignition of combustibles and flammables
• Dust
• Vapour
• Static electricity
• Flashover
Prevention

- Good housekeeping
- Approved containers
- Grounding of equipment
- Ventilation
- Fire hazard policies and procedures
- Fire fighting
- Fire detection
- Forest Fire Prevention Act and work practices
- Type of fire
  - Gaseous
  - Liquid
  - Solid
- Size of fire
- Fire reporting

Fire suppression
- Extinguishing equipment and use

Fire fighting training
- Backpack pumps

S0246.1.5 Identify and describe how to handle, store and dispose of hazardous materials, commonly found in the work place.

Materials
- Lubricants
- Solvents
- Liquid and pressurized fuels
- Pressurized materials
- Wood debris
- Corrosives

Handling and disposal
- Personal protective equipment
- Personal hygiene
- Application of WHMIS
- Securing for transport
- Loading and unloading
- Storage
Disposal methods
- Burying
- Recycling/re-use

Spill response
Labeling
Dispensing
Transport

S0246.1.6 Identify and describe the use of pedestrian and vehicular traffic control devices at the job site.

Hazards to control
- Collision hazards
- Operating machinery
- Obstacles to pedestrian and vehicular traffic

Site securing methodology
- Traffic cones
- Hazard tape
- Flag persons
- Signage
- Temporary barricades
- Temporary traffic signals
- Safe distances to maintain
- Deployment methodology
- Crash truck

Evaluation Methods:
On going written and practical testing
Number: S0247

Title: Arborist Theory I

Duration: 57 Total Hours

Theory: 57 hours   Practical: 0 hours

Prerequisite: N A

Cross-reference to training standard: U6040.14, U6041.01 - .07, .10, U6042.01 - .03, .06, .07, .09, U6043.01 - .04, .08 - .10, .12, U6044.01 - .03, U6045.01, .02, .05, .06, .08, .09, .13 - .15, .18, .19, 21, U6046.03, .10, .12 - .15, U6047.01 - .03, .05 - .07, .09, .10, U6051.19, U7160.01-13, U7161.01-.06, .09; U7162.01, .03, .05, .07, .08; U7165.01-04, .06, .07, U7162.01; U7163.04, 08, 0.09; U7164.15, 17, 18.

General Learning Objective:

Describe how to plan work safely, identify electrical hazards, identify other hazards outside of the electrical environment, removing of trees, rigging principals and how to manage fire and dangerous goods.

Learning Outcomes and Contents:

S0247.2.1 Plan all work operations safely, in compliance with provincial and municipal legislation and regulations.

Interpret job documents
- Plans and specifications
- Work orders
- Scope of work
- Equipment required
- Personnel required
- Materials required
- Worksite hazards
- Traffic hazards

Other requirements
- Cycle clearance requirements

Determine required personal protective equipment
- Head protection
- Eye protection
- Hearing protection
- Foot protection
- Face protection
- Hand protection
• Chainsaw protection
• Fall protection/work positioning systems

Determine job site limits
• Property lines
• Safe limits of approach
• Overhead utilities
• Buried utilities

Identify job sequences, hazards and required barriers to hazards
• Job / task sequence
• Identified hazards
• Identify barriers
• Identify tools/equipment required
• Identify appropriate job communications
• Identify when to reevaluate hazards and barriers

S0247.2.2 Describe methods of eliminating or controlling electrical hazards.

Electrical Theory
Ohm’s Law
Relationships between:
• Resistance
• Voltage
• Current

Work performed and tools used
Utility Hazards
• Generation process
• Generation voltage to transmission voltage
• Transmission voltage to distribution voltage
• Second point of contact
• Backfeed
• Touch potential – ground gradients
• Step potential – ground gradients

Barriers to Electrical Energy
• Electrical Utility Safety Rule Book
• Application of appropriate safe limits of approach
• Application of appropriate job planning
• Proximity to other workers/equipment
• Establishing clear communication between workers
S0247.2.3 Describe how to manage all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; and hazards to the public.

Environmental hazards
- Darkness
- Wet/ice/snow conditions
- Wind
- Thunder & lightning
- Temperature extremes
- Ice

Tree hazards
- Hangers and split branches
- Deadwood
- Compression and tension wood
- Spring poles
- Barber chair
- Chicot
- Widow maker
- Free-standing tree
- Wind-thrown trees
- Storm damage
- Falling debris
- Wildlife
- Severed limbs
- Adjacent trees
- Excessive fill over root zone
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs

Ground hazards
- Debris
- Unstable ground
- Slippery ground
- Slopes/uneven ground
- Wildlife, holes and dens
- Trip hazards
- Deep snow

Underground Hardware
- Natural gas markers
- Water line markers
- Electrical transformers
- Septic systems, wells
- Communication lines
Poisons Plants
- Poison Ivy
- Poison Oak
- Poison Sumac
- London Plane Tree
- Poison Parsley

S0247.2.4 Describe typical tree removal processes using directional felling techniques without rigging equipment.

Identifying tree to be removed
Determine removal method based on tree condition and site condition
Establish communications techniques with fellow workers
Factors affecting removal method
- Crown condition
- Stem condition
- Root condition
- Lean
- Living/dead
- Central leader/multi-stemmed
- Structural defects
- Site conditions
- Job requirements
- Potential hazards
- Conductor location

Felling Zone preparation
- Tree condition – dead, living, diseased
- Property considerations
- Personnel location
- Traffic control
- Potential targets and hazards removed

Danger Zone preparation
- Escape route developed
- Personnel out of Zone
- Property considerations
- Height of tree
- Inspect worksite
- Hangers removed

Tree felling
- Balanced tree
- Felling cuts
- Conventional notch
- Humboldt notch and back cut
- Boring and back cut
- Side notching
• Modifying the hinge to adjust direction of fall
• Felling levers
• Wedges

Gas Powered Tools
• Chainsaw
• Clearing saw
• Blower

Inspect worksite
• Hangers removed
• Rigging equipment removed

S0247.2.5 Describe methods of handling/disposing of debris generated on the job site.

Equipment required
• Setup
• Pre-operational inspection
• Starting/Stopping
• Use
• Personal protective equipment

Bucking and limbing
• Progression of operation
• Top to butt/butt to top
• Non-tensioned/tensioned
• Compression/tension wood
• Potential for rolling
• Limb by limb technique

Sweep technique
• Spring poles

Handle/dispose of debris
• Piling brush for chipping
• Lifting/carrying brush and large wood
• Loading brush and large wood on vehicles
• Chipping brush
• Disposal/recycling

Site clean-up
• Lower stumps
• Clean-up site of small debris

Use of chainsaws on the work site
Determine chainsaw selection
• CSA standard
• Job size
• Size of wood to be cut
• Bar length
• Power to weight ratio
Pre-operational inspection/maintenance
- Chassis
- Anti-vibration mounts
- Bar
- Chain - tension and sharp
- Chain catcher
- Sprocket
- Chain brake operation – inertia and mechanical
- Provision for repair
- Fluid levels
- Spark arrestors
- Throttle lock-out
- Engine operation

Handle and carry
- Chain brake on when moving saw from tree to tree
- Engine off when moving to new location
- Bar towards rear
- Two person saw to be carried by two people
- No running

Operation
Personal protective equipment

Starting/stopping chainsaw
- On ground
- Leg lock

Secure/prepare work area
Working position
Escape routes
Ongoing inspection and maintenance
Refueling/lubricants
Chain sharpening/replacement

S0247.2.6 Identify appropriate communication skills to deal effectively with customers and in the workplace.

Tailboard safety discussion
Write effectively
Read effectively
- Job specifications
- Sentence, paragraph structure
- Definition of terms
- Content divisions
- Work orders
- Requirements
- Component tasks
• Safety considerations
• Packing slips and bills of lading
• Company memos and manuals
• Government publications
• Manufacturers’ documentation

Listen effectively
• Hearing
• Interpreting directions
• Customer questions
• Main ideas components

S0247.2.7 Describe inspecting, adjusting, maintaining and wearing required personal protective equipment.

Eye protection
• CSA and/or ANSI approved
• Goggles
• Prescription safety glasses
• Non-prescription safety glasses
• Flash

Head protection
• CSA and/or ANSI approved
• Hard hats Class E type

Face protection
• CSA and/or ANSI approved
• Face shield

Hearing protection
• CSA and/or ANSI approved
• Ear muffs
• Ear plugs
• Disposable foam plugs

Hand protection
• CSA and/or ANSI approved
• Work gloves
• Chainsaw gloves

Foot protection
• CSA and/or ANSI approved
• Electrical resistive

Leg protection
• CSA and/or ANSI approved
• Chainsaw pants
• Chaps
S0247.2.8 Describe the selection, use of, and inspection of hand tools and tree maintenance equipment according to manufacturer’s recommendations.

Hand Tools
- Chisels
- Mallets
- Axes
- Sledge Hammers
- Shovels/Spades
- Picks
- Rakes
- Brooms
- Ladders
- Knives
- Pole Pruners
- Pole Saws
- Compressors
- Extension Cords
- Maintenance And Adjustment Tools
- Drills
- Augers And Bits
- Brush Saws
- Handsaw
- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope
- Throw pouch
- Sling shot
- Loppers
- Secateurs
- Friction devices
- Friction savers / cambium savers
- Connectors
- Carabiners
- Clevis
- Felling levers
- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope
• Tackle blocks
• Multi-sheave block
• Rope pullers
• Gas Powered Tools
• Chainsaw

S0247.2.9 Identify subject woody plant(s) on site.

• Adjacent features
• Written description
• Flagging/marking subject trees
• Morphological characteristics
• Growth characteristics
• Plant names

S0247.2.10 Describe proper use of knots and hitches.

Rope terminology
• Bight
• Loop
• Turn
• Round turn
• Working end, lead and fall
• Running end, lead and fall
• Standing part, lead and fall
• Lead
• Fall
• Splice
• Bridge
• Bar
• Tail

Rigging Knots (18 knots)
• Square or Reef
• Single bowline
• Double bowline
• Figure 8 on a bight
• Running bowline
• Bowline on a bight
• Figure 8 stopper knot
• Single sheet bend
• Double sheet bend
• Clove hitch and two half hitches
• Half hitch
• Clove hitch (end)
• Clove hitch (middle)
• Snubbing hitch
• Stirrup hitch
• Cow hitch
• Double Fisherman
• Triple Fisherman

Fall Protection Knots (13)
• Tautline hitch – Figure 8 Stopper Knot
• Blake’s hitch
• Klemheist
• Prusik (6 coil)
• Swabbish
• Gripping hitch
• Cow hitch (Girth Hitch)
• Beckett bend – Figure 8 Stopper Knot
• Triple fisherman
• Double fisherman
• Anchor hitch
• Bowline – Figure 8 Stopper Knot
• Figure 8 on a bight

Splices on three strand rope only (2)
• Eye splice
• Crown splice

S0247.2.11 Describe the types and purposes of typical pruning processes and the tools and equipment required.

Considerations required for pruning operations.
• Customer consideration
• Species characteristics
• Tree condition

Identify pruning cut location on tree
• Collar
• Branch bark ridge

Pruning cuts
• Drop cut
• Hinge cut
• Snap/bypass cut
• Jump cut
• Stub cut
• Thinning cuts
• Heading cuts
Pruning methods
- Crown thinning
- Side pruning
- Dead wooding
- Crown cleaning
- Crown raising
- Crown reduction
- Pollarding
- Crown restoration
- Overhang pruning
- Directional pruning

Mechanical tools and equipment
- Chipper

Hand Tools
- Handsaw
- Rigging ropes
- Friction saver
- Slings
- Whoopie
- Nylon web
- Rope
- Throw pouch
- Sling shot
- Loppers
- Secateurs
- Friction devices
- Friction savers / cambium savers
- Connectors
- Carabiners
- Clevis
- Felling levers
- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope
- Tackle blocks
- Multi-sheave block
- Rope pullers

Gas Powered Tools
- Chainsaw
- Blower

Tool disinfection as required
Raise, secure and lower tools and equipment
• Ropes
• Lanyards
• Connecting devices
• Conductor location

Raise/lower limbs using ropes
• Control limbs using hinge cuts
• Use of ropes and knots
• Control of cut sections

Inspect worksite
• Hangers removed
• Rigging equipment removed

S0247.2.12 Describe typical tree removal processes using rigging equipment.

Method and tools/equipment selection
Factors affecting removal method
Identifying tree to be removed
Plant characteristics/condition
• Living/Dead
• Central Leader/Multi-Stemmed
• Structural Defects
• Site Conditions
• Job Requirements
• Potential Hazards

Fall zone preparation
Danger zone preparation
• Escape route
• Tree felling
• Tree condition
• Balanced tree

Unbalanced/leaning tree
Tree with splits or cavities
"Hung up" trees

Felling cuts
• Conventional Notch
• "V" Notch And Back Cut
• "Humboldt" Notch And Back Cut
• Felling Assist Devices
• Wedges
• Levers
• Pull Ropes
• Tackle Blocks
S0247.2.13 Describe selecting, inspecting and maintenance procedures for fall protection system components.

Climbing rope
Climbing harness
Work positioning lanyard
Connecting links:
  • Captive eye
  • Carabiner
Slings
  • Redirect climbing line
  • Basket hitch attachment
  • Girth hitch attachment
Pulleys for redirect
Friction saver
Eye to eye Prusik
Split tail
Mechanical fall arrester

S0247.2.14 Describe various methods for ascending and descending trees to access required work position.

Techniques used to ascend/descend trees
  • Use of ladder
  • Use of spurs
  • Belay technique
Secured body thrust on belay
  • Secured body thrust with climbing hitch
  • Secured footlock
  • Split tail
Pre- climb tree inspection
  • Root zone hazards
  • Rots
  • Decay
  • Fruiting bodies
  • Conks
  • Grade changes
  • Root crown excavation to determine root structure condition
Crown zone hazards
  • Hangers
  • Dead wood
  • Animals
  • Dieback
• Abnormal growth
• Missing sections of tree
• Limbs in proximity
• Included bark
• Splits, cracks

Stem zone hazards

Structural defects
• Rots
• Decay
• Fruiting bodies
• Conks
• Included bark
• Splits, cracks
• Grade changes

Coring/sounding of wood to determine stem condition

Work to be completed

Select anchor points

Interim anchor point
• Type of load applied
• Direction of loading from stem of tree
• Other loads on the limb (foliage, snow, torque, etc.)
• Tree species and characteristics
• Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season and temperature
• Location of limb to electrical conductor, worker can not swing into electrical conductors

Final anchor point
• Type of load applied
• Direction of loading from stem of tree
• Other loads on the limb (foliage, snow, torque, etc.)
• Tree species and characteristics
• Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season and temperature
• Location for work and electrical conductor, worker can not swing into electrical conductor
Equipment set up
• Ladder positioning
• Installation of climbing line
• Rope poking tool
• Pole pruner
• Throw line

Tie, dress, set knots for fall protection

Work positioning

Termination knots
Closed climbing system
Open climbing systems
Reposition climbing line
• Utilize fall protection
• Double tie ins
• Work positioning lanyard

Access to work location
Primary anchor
• Double tie-ins, work positioning lanyard, when using sharp tools that could cut climbing line
• Repositioning climbing rope to another anchor point
• Re-directs

Limb walking
• Secure self at work location
• Work positioning lanyard
• Double tie ins

S0247.2.15 Describe aerial tree rescue.

Assess the Emergency
Observation of the scene
• Electrical Conductors/Contact
• Struck by limbs, tree sections, lightning
• Is victim pinned
• Medical conditions (bug/animal bites, heat exhaustion, etc)

Try to communicate with the victim
Verbally
• Assess the victims condition
• Is victim able to descend by him/her self
• Is victim unconscious
• Is victim unresponsive
• Is victim bleeding profusely

Determine need for EMS
• Determine feasibility/appropriateness of aerial rescue
• Electrical Conductors/Contact
- Rigging Systems Hazards
- Ground Hazards
- Rescuer’s competency in performing aerial rescue
- First Aid training
- Climbing ability
- Availability of appropriate equipment and personnel

Initiate EMS response
Aerial Rescue Tree
Select ascension technique
- Ascend tree
- Move to victim’s location
- Assess victim’s condition
- Determine course of action
- Perform rescue

S0247.2.16 Describe rigging principles and equipment.

Determine shock-loading on ropes and equipment
- Newton’s laws
- Calculating force
- Progressive calculations
- Safety margin
- Heat
- Elasticity
- Friction
- Safety factors
- Cycles to failure
- Wood densities

Determine mechanical advantage when using block and tackle equipment
- Block and tackle methodology/principles
- Calculations of forces
- Anchor points
- Pulleys
- Lines

Rigging equipment materials, safe working load limits, tensile strength, inspection for:
- Ropes
- Carabiners
- Slings
- Pulleys
- Arborist blocks
- Friction devices
- Figure-8
- Mechanical lowering devices
- Quick links and shackles
- Block and tackle

Evaluation Methods:
On going written and practical testing
Number: S0248

Title: **Arborist Practices I**

Duration: 156 Total Hours

Theory: 0 hours  Practical: 57 hours

Prerequisite: N A

Cross-reference to training standard: U6040.02 - .11, .13, .14, U6041.01 - .07, .09 - .11, U6042.01 - .03, .05, .06, .08, .09, .12 - .15, U6043.02, .05 - .11, U6044.04 - .07, U6045.01 - .07, .10 - .24, U6046.03 - .16, U6047.04 - .09, .11, U6048.01 - .14, U6049.01 - .10, U6050.01 - .09, U 6051.11, .19, U7160.01-.13, U7161.01-.11; U7162.01-09; U7163.01,.02, .10-.12; U7164.01-.11, .13, .14, .16, .17, .19, .20, .22-24; U7165.01-.08; U7169.01-.13; U7170.01-.09; U7171.01-.09; U7172.01-.14

**General Learning Objective:**

Demonstrate a knowledge of how to plan work safely, utilizing safe work practices, pruning and removing of trees in proximity of electrical conductors, ascending, descending and performing an aerial rescue, inspect, adjust and maintain personal protective equipment and fall protection equipment utilized in the Utility Arboricultural trade and managing fire, waste and dangerous goods.

**Learning Outcomes and contents:**

S0248.3.1 Demonstrate inspecting, adjusting, maintaining and wearing required personal protective equipment.

Eye protection
- Goggles
- Prescription safety glasses
- Non-prescription safety glasses

Head protection
- Hard hats

Face protection
- Face shield

Hearing protection
- Ear muffs
- Ear plugs
- Disposable foam plugs

Hand protection
- Work gloves
• Chainsaw gloves
• Foot protection
• Work boots

Leg protection
• Chainsaw pants
• Chaps

S0248.3.2 Demonstrate methods of handling and disposing of debris generated on the job site.

Bucking and limbing
• Progression of operation
• Top to butt/butt to top
• Non-tensioned/tensioned
• Compression/tension wood
• Potential for rolling
• Limb by limb technique
• Sweep technique
• Spring poles

Handle/dispose of debris
• Piling brush for chipping
• Lifting/carrying brush and large wood
• Loading brush and large wood on vehicles
• Chipping brush
• Disposal/recycling

Site clean-up
• Lower stumps
• Clean-up site of small debris

Use of chainsaws on the work site
• Equipment required
• Setup
• Pre-operational inspection
• Starting/stopping
• Use
• Personal protective equipment

Pre-operational inspection/maintenance
• Chassis
• Anti-vibration mounts
• Bar
• Chain - tension and sharp
• Chain catcher
• Sprocket
• Chain brake operation – inertia and mechanical
• Provision for repair
• Fluid levels
• Spark arrestors
• Throttle lock-out
• Engine operation

Handle and carry
• Chain brake on when moving saw from tree to tree
• Engine off when moving to new location
• Bar towards rear
• Two person saw to be carried by two people
• No running

Operation
• Personal protective equipment
• Starting/stopping chainsaw
• On ground
• Leg lock
• Secure/prepare work area
• Working position
• Escape routes
• Ongoing inspection and maintenance
• Refueling/lubricants
• Chain sharpening/replacement

S0248.3.3 Demonstrate removing woody plants using directional felling techniques without rigging equipment.

Identifying tree to be removed
Determine removal method based on tree condition and site condition
Establish communications techniques with fellow workers
Factors affecting removal method
• Crown condition
• Stem condition
• Root condition
• Lean
• Living/dead
• Central leader/multi-stemmed
• Structural defects
• Site conditions
• Job requirements
• Potential hazards
• Conductor location
Felling Zone preparation
- Tree condition – dead, living, diseased
- Property considerations
- Personnel location
- Traffic control
- Potential targets and hazards removed

Danger Zone preparation
- Escape route developed
- Personnel out of Zone
- Property considerations
- Height of tree

Inspect worksite
- Hangers removed

Tree felling
- Balanced tree
- Felling cuts
- Conventional notch
- Humboldt notch and back cut
- Boring and back cut
- Side notching
- Modifying the hinge to adjust direction of fall
- Felling levers
- Wedges

Gas Powered Tools
- Chainsaw
- Clearing saw
- Blower

Inspect worksite
- Hangers removed
- Rigging equipment removed

S0248.3.4 Demonstrate effective communications skills with customers and workers.

Tailboard safety discussion
Write effectively
Read effectively
- Job specifications
- Sentence, paragraph structure
- Definition of terms
- Content divisions
- Work orders
- Requirements
- Component tasks
- Safety considerations
• Packing slips and bills of lading
• Company memos and manuals
• Government publications
• Manufacturers’ documentation

Listen effectively
• Hearing
• Interpreting directions
• Customer questions
• Main ideas components

S0248.3.5 Demonstrate the knowledge of fire suppression techniques.
• Fire extinguisher use
• Use of backpack pumps
• Determine correct fire extinguisher needs

S0248.3.6 Demonstrate the knowledge of proper methods to handle, store and dispose of hazardous materials.
• Spill clean-up
• Application of WHMIS
• Personal Protective Equipment requirements

S0248.3.7 Demonstrate the selection, use of, and inspection of hand tools and tree maintenance equipment according to manufacturer’s recommendations.

Hand Tools
• Handsaw
• Rigging ropes
• Friction saver
• Slings
• Whoopie
• Nylon web
• Rope
• Throw pouch
• Sling shot
• Loppers
• Secateurs
• Friction devices
• Friction savers / cambium savers
• Connectors
• Carabiners
• Clevis
• Felling levers
- Wedges
- Rigging blocks
- Wire rope
- Synthetic rope
- Tackle blocks
- Multi-sheave block
- Rope pullers
- Gas Powered Tools
- Chainsaw

Tool disinfection as required

S0248.3.8 Demonstrate selecting, inspecting, adjusting and maintaining fall protection system components.

Climbing rope
Climbing harness
Work positioning lanyard
Connecting links:
  - Captive eye
  - Carabiner
Slings - redirect climbing line
  - Basket hitch attachment
  - Girth hitch attachment
Pulleys for redirect
Friction saver
Eye to eye Prusik
Split tail
Mechanical fall arrester

S0248.3.9 Demonstrate various methods of ascending and descending trees to access required work position.

Techniques used to ascend/descend trees
  - Use of ladder
  - Use of spurs
  - Belay technique
  - Secured body thrust on belay
  - Secured body thrust with climbing hitch
  - Secured footlock
  - Split tail

Pre- climb tree inspection
Root zone hazards
  - Rots
  - Decay
• Fruiting bodies
• Conks
• Grade changes

Root crown excavation to determine root structure condition
• Crown zone hazards

Stem zone hazards
• Hangers
• Dead wood
• Animals
• Dieback
• Abnormal growth
• Missing sections of tree
• Limbs in proximity
• Included bark
• Splits, cracks

Structural defects
• Rots
• Decay
• Fruiting bodies
• Conks
• Included bark
• Splits, cracks

Coring/sounding of wood to determine stem condition

Work to be completed

Select anchor points

Interim anchor point
• Type of load applied
• Direction of loading from stem of tree
• Other loads on the limb (foliage, snow, torque, etc.)
• Tree species and characteristics
• Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season and temperature
• Location of limb to electrical conductor, worker can not swing into electrical conductors

Final anchor point
• Type of load applied
• Direction of loading from stem of tree
• Other loads on the limb (foliage, snow, torque, etc.)
• Tree species and characteristics
• Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season and temperature
• Location for work and electrical conductor, worker can not swing into electrical conductor

Equipment set up
Ladder positioning
Installation of climbing line
Rope poking tool
Pole pruner
Throw line
Tie, dress, set knots for fall protection

Ascending
Work positioning
Termination knots
Closed climbing system
  • Reposition climbing line
  • Utilize fall protection
  • Double tie ins
  • Work positioning lanyard

Access to work location
Primary anchor
Double tie-ins, work position lanyard, when using sharp tools that could cut climbing line

Repositioning climbing rope to another anchor point
  • Re-directs
  • Limb walking
  • Secure self at work location
  • Work positioning lanyard
  • Double tie ins

S0248.3.10 Demonstrate aerial tree rescue using appropriate methods.

Assess the Emergency
• Observation of the scene
• Electrical Conductors/Contact
• Struck by limbs, tree sections, lightning
• Is victim pinned
Medical conditions (bug/animal bites, heat exhaustion, etc)
Try to communicate with the victim
• Verbally
• Assess the victims condition
• Is victim able to descend by him/her self
• Is victim unconscious
• Is victim unresponsive
• Is victim bleeding profusely

Determine need for EMS
Determine feasibility/appropriateness of aerial rescue
• Electrical Conductors/Contact
• Rigging systems hazards
• Ground hazards
• Rescuer’s competency in performing aerial rescue
• First Aid training
• Climbing ability
• Availability of appropriate equipment and personnel

Initiate EMS response
Aerial Rescue Tree
• Select ascension technique
• Ascend tree
• Move to victim’s location
• Assess victim’s condition
• Determine course of action

Perform rescue

Evaluation Methods:
On going written and practical testing
Number: S0249

Title: Arborist Hand Tools I

Duration: 36 Total Hours
Theory: 0 hours    Practical: 36 hours

Prerequisite: N A

Cross-reference to training standard: U6040.13, U6042.06, U6043.04, .06, .11, U6044.03, .07, U6045.15, .17, U6046.11, 14, .15, U6047.03, .04, .06, .09, U6049.01 - .10, U7163.12; U7169.01 -13

General Learning Objective:
Demonstrate knowledge of how to select, adjust, maintain and store, tools and equipment commonly used in the Utility Arboricultural trade.

Learning Outcomes and contents:

S0249.4.1 Select, inspect, adjust, maintain, set-up, and store manual and powered tools and equipment common to arboricultural operations.

Hand Tools
- Chisels
- Mallets
- Axes
- Sledge Hammers
- Shovels/Spades
- Picks
- Rakes
- Brooms
- Ladders
- Knives
- Pole Pruners
- Pole Saws
- Compressors
- Extension Cords
- Maintenance And Adjustment Tools
- Drills
- Augers And Bits
- Brush Saws
- Handsaw
• Rigging ropes
• Friction saver
• Slings
• Whoopie
• Nylon web
• Rope
• Throw pouch
• Sling shot
• Loppers
• Secateurs
• Friction devices
• Friction savers / cambium savers
• Connectors
• Carabiners
• Clevis
• Felling levers
• Wedges
• Rigging blocks
• Wire rope
• Synthetic rope
• Tackle blocks
• Multi-sheave block
• Rope pullers
• Chainsaw
• Gas Powered Tools

Select appropriate tool
• Pruning methods
• Diameter of limb
• Work to be completed

S0249.4.2 Perform daily maintenance on chainsaws, including filling fuel and lubricant reservoirs according to manufacturers’ specifications/ operators’ manuals.

Cleaning
• Air filter
• Spark arrestor
• Fuel filter
• Lubrication
• Lubricants
• Fueling
• Gasoline
• 2-stroke oils
• Containers
Mixing ratios
Refueling
Manufacturers’ specifications/ operators’ manuals
Inspect components
- Bar
- Sprockets
- Chain
- Chassis
- Chain brake
Service bars
- Gullet and de-burr
Chains
- Identification
- Removal from bar
- De-burr drive links
- Break/remove/add/re-rivet links
- Sharpening
- Depth gauge adjustment
- Chain installation on bar
- Chain tension adjustment
- Remove
- Clean and lubricate bearing
- Replace
- Adjust/repair recoil
Seasonal adjustment
Test and adjust chain brake

S0249.4.3 Start and stop chainsaws and test chainsaw performance.

Start chainsaw
- Secure chainsaw
- Hold firmly when starting
- Manufacturers’ specifications/ operators’ manuals

Adjust throttle
- Bench test
- Carburetor adjustment with tachometer
- Load test
- Hold with two hands
- Make test cut

Stopping procedure
- Set chain brake
- Switch off
S0249.4.4 Complete routine repairs and adjustments, to clearing saws and their components according to manufacturers’ specifications/ operators’ manuals.

Inspect components
- Sprockets
- Blade
- Chassis
- Sharpening
- Set of teeth

Clutch
- Remove
- Clean and lubricate bearing
- Replace

Adjust/repair recoil

Seasonal adjustment

Evaluation Methods:
On going written and practical testing
Number: S0250
Title: Arborist Equipment I
Duration: 6 Total Hours
Theory: 0 hours  Practical: 6 hours
Prerequisite: N A

Cross-reference to training standard: U6040.12, U6041.04, .07, U6042.06, U6043.04, .06, .10, U6044.06, .07, U6046.01 - .05, .07 - .11, .16, U6047.07, .08, U6048.01 - .14, U6050.01 - .09, U7170.0 -.09

**General Learning Objective:**

Demonstrate a thorough working knowledge of brush chippers.

**Learning Outcomes and contents:**

S0250.5.1 Describe types of chippers.

**Drum type**
**Disc type**
- Mounting configurations
- Trailer-mounted
- Vehicle-mounted
- Track-mounted

S0250.5.2 Describe how to prepare chipper for transportation and operation.

**Chipper circle check**
**Visual defects**
- Loose, worn, cracked, broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- In-feed chute condition
- Cutter knife sharpness
- Reporting deficiencies
Legislated requirements
Towing requirements
  • Manufacturers’ instructions
  • Hitching chipper to tow vehicle
  • Pintle or ball hitch
  • Pin hitch
  • Inspection of hitching mechanism including tongue
  • Safety chains attached in crossed (cradled) arrangement and safety hooks facing upward
  • Brake inspection and hook-up
  • Signal/tail light connection and test
  • Chipper jack positioning for travel
  • Extendable tongue positioning and securing
  • Tire/rim condition
  • Discharge chute positioning for travel
  • Removal and stowing of wheel chocks

S0250.5.3 Describe how to set up chipper for use on site.

Manufacturers’ instructions
Legislated requirements, e.g. Ministry of Transport Book 7
Set up procedure
Site selection
  • Level, stable ground
  • Work site limits and security
  • Efficiency / safety for worker
  • Secure chipper
  • Discharge chute orientation and control
  • Monitor work site changes
Pre-operational checks prior to start-up
Pre-operational checks after start-up
  • Start-up procedures
  • Gauges and warning lights functioning
  • Safety bar
  • Roller movement
  • Chipper stability
  • Discharge deflection
  • Clutch engagement and functioning
  • Engine speed (RPM)
  • Report deficiencies
S0250.5.4 Describe how to operate chipper.

Manufacturers’ operating procedures
Legislated requirements
• Personal protective equipment
• Foot protection
• Leg protection / coveralls
• Hand protection
• Head protection
• Hearing protection
• Eye protection
• High visibility clothing

Pedestrian and vehicular control device use

Materials preparation
• Brush pile proximity and organization
• Item size
• Purging of dangerous extraneous materials: metal, stones, nails, contaminated brush

Feeding procedure
• Butt ends first
• Order by size
• Operator positioning
• Controlling chipper feed
• Proximity to feed rollers
• Monitoring discharge
• Use of pusher pieces of wood

Eliminate chute and in-feed blockages

Normal shutdown procedures
Emergency shutdown procedures

S0250.5.5 Describe basic chipper maintenance.

Inspect as per manufacturers instructions
• Inspect guards
• Check fluids
• Check directional control arm if equipped

Describe how to change cutter knives
Describe how to cycle blade bolts
Describe how to rotate anvil
S0250.5.6 Demonstrate how to prepare chipper for transportation and operation.

Chipper circle check
- Visual defects
- Loose, worn, cracked, broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- In-feed chute condition
- Cutter knife sharpness
- Report deficiencies

Legislated requirements
Towing requirements
Manufacturers’ instructions

Hitch chipper to tow vehicle
- Pintle or ball hitch
- Pin hitch
- Inspection of hitching mechanism including tongue
- Safety chains attached in crossed (cradled) arrangement and safety hooks facing upward
- Brake inspection and hook-up
- Signal/tail light connection and test
- Tire/rim condition
- Chipper jack positioning for travel
- Discharge chute positioning for travel
- Extendable tongue positioning and securing
- Removal and stowing of wheel chocks

S0250.5.7 Demonstrate how to set up chipper for use on site.

Manufacturers’ instructions
Legislated requirements, e.g. Ministry of Transport Book 7
Set up procedure
Site selection
- Level, stable ground
- Work site limits and security
- Efficiency / safety for worker
- Secure chipper
- Discharge chute orientation and control
- Monitor work site changes

Pre-operational checks prior to start-up
Pre-operational checks after start-up
- Start-up procedures
- Gauges and warning lights functioning
• Safety bar
• Roller movement
• Chipper stability
• Discharge deflection
• Clutch engagement and functioning
• Engine speed (RPM)
• Report deficiencies

S0250.5.8 Demonstrate how to operate chipper.

Manufacturer’s operating procedures
Select and adjust personal protective equipment
• Foot protection
• Leg protection / coveralls
• Hand protection
• Head protection
• Hearing protection
• Eye protection
• High visibility clothing
• Pedestrian and vehicular control device use

Materials preparation
• Pile brush and material in appropriate location for chipper operation.
• Cut material to appropriate size
• Purge brush pile of dangerous extraneous materials: metal, stones, nails, contaminated brush

Demonstrate brush feeding procedure
• Butt ends first
• Order by size
• Operator positioning
• Lift brush onto feed rollers
• Control chipper feed
• Proximity to feed rollers
• Monitor discharge
• Use of pusher pieces of wood

Eliminate in-feed and chute blockages

Demonstrate normal shutdown procedure
Demonstrate emergency shutdown procedure

Evaluation Methods:
On going written and practical testing
Number: S0251

Title: Arboricultural Sciences I

Duration: 33 Total Hours

Theory: 33 hours Practical: 0 hours

Prerequisite: N A

Cross-reference to training standard: U6041.02, .03, U6044.01, .02, U6045.07 - .09, U6047.10, U6051.05, .08, .18, U7167.01-.04, .06-.12, .14.

General Learning Objective:

Demonstrate a knowledge of how to identify various woody plants, growth factors of woody plants, compartmentalization of woody plants, diseases and disorders of trees that could be harmful to the integrity of the electrical system, evaluate the condition of anchor points in trees used for fall protection, evaluation of work operations within environmentally sensitive areas.

Learning Outcomes and contents:

S0251.6.1 Identify and describe the structure, functions and interrelationship of the main organs of plants.

- Leaves
- Vascular system
- Branch structure
- Roots
- Flowers
- Fruits
- Seeds
- The plant as a system
- Interrelationship of plant parts

S0251.6.2 Describe plant growth and all affecting factors, including environmental conditions, soil, plant competition etc.

- Temperature
- Air temperature
- Soil temperature
- Water availability
- Space above and below ground level
- Wind
S0251.6.3 Describe the process of compartmentalization of decay in trees.
- Creation of the walls 1-4
- Protection of branch tissue through proper pruning

S0251.6.4 Identify the physical condition and soundness of interim and final anchor points based on tree size, condition and species.

Select anchor points
Interim anchor point
- Type of load applied
- Loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species
- Cross sectional area of limb
- Condition of wood
- Angle of branch attachment
- Size of branch relative to stem
- Characteristics of branch union
- Season/ambient temperature

Final anchor point
- Type of load applied
- Loading from stem of tree
- Other loads on the limb (foliage, snow, torque, etc.)
- Tree species
- Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season/ambient temperature

Evaluation Methods:
On going written and practical testing
Number: S0252
Title: Arborist Tree Identification I
Duration: 33 Total Hours
Theory: 33 hours Practical: 0 hours
Prerequisite: N A

Cross-reference to training standard: U6042.03, U6043.01, U6044.01, U6047.01, U6051.12, U7162.03; U7163.01; U7165.01; U7166.01

General Learning Objective:
Demonstrate a thorough working knowledge of tree genera, species and cultivars by identifying 45 plants commonly found in Ontario.

Learning Outcomes and contents:

S0252.7.1 Identify 45 common woody plants in all seasons according to species and morphological characteristics using the International System of Plant Nomenclature.

Plant groups
- Herbaceous/woody
- Deciduous/evergreen
- Conifers / broadleaf
- Native/exotic
- Invasive

Plant nomenclature
- Family
- Genus
- Species / hybrid
- Variety/cultivar
- Common name

Identification characteristics for each plant
- Leaves
- Flowers/fruit
- Buds
- Bark
- Growth habit and form
- Characteristics as they relate to utility arboriculture and arboriculture
- Brittleness of wood
- Growth rate

**CONIFERS – EVERGREEN AND DECIDUOUS**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Balsam Fir</td>
<td>Abies balsamea</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>2. White Fir</td>
<td>Abies concolor</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>3. Nootka False Cypress</td>
<td>Chamaecyparis nootkatensis</td>
<td>Cupressaceae</td>
</tr>
<tr>
<td>4. Eastern Red Cedar</td>
<td>Juniperus virginiana</td>
<td>Cupressaceae</td>
</tr>
<tr>
<td>5. European Tamarack</td>
<td>Larix decidua</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>6. Native Tamarack</td>
<td>Larix laricina</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>7. Dawn Redwood</td>
<td>Metasequoia glyptostroboidea</td>
<td>Cupressaceae</td>
</tr>
<tr>
<td>8. Norway Spruce</td>
<td>Picea abies</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>9. White Spruce</td>
<td>Picea glauca</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>10. Black Spruce</td>
<td>Picea mariana</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>11. Serbian Spruce</td>
<td>Picea omorika</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>12. Colorado Spruce</td>
<td>Picea pungens</td>
<td>Pinaceae</td>
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<tr>
<td>14. Mugo Pine</td>
<td>Pinus mugo</td>
<td>Pinaceae</td>
</tr>
<tr>
<td>15. Austrian Pine</td>
<td>Pinus nigra</td>
<td>Pinaceae</td>
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<tr>
<td>16. Red Pine</td>
<td>Pinus resinosa</td>
<td>Pinaceae</td>
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<td>17. Eastern White Pine</td>
<td>Pinus strobus</td>
<td>Pinaceae</td>
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<tr>
<td>18. Scots Pine</td>
<td>Pinus sylvestris</td>
<td>Pinaceae</td>
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<td>19. Douglas Fir</td>
<td>Pseudotsuga menziesii</td>
<td>Pinaceae</td>
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<tr>
<td>20. Yew</td>
<td>Taxus sp.</td>
<td>Taxaceae</td>
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<tr>
<td>21. Eastern White Cedar</td>
<td>Thuja occidentalis</td>
<td>Cupressaceae</td>
</tr>
<tr>
<td>22. Eastern Hemlock</td>
<td>Tsuga canadensis</td>
<td>Pinaceae</td>
</tr>
</tbody>
</table>

**DECIDUOUS – OPPOSITE ARRANGEMENT**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Amur Maple</td>
<td>Acer ginnala</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>2. Manitoba Maple</td>
<td>Acer negundo</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>3. Japanese Maple</td>
<td>Acer palmatum</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>4. Striped Maple</td>
<td>Acer pensylvanicum</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>5. Norway Maple</td>
<td>Acer platanoides</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>6. Sycamore Maple</td>
<td>Acer pseudoplatanus</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>7. Red Maple</td>
<td>Acer rubrum</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>8. Silver Maple</td>
<td>Acer saccharinum</td>
<td>Aceraceae</td>
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</table>
### CONIFERS – EVERGREEN AND DECIDUOUS

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Sugar Maple</td>
<td>Acer saccharum</td>
<td>Aceraceae</td>
</tr>
<tr>
<td>10. Mountain Maple</td>
<td>Acer spicatum</td>
<td>Aceraceae</td>
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<tr>
<td>11. Common Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>Hippocastanaceae</td>
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<tr>
<td>12. Northern Catalpa</td>
<td>Catalpa speciosa</td>
<td>Bignoniaceae</td>
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<td>13. White Ash</td>
<td>Fraxinus americana</td>
<td>Oleaceae</td>
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<tr>
<td>14. European Ash</td>
<td>Fraxinus excelsior</td>
<td>Oleaceae</td>
</tr>
<tr>
<td>15. Black Ash</td>
<td>Fraxinus nigra</td>
<td>Oleaceae</td>
</tr>
<tr>
<td>16. Green Ash</td>
<td>Fraxinus pennsylvanica</td>
<td>Oleaceae</td>
</tr>
<tr>
<td>17. Amur Cork Tree</td>
<td>Phellodendron amurense</td>
<td>Rutaceae</td>
</tr>
<tr>
<td>18. Ivory Silk Tree Lilac</td>
<td>Syringa reticulata 'Ivory Silk'</td>
<td>Oleaceae</td>
</tr>
<tr>
<td>19. Common lilac</td>
<td>Syringa vulgaris</td>
<td>Oleaceae</td>
</tr>
</tbody>
</table>

### DECIDUOUS – ALTERNATE ARRANGEMENT

<table>
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<tr>
<th>Rank</th>
<th>Tree Name</th>
<th>Genus and Family</th>
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<tbody>
<tr>
<td>1</td>
<td>American Beech</td>
<td>Fagus grandifolia Fagaceae</td>
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<td>2</td>
<td>European Beech</td>
<td>Fagus sylvatica Fagaceae</td>
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<tr>
<td>3</td>
<td>White Oak</td>
<td>Quercus alba Fagaceae</td>
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<td>4</td>
<td>Bur Oak</td>
<td>Quercus macrocarpa Fagaceae</td>
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<td>5</td>
<td>Pin Oak</td>
<td>Quercus palustris Fagaceae</td>
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<tr>
<td>6</td>
<td>Pyramidal English Oak</td>
<td>Quercus robur &quot;Fastigiata&quot; Fagaceae</td>
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<tr>
<td>7</td>
<td>Red Oak</td>
<td>Quercus rubra Fagaceae</td>
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<tr>
<td>8</td>
<td>Bitternut hickory</td>
<td>Carya cordiformis Juglandaceae</td>
</tr>
<tr>
<td>9</td>
<td>Shagbark Hickory</td>
<td>Carya ovata Juglandaceae</td>
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<tr>
<td>10</td>
<td>Butternut</td>
<td>Juglans cinerea Juglandaceae</td>
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<tr>
<td>11</td>
<td>Black Walnut</td>
<td>Juglans nigra Juglandaceae</td>
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**Evaluation Methods:**
On going written and practical testing.
## Level 2 Arborist

Summary of Total Program In-School Training Hours Level 2

<table>
<thead>
<tr>
<th>Reportable Subjects</th>
<th>Total</th>
<th>Theory</th>
<th>Practical</th>
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<tbody>
<tr>
<td>S0401  Arborist Theory II</td>
<td>24</td>
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<tr>
<td>S0402  Arborist Practices II</td>
<td>156</td>
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<tr>
<td>S0403  Plant Health Care – Pest Management</td>
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<td>S0404  Arboricultural Sciences II</td>
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<td>S0405  Arborist Tree Identification II</td>
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<td>S0406  Arborist Crane Assisted Rigging</td>
<td>30</td>
<td>24</td>
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<td>S0407  Arborist Equipment II</td>
<td>24</td>
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<td>S0408  Arborist Calculations</td>
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<td>Total</td>
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Number: S0401

Title: Arborist Theory II

Duration: 24 Total

Theory: 24 Hours   Practical: 0 hours

Prerequisites: Level 1

Cross-reference to training standard: U7161.01-.11, U7162.01; U7166.01-12; U7167.06, 07, 09,14,17; U7168.01, 11

General Learning Objective:

Demonstrate a thorough, working knowledge of safe work site requirements; tree wound/defect corrective measure selection; woody plant selection and installation; and spraying, fertilizing and pneumatic equipment selection, inspection, adjustment, maintenance, set up and use.

Learning Outcomes and contents:

S0401.8.1 Identify, select and describe corrective measures for wounds and defects in woody plants.

Identify types wounds and defects
- Mechanical wounds to root, trunk and branches
- Visible girdling roots
- Sunscald
- Frost cracks
- Seams
- Cavities
- Weak scaffold structure

Severity assessment
Treatment of wounds and defects
- Method selection
- Severity
- Bark tracing
- Girdling root removal
- Sunscald treatment
- Rigid bracing installation
- Flexible bracing installation
- Cavity treatment
- Root pruning on construction site
Monitoring success of treatment

S0401.8.2 Select woody plant materials for installation.

Select nursery stock
- Quantity
- Size
- Species
- Health
- Structure

Site conditions
Cultural requirements
Transplant methodology
Transplant shock
Initial maintenance requirements

S0401.8.3 Describe techniques for transplanting woody plant materials.

Inspect nursery stock
- Selection in the field
- Inspection prior to planting

Digging woody plants for transplanting
- Bare root
- Balled and burlapped
- Tree spading
- Containerized

Transporting woody plants
- Handling
- Loading
- Protecting
- Interim storage

Preparing planting sites
- Planting location
- Planting medium preparation
- Correcting compaction
- Correcting nutrient deficiencies
- Drainage provision
- Excavation
- Pit configuration

Woody plant installation
- Root and crown pruning
- Placement, orientation and leveling
- Planting depth
- Anchoring
- Backfilling
• Removal of burlap, basket wire, containers, labels, seals and ribbons.
• Mulching
• Watering
• Site clean-up

Follow-up inspection, maintenance and monitoring
• Pruning
• Anchor removal
• Trunk guard removal
• Mulching
• Watering
• Nutrients
• Plant health

Evaluation Methods:
On going written testing
Number: S0402

Title: Arborist Practices II

Duration: 156 Total Hours

Theory: 0 hours Practical: 156 hours

Prerequisite: Level 1

Cross-reference to training standard: U7160.01-.13; U7161.01-.11, U7162.01-.09, U7163.01-.12, U7164.01-.24, U7165.05,

General Learning Objective:

Demonstrate a thorough, working knowledge of arboricultural safety equipment, manual and powered tools, including chainsaws, and work site operations and safety, including ascending to and descending from work positions in trees, standard and specialty tree removal techniques, and tree wound/defect correction.

Learning Outcomes and contents:

S0402.9.1 Work in a safe manner on site

Worksite hazard management update (review Unit S0247.2.2; 2.3)
Worksite security update (review Unit S0247.2.3)
Chainsaw safety (review Unit S049.4.3)
Ascent and descent trees (review Unit S0247.2.14)
Rope terminology (review unit S0247.2.10)
Knots (review unit S0247.2.10)

S0402.9.2 Ascent and descent tree with climbers (spurs)

Pre-climbing preparation
Spurring with fall restrict tool
Spurring on belay
Spurring with double lanyard

S0402.9.3 Select, inspect, adjust, maintain, set-up, use and store manual and powered tools and equipment common to arboricultural operations.

Manual/power tools and equipment update (review of Unit SO249.4.1)
  • Selection
  • Inspection
• Adjustment
• Maintenance
• Use
• Storage

Rigging equipment (review Unit S0247.2.16)
• Selection
• Inspection
• Adjustment
• Maintenance
• Operate
• Storage

Perform required pruning operation (review Unit S0247.2.11 not including Pruning methods) using chainsaw aloft
• Chainsaw selection
• Job size
• Size of wood to be cut
• Bar length
• Power to weight ratio
• Pre-operational inspection/maintenance
• Operation
• Personal protective equipment
• Starting/stopping chainsaw
• Secure/prepare work area
• Working position
• Escape routes
• Cuts and notches
• Climbing procedures
• Pruning cuts
• Ongoing inspection and maintenance

S0402.9.4 Remove trees using felling techniques.

Method and tools/equipment selection
• Factors affecting removal method
• Identifying tree to be removed
• Plant characteristics/condition
• Living/dead
• Central leader/multi-stemmed
• Structural defects
• Site conditions
• Job requirements
• Potential hazards
Fall zone preparation
Danger zone preparation
• Escape Route

Tree felling
• Tree condition
• Balanced tree
• Unbalanced/leaning tree
• Tree with splits or cavities
• “Hung up” trees
• Felling cuts
• Conventional notch
• “V” notch and back cut
• “Humboldt” notch and back cut
• Boring and back cut
• Side notching
• Modifying the hinge to adjust direction of fall
• Felling assist devices
• Wedges
• Levers
• Pull ropes
• Tackle blocks
• Free fall
• Conventional drop rigging
• Rigging using lowering devices
• Knots
• Zeppelin bend
• Timber hitch
• Cow hitch
• Alpine butterfly

S0402.9.5 Remove and prune trees using rigging techniques.

Review rigging calculations method and tools/equipment selection
• Factors affecting removal method
• Identifying tree to be removed
• Plant characteristics/condition
• Living/dead
• Central leader/multi-stemmed
• Structural defects
• Site conditions
• Job requirements
• Potential hazards

Fall zone preparation
Danger zone preparation
Sectional removals
- Free fall
- Conventional drop rigging
- Rigging using lowering devices

S0402.9.6 Handle/dispose of debris

Bucking and climbing
- Progression of operation
- Top to bottom/bottom to top
- Non-tensioned/tensioned
- Compression/tension wood
- Potential for rolling
- Limb by limb technique
- Sweep technique

Handle/dispose of debris
- Piling brush for chipping
- Lifting/carrying brush and large wood
- Loading brush and large wood on vehicles
- Chipping brush
- Disposal/recycling

Site clean-up

S0402.4.9.7 Describe the various tree climbing systems

Types of cabling systems
- Dynamic versus static
- Steel versus cobra

Components of climbing systems
- Lags
- Thimbles
- 7 stand 50 gauge cable
- Threaded rod
- Mone eye nuts
- Lock washers and nuts

Installation Procedures
- Steel with J lag
- Steel with threaded rod
- Cobra system

Evaluation Methods:
Ongoing practical/performance testing, supplemented with written testing, as appropriate.
Number: S0403

Title: **Arborist Plant Health Care - Pest Management**

Duration: 48 Total Hours

*Theory: 48 hours  Practical: 0 hours*

Prerequisite: N A

Cross-reference to training standard: U7167.01 -.03, 05, 06, .13-16. U7166.01-03, U7167.01-03, 05, 06, 14-16

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**General Learning Objective:**

Demonstrate a working knowledge of the care and treatment of woody plant insects, mites, diseases and disorders using Integrated Pest Management systems.

**Learning Outcomes and contents:**

S0403.10.1 Identify insect and mite pests of woody plants

- **History of pest control in arboriculture**
- **Pest management systems**
  - Integrated pest management
  - Plant health care
  - Components of the new systems
- **Diagnosis of plant problem**
  - Diagnostic techniques
  - Thought process for correct diagnosis
  - Diagnostic agencies
  - Sampling of soil and woody plant tissue
  - Assessment of tree
  - Systematic inspection techniques
  - Determination of normal and abnormal growth for species
- **Assessment of site conditions**
  - Soil
  - Ph
  - Texture/structure
  - Oxygen availability
  - Water availability
  - Space available
  - Light availability
• Environmental conditions
• Temperature extremes/hardiness zones
• Human activities - past and present
• Cultural practices

Identification of primary and secondary stresses
Identification of signs and symptoms

Arboricultural reference material available

Insects

Signs and symptoms of each main group

• Defoliators
• Whole leaf and skeletonizers
  - Sawflies
  - Eastern tent caterpillar
  - Elm leaf beetle
  - Fall webworm
  - Forest tent caterpillar
• Leaf miners
• Birch leaf miner
• Cedar leaf miner
• Elm leaf miner
• Sap suckers
  - Aphids
  - Scales
  - Spider mites
• Wood borers
  - Asian long horned beetle
  - Bronze birch borer
  - Emerald ash borer
• Gall makers
  - Cooley spruce gall Adelgid
  - Eastern spruce gall
• Beneficial insects
  - Lady beetles
  - Parasitic wasps

Amount of damage that can be done by each insect group

Identification features

Life cycle

Timing pest management
S0403.10.2 Discuss and describe control measures.

Life cycle information
- Action threshold information
- Identification of weak link (best time to treat)
- Use of phonology to time control methods

Range of control strategies
- Education
- Prevention of damage
- Redesigning the landscape
- Elimination of problem trees
- Resistant species
- Cultural
- Fertilization
- Mulching
- Watering
- Aeration
- Sanitation
- Mechanical/physical
- Biological
- Insects
- Biological (continued)
- Pathogens e.g. Bacillus thuringiensis varieties

Chemical
- Horticultural oil
- Insecticidal soap
- Sulphur
- Botanical
- Pheromones

Determination of best control method
- Government legislation
- Safety of pesticides
- Ld 50 rating of active ingredients and products
- Applicator’s exposure to pesticide
- Effects of pesticide on humans
- Symptoms
- Antidotes
- Safety of non-target organisms
- Possibility of environmental contamination
- Client preference
- Type of woody plant

Integrating treatments for maximum effectiveness at minimum cost
Monitoring success of treatment
S0403.10.3 Identify diseases and disorders of woody plants

Diseases
- Pathogens that cause disease - fungus, bacteria, virus
- Disease cycle
- Pathogen requirements
- Host environments
- Environmental condition requirements

Leaf diseases
- Deciduous - e.g. Apple scab
- Coniferous - e.g. Needle cast
- Signs and symptoms
- Potential damage caused

Branch and stem diseases - e.g. cytospora canker
- Signs and symptoms
- Potential damage caused

Root diseases - e.g. armilleria root rot
- Signs and symptoms
- Potential damage caused

Vascular diseases - e.g. Dutch Elm Disease
- Signs and symptoms
- Potential damage caused

Disorders
- Moisture problems
- Insufficient moisture
- Excessive moisture
- Signs of disorder
- Potential damage caused
- Nutrient deficiencies
- Soil testing
- Foliar testing
- Signs of disorder
- Potential damage caused
- Animal damage
- Signs of disorder
- Potential damage caused
- Human activities
- Construction damage
- Signs of disorder
- Potential damage caused
- Pollution
- Soil, salt
- Air
- Signs of disorder
• Potential damage caused
• Pesticide damage
• Temperature extremes
• Desiccation
• Signs of disorder
• Potential damage caused
• Poor planting practices
• Planting too low/high
• Girdling ropes and ties
• Girdling roots
• Improper pruning
• Signs of disorder
• Potential damage caused

S0403.10.4 Describe and discuss control measures

Life cycle information
• Action threshold information
• Identification of weak link (best time to treat)
• Use of phenology to time control methods
• Range of control strategies available
• Education
  ➢ Prevention of damage
• Redesigning the landscape
  ➢ Elimination of problem trees
  ➢ Resistant species
• Cultural
  ➢ Fertilizers
  ➢ Mulches
  ➢ Watering
  ➢ Aeration
  ➢ Sanitation
• Mechanical/physical
• Biological
  ➢ Pathogens
• Chemical
  ➢ Sulphur

Determination of best control method
• Government legislation
• Safety of pesticides
• LD 50 Rating of active ingredients and products
• Applicator’s exposure to pesticide
• Safety of non-target organisms
• Possibility of environmental contamination
- Client preference
- Type of woody plant

Integrating treatments for maximum effectiveness at minimum cost
Monitoring success of treatments

Evaluation Methods:
Written assignments and ongoing written testing
Number: S0404

Title: Arboricultural Science II

Duration: 30 Total Hours

Theory: 30 hours    Practical: 0 hours

Prerequisite: N A

Cross reference to training standard: U7167.01, 03, 05, 06, 13,16; U7166.01, 03, U7167.01; 03, 05, 06, 14-16

General Learning Objective:

Demonstrate a working knowledge of plant growth and development, including the impact of sudden and long-term environmental change and soil quality on plant growth. Demonstrate a working knowledge of soils as a medium for plant growth, including testing and prescribing treatment for chemical deficiencies.

Learning Outcomes and contents:

S0404.11.1 Describe the physical qualities of soil that impact on plant growth

Soil types and textures
- Drainage
- Aeration/porosity
- Water retention

Soil compaction

Soil volume
- Soil depth
- Surface area

S0404.11.2 Prescribe methods of modifying the physical qualities of soil to improve plant growth.

Compaction
Aeration
Drainage
Temperature
Moisture retention
Nutrients
Minimum volume of soil
• Fertilizer
• Humus

S0404.11.3 Determine chemical quality of soil for plant growing purposes

Soil nutrients
• Micro
• Macro

Soil reaction
• Ph
• Cation Exchange Capacity (C.E.C)
• Electrical Conductivity (E.C.)

Soil sampling
• Soil probe
• Sampling locations

Soil/plant tissue testing
• Soil test kits
• Laboratory testing

Test results
• Interpretation

S0404.11.4 Prescribe methods of treating chemical deficiencies in soil

Fertilizing
Ph adjustment
Mycorrhizal inoculation

Evaluation Methods:
Ongoing written testing and assignments.
Number: S0405
Title: Arborist Tree Identification II
Duration: 36 Total Hours
Theory: 36 hours   Practical: 0 hours
Prerequisite: Level 1
Cross reference to training standard: U7162.03; U7163.01; U7165.01; U7166.01

General Learning Objective:
Demonstrate a thorough working knowledge of tree genera, species and cultivars by identifying 50 additional plants commonly found in Ontario.

Learning Outcomes and contents:

S0405.12.1 Identify an additional 50 common woody plants according to species and morphological characteristics using the International System of Plant Nomenclature.

Review unit S0246.1.7

Plant groups
- Herbaceous/woody
- Deciduous/evergreen
- Needled/broad-leaved conifers
- Native/exotic
- Invasive

Plant nomenclature for each plant
- Family
- Genus
- Species
- Variety/cultivar
- Common name

Identification characteristics for each plant
- Leaves/needles
- Flowers/seeds
- Buds
- Bark
- Growth habit and form

Cultural requirements for each plant
- Moisture
- Light
- Hardiness
- Soil
- Pruning

S0405.12.2 Tree list

<table>
<thead>
<tr>
<th>DECIDUOUS – ALTERNATE ARRANGEMENT</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Japanese Angelica Tree</td>
<td>Aralia elata</td>
<td>Areliaceae</td>
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<tr>
<td>2 Staghorn Sumac</td>
<td>Rhus typhina</td>
<td>Amaciaceae</td>
<td></td>
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<tr>
<td>3 European Alder</td>
<td>Alnus glutinosasa</td>
<td>Betulaceae</td>
<td></td>
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<tr>
<td>4 Yellow Birch</td>
<td>Betula alleghaniensis</td>
<td>Betulaceae</td>
<td></td>
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<tr>
<td>5 River birch</td>
<td>Betula nigra</td>
<td>Betulaceae</td>
<td></td>
</tr>
<tr>
<td>6 White Birch</td>
<td>Betula papyrifera</td>
<td>Betulaceae</td>
<td></td>
</tr>
<tr>
<td>7 European White Birch</td>
<td>Betula pendula</td>
<td>Betulaceae</td>
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<tr>
<td>8 Hornbeam, Blue Beech</td>
<td>Carpinus caroliniana</td>
<td>Betulaceae</td>
<td></td>
</tr>
<tr>
<td>9 Turkish Hazel</td>
<td>Corylus columa</td>
<td>Betulaceae</td>
<td></td>
</tr>
<tr>
<td>10 Hophornbeam, Ironwood</td>
<td>Ostrya virginiana</td>
<td>Betulaceae</td>
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<tr>
<td>11 Honey Locust</td>
<td>Gleditsia triacanthos</td>
<td>Caesalpiniaceae</td>
<td></td>
</tr>
<tr>
<td>12 Kentucky Coffee Tree</td>
<td>Gymnocladus dioicus</td>
<td>Caesalpiniaceae</td>
<td></td>
</tr>
<tr>
<td>13 Pagoda Dogwood</td>
<td>Cornus alternifolia</td>
<td>Cornaceae</td>
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<tr>
<td>14 Russian Olive</td>
<td>Elaeagnus angustifolia</td>
<td>Elaeagnaceae</td>
<td></td>
</tr>
<tr>
<td>15 Black Locust</td>
<td>Robinia pseudoacacia</td>
<td>Fabaceae</td>
<td></td>
</tr>
<tr>
<td>16 Ginkgo, Maidenhair Tree</td>
<td>Ginkgo biloba</td>
<td>Ginkgoaceae</td>
<td></td>
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<tr>
<td>17 American Sweetgum</td>
<td>Liquidamber styraciflua</td>
<td>Hammamnelidaceae</td>
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<tr>
<td>18 Eastern Redbud</td>
<td>Cercis canadensis</td>
<td>Leguminoaceae</td>
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<tr>
<td>19 Tuliptree, Yellow Poplar</td>
<td>Liriodendron tulipifera</td>
<td>Magnoliaceae</td>
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<tr>
<td>20 White Mulberry</td>
<td>Morus alba</td>
<td>Moraceae</td>
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<tr>
<td>21 Red Mulberry</td>
<td>Morus rubra</td>
<td>Moraceae</td>
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<tr>
<td>22 London Plane Tree</td>
<td>Platanus X acerifolia</td>
<td>Platanaceae</td>
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<tr>
<td>23 Sycamore</td>
<td>Plantanus occidentalis</td>
<td>Platanaceae</td>
<td></td>
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<tr>
<td>24 European Buckthorn</td>
<td>Rhamnus cathartica</td>
<td>Rhamnaceae</td>
<td></td>
</tr>
<tr>
<td>25 Downy Serviceberry</td>
<td>Amelanchier arborea</td>
<td>Rosaceae</td>
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<tr>
<td>26 Hawthorn</td>
<td>Crataegus sp.</td>
<td>Rosaceae</td>
<td></td>
</tr>
<tr>
<td>27 Apple, crabapple</td>
<td>Malus sp.</td>
<td>Rosaceae</td>
<td></td>
</tr>
<tr>
<td>28 Pin Cherry</td>
<td>Prunus pensylvanica</td>
<td>Roseaceae</td>
<td></td>
</tr>
<tr>
<td>29 Black Cherry</td>
<td>Prunus serotina</td>
<td>Rosaceae</td>
<td></td>
</tr>
<tr>
<td>30 Choke Cherry</td>
<td>Prunus virginiana</td>
<td>Rosaceae</td>
<td></td>
</tr>
<tr>
<td>31 Pyrus calleryana 'Chanticleer'</td>
<td>Chanticleer pear</td>
<td>Rosaceae</td>
<td></td>
</tr>
</tbody>
</table>
### Arborist/Utility Arborist

<table>
<thead>
<tr>
<th></th>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>American Mountain Ash</td>
<td><em>Sorbus americana</em></td>
<td>Rosaceae</td>
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<tr>
<td>33</td>
<td>European Mountain Ash</td>
<td><em>Sorbus aucuparia</em></td>
<td>Rosaceae</td>
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<tr>
<td>34</td>
<td>White Poplar</td>
<td><em>Populus alba</em></td>
<td>Salicaceae</td>
</tr>
<tr>
<td>35</td>
<td>Balsam Poplar</td>
<td><em>Populus balsamifera</em></td>
<td>Salicaceae</td>
</tr>
<tr>
<td>36</td>
<td>Carolina Poplar</td>
<td><em>Populus x canadensis</em></td>
<td>Salicaceae</td>
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<tr>
<td>37</td>
<td>Largetooth Aspen</td>
<td><em>Populus grandidentata</em></td>
<td></td>
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<tr>
<td>38</td>
<td>Lombardy Poplar</td>
<td><em>Populus nigra &quot;Italica&quot;</em></td>
<td>Salicaceae</td>
</tr>
<tr>
<td>39</td>
<td>Trembling Aspen</td>
<td><em>Populus tremuloides</em></td>
<td>Salicaceae</td>
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<tr>
<td>40</td>
<td>Weeping Willow</td>
<td><em>Salix alba ‘Tristis’</em></td>
<td>Salicaceae</td>
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<tr>
<td>41</td>
<td>Crack Willow</td>
<td><em>Salix fragilis</em></td>
<td>Salicaceae</td>
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<tr>
<td>42</td>
<td>Black Willow</td>
<td><em>Salix nigra</em></td>
<td>Salicaceae</td>
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<tr>
<td>43</td>
<td>Tree of Heaven</td>
<td><em>Ailanthus altissima</em></td>
<td>Simaroubaceae</td>
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<tr>
<td>44</td>
<td>American Basswood</td>
<td><em>Tilia americana</em></td>
<td>Tiliaceae</td>
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<tr>
<td>44</td>
<td>Littleleaf Linden</td>
<td><em>Tilia cordata</em></td>
<td>Tiliaceae</td>
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<tr>
<td>45</td>
<td>Common Hackberry</td>
<td><em>Celtis occidentalis</em></td>
<td>Ulmaceae</td>
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<tr>
<td>46</td>
<td>American Elm</td>
<td><em>Ulmus americana</em></td>
<td>Ulmaceae</td>
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<td>47</td>
<td>Scots Elm</td>
<td><em>Ulmus glabra</em></td>
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<tr>
<td>48</td>
<td>English Elm</td>
<td><em>Ulmus procera</em></td>
<td>Ulmaceae</td>
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<tr>
<td>49</td>
<td>Siberian Elm</td>
<td><em>Ulmus pumila</em></td>
<td>Ulmaceae</td>
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<tr>
<td>50</td>
<td>Slippery Elm</td>
<td><em>Ulmus rubra</em></td>
<td>Ulmaceae</td>
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</tbody>
</table>

**Evaluation Methods:**
*Ongoing written testing and assignments*
Number: S0406

Title: Arborist Crane Assisted Rigging

Duration: 24 Total Hours

Theory: 24 hours Practical: 6 hours

Prerequisite: Level 1

Cross reference to training standard:
________________________________________________________________

General Learning Outcome:

Demonstrate knowledge of crane-assisted safe work site rigging operations including calculating load weights and distribution, determining balance point, assessing and determining choker locations, ascending to and descending from work points and performing tree and limb removal with rigging devices.

Learning outcomes and contents:

S0406.13.1 Describe how to plan and set up work sites

Interpret worksite documentation
- Worksite specifications
- Crane specifications and load weights, i.e. Load capacity charts, green log charts
- Working radius/ landing zone location
- Hook height
- Load path, i.e. Route from lift to landing
- Work orders
- Scope of work
- Personnel required/ job responsibilities
- Worksite hazards

Equipment required
- Butt rope
- Tag line
- Slings
- Rigging devices
- Ground protection mats

Determine job site limits
- Property lines
- Structures i.e. Buildings, fences
• Safe limits of approach
• Overhead utilities i.e. electrical, communications
• Buried utilities i.e. Water, gas, electrical, communications
• Underground structures i.e. Septic systems, cisterns, wells, gravesites,

Establish work sequence
• Methodologies required
• Identify hazards / plan barriers
• Site conditions
• Tools/equipment selected

Environmental hazards
• Restricted visibility, i.e. Glare, fog, darkness
• Wet/ice/snow conditions
• Wind
• Thunder & lightning
• Temperature extremes

Tree hazards
• Hangers and split branches
• Deadwood
• Excessive fill over root zone
• Root, stem/trunk and branch rot and cavities
• Cracks, seams and ribs
• Wood under tension
• Wind-thrown trees
• Wildlife, i.e. stinging insects, raccoons

Ground hazards
• Debris
• Unstable ground
• Slippery ground
• Slopes/uneven ground/embankments
• Structures, i.e. Bridges, culverts, foundations, retaining walls
• Wildlife, holes and dens
• Trip hazards
• Deep snow

Proximity to other workers/equipment

Wood characteristics
• Tension wood
• Compression wood
• Seasonal fluctuations
• Wood strength
S0406.13.2 Describe methods to establish and maintain worksite communication

Communication Methods (*No response shall be made to unclear signals*)
- Verbal communication – *clear command equals clear response*
- Direct communication
- 2 way radios / cell phones
- Specific hand signals with crane operator:
  - Raise load
  - Lower load
  - Raise boom
  - Lower boom
  - Stop
  - "Dog it"
  - Go
  - Back up
  - Straight
  - To the right
  - To the left
  - Emergency stop
  - All clear
  - Shut down power
  - Traffic control signals

Written communication, i.e. Job plan
- Designated signal person
- Establish a hoist line pretension signal

S0406.13.3 Describe how to perform tree and limb removals with hoisting devices

Establish barriers according to job plan and regulations
- Safe limits of approach for electrical utilities
- Dedicated observer / signal person
- Blind lifts
- Proximity to electrical conductors
- Controlling public access
- Traffic controls including road closure permits
- Controlling load path access

Assist the crane operator to set up crane according to job plan
Collaborate with the crane operator to determine the weight, balance points and sequence of lifts
- Calculate load weights and distribution
- Allowances for seasonal variations such as seed / fruit
Arborist/Utility Arborist

- foliage and sap content
- Environmental factors such as wind, rain, snow and ice
- Using green log weight charts
- Side loading of cranes
- Considering wood characteristics

Communicate job plan to all personnel

Select rigging equipment
- Types of sling, i.e. Synthetic fibre, wire rope, chain
- Configuration, i.e. Eye to eye, endless loop, spreaders,
- Length and diameter
- Hardware i.e. Clevis, spreader

Inspect rigging equipment for
- Rating tags, attached and legible
- Excessive wear and damage i.e. Abrasion, crushing,
bends, bird caging, kinks

Ascend tree

Assess selected attachment point(s)
- Structural integrity, i.e. loose bark, decay

Connect to attachment point(s)

Orientation of sling(s) on load

Signal to pretension hoist line to estimated weight of load

Inspect rigging system

Verify connections are secure

Positioning of boom relative to load

Reposition to cutting location
- Remove any branches interfering with cutting operation
- Install guide lines or butt lines if required
- Assess cutting position for inadvertent load movement

Communicate with crane operator the intent to begin the cutting
operation

Perform cutting operation
- Simple straight cut

Traditional cuts

Prepare the load to transfer to landing area
- Remove butt line if installed
- Direct usage of guidelines if required

Signal crane operator to land load

S0406.13.4 Describe maintenance and storage of rigging equipment

Maintain rigging equipment as per manufacturer’s instructions
- Cleaning
- Lubricating / oiling
- Repairing as required
- Drying as required
Storage as per manufacturer’s instructions
  • Coiling, wrapping, hanging
  • Out of direct sunlight
  • Out of corrosive atmosphere
  • Protected from nicks or abrasions
  • Away from destructive substances

Evaluation Methods:
Ongoing written testing and assignments
Number: S0407
Title: Arborist Equipment 2
Duration: 24 Hours
Theory: 8 Hours Practical: 16 Hours
Prerequisite: Level 1

GENERAL LEARNING OBJECTIVE:
Demonstrate a thorough working knowledge of stumpers and aerial devices.

Learning outcomes and contents:
S0407.14.1 Describe types of stumpers
Self propelled
Trailer mounted

S0407.14.2 Describe how to prepare stumper for transport
Stumper circle check
- Visual defects
- Loose, worn, cracked, broken nuts/bolts/pins
- Fluid levels and leaks
- Tension of belts
- Condition of guards and shields
- Cutter teeth sharpness
- Reporting deficiencies
Legislated requirements
- Towing requirements
Manufacturer’s instructions
Loading and securing non-trailer stumper for transport
Hitching stumper to tow vehicle
- Pintle or Ball Hitch
- Pin hitch
- Inspection of hitching mechanism including tongue
- Safety chains attached in crossed (cradled) arrangement and safety hooks facing upward
- Brake inspection and hookup
- Signal tail light connection and test
- Tire/rim condition
- Stumper jack positioning for travel
S0407.14.3 Describe how to setup stumper for use on site.

Manufacturer’s instructions
Legislated requirements
Underground utility locations
Setup procedure
  • Site selection
  • Level ground
  • Stable ground
  • Work site limits and security
  • Securing stumper
  • Grinding wheel orientation and control
  • Monitoring work site changes
  • Stumper work positioning
  • Stable ground
  • Stump site preparation
  • Unhitching from tow vehicle
  • Locking pin removal
  • Safety curtains and operator shield
  • Movable control panel setup
  • Monitoring work site changes

Preoperational checks prior to start-up
  • Stumper circle check
  • Visual defects
  • Loose, worn, cracked broken nuts/bolts/pins
  • Fluid levels and leaks
  • Tension of belts
  • Condition of guards and shields
  • Teeth sharpness, angle and condition
  • Grinder wheel condition
  • Reporting deficiencies

Operational inspection
  • Start up procedures
  • Gauges and warning lights functioning
  • Position of cutter wheel to stump
  • Clutch engagement and functioning
  • Engine speed
  • Chain oil function
  • Reporting deficiencies
S0407.14.4 Describe how to operate stumpers

Manufacturer’s operating procedures
- Legislated requirements
- Personal protective equipment
- Footwear
- Coveralls
- Gloves
- Headgear
- Eye protection
- Ear protection
- Pedestrian and vehicular control device use

Stump/site preparation
- Chain oil activation
- Initial grinder wheel location
- First cut – light
- Progressive wheel lowering
- Desired depth of cut
- Significance of wood type
- Re-positioning for second cut, if necessary

Normal shut-down procedures
Emergency shut down procedures
Post operational clean-up

S0407.14.5 Describe preparation for using aerial device

Types of aerial device
- Truck mounted
- Self propelled

Legislated requirements
Manufacturer’s instructions
Pre-operational checks
- Vehicle circle check
- Check tire pressures
- PTO check
- Aerial device circle check
- Bucket inspection
- Hand line
- Dielectric test certificate
- Electrical integrity of boom
- Holding valve check
- Safety interlock check
- Control valve checks
- Hydraulic system check
- Leaks
• Loose fittings
• Hydraulic oil level
• Breather cap
• Fall protection systems check
• Bucket escape equipment check
• Bucket rescue equipment check
• Outriggers and pads inspection

Aerial device setup
• Traffic control devices
• Vehicular
• Pedestrian
• Flag person
• Vehicle warning light
• Site selection
• Surface slope/terrain
• Overhead obstructions
• Removal/stowing of covers
• Stabilizing vehicle
• Vehicle parking brake
• Wheel chocks
• Engaging PTO
• Setting outriggers/equipment holders

Personal protective equipment
• Approved footwear
• Eye protection
• Hand protection
• Safety helmet

Fall protection systems
• Body harness
• Shock-absorbing lanyard

S0407.14.6 Describe the use of aerial device for arboricultural operations

Loading tools, equipment and materials into bucket
• Job requirements
• Manufacturers instructions
• Legislated requirements
• Hydraulic tool attachment
• Emergency equipment
• Coordination with ground crew

Aerial device operation
• Manufacturer’s instructions
• Legislative requirements
• Mounting/dismounting bucket using 3 points of contact
- Ground person responsibilities
- Engaging PTO
- Upper/lower controls
- Raise bucket
- Rotate boom
- Lower bucket
- Work positioning
- Electrical awareness
- Tree pruning from bucket
- Tree sectional removal from bucket
- Tree maintenance from bucket
- Transferring between bucket and tree
- Fall arrest system
- Monitoring aerial device condition
- Emergency hydraulic shut off
- Hydraulic failure
- Engine failure

Aerial device movement with operator in bucket
- Short distances
- Speed and direction of movement
- Operator and bucket security
- Boom positioning
- Surface conditions
- Disengaged PTO

Aerial device transport
- Manufacturer’s instructions
- Legislative requirements
- Securing aerial device for transport
- Stowing and securing boom
- Retracting outriggers
- Disengage PTO
- Debris removal

S0407.14.7 Describe aerial device escape and rescue procedures

- Source of problem
- Investigation/diagnosis of cause
- Control/correction/alleviation
- Condition of operator
- Calling for assistance

Escape from a disabled aerial device
- Operator functional
- Proximity of energized conductors
- Use of emergency pump
• Use of lower controls
• Transferring from a disabled aerial device into a second aerial device
• Transferring from a disabled aerial device into a tree
• Use of lifeline

Rescue of a disable operator
• Lower control use
• Positioning of bucket to flat surface
• Tipping bucket
• Using a rescue rig
• Removing disabled worker
• Emergency first aid

S0407.14.8 Describe aerial device preventative maintenance

Manufacturer's instructions
Legislative requirements

Evaluation methods:
On going written and practical testing
Arborist/Utility Arborist

Number: S0408

Title: Arborist Calculations

Duration: 12 Total Hours

Theory: 12 Hours Practical: 0 Hours

Prerequisite: N A

Cross-reference to training standard:
U7162.01; U7163.04, 08, .09; U7164.15, 17, 18

GENERAL LEARNING OBJECTIVE:

Demonstrate a thorough knowledge of mathematics typically necessary in the industry.

Learning outcomes and contents:

S0408.15.1 Determine quantities of materials required based on linear, area and volume calculations, in both systems of measurement.

Systems of measurement
  • System International (metric)
  • Foot Pound Second and Imperial
  • Conversions

Dimensions of measurement
  • Linear / Area measures
  • Volume / Mass measures

Quantity determination
  • Appropriate units of measure
  • Shrinkage and expansion factors

S0408.15.2 Determine rigging equipment

Ropes
  • Construction
  • Materials
  • Safe working load limits
  • Tensile strength
  • Inspection
Carabiners
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Slings
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Pulleys
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Arborist blocks
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Port-a-wrap
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Figure 8
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Mechanical lowering devices
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection
Quick links and shackles
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

Block and tackle
- Construction
- Materials
- Safe working load limits
- Tensile strength
- Inspection

S0408.15.3 Determine shock loading on ropes and equipment

Newton's law
Calculating force
Progressive calculations
Safety margin
- Heat
- Elasticity
- Friction
- Safety factors
- Cycles to failure
- Wood densities

S0408.15.4 Determine mechanical advantage when using block and tackle equipment.

Block and tackle methodology/principles
Calculations of forces
- Anchor points
- Pulleys
- Lines

Evaluation methods:
Written testing
Level 2 Utility Arborist

Summary of Total Program In-School Training Hours Level 2

<table>
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<tr>
<th>Reportable Subjects</th>
<th>Total</th>
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<td>Utility Arborist Theory II</td>
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Number: S0259
Title: Utility Arborist Workplace Safety II
Duration: 18 Total Hours
Theory: 18 hours    Practical: 0 hours
Prerequisite: Arborist Workplace Health and Safety I
Cross-Reference to training standard: U6040.01 - .14, U6041.01 - .11, U6042.02, .04, .07, .09, .11, .13 - .16, U6043.05, U6044.05, U6045.01, .02, .11, .12, .20, .23, .24, U6046.02, .03, .05 - .07, .10, .14 - .16, U6047.05, .06, .09, .11, U6048.01, .10, .11, .14, U6050.01, .02, .08, U6051.07 - .10

General Learning Objective:

Demonstrate a working knowledge of pertinent safety and related legislation as they apply to Utility Arboricultural safe workplace practices; and deal with potentially dangerous on-site conditions, emergencies, hazards and materials.

Learning Outcomes and contents:

S0259.16.1 Describe the requirements of federal, provincial and municipal legislation and regulations governing all aspects of the Utility Arboricultural industry.

Review Unit: S0246.1.1

Electrical Utility Safety Rules

<table>
<thead>
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Construction Regulation 213

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Highway Traffic Act

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<td>Circle checks Maintenance Logs</td>
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### Arborist/Utility Arborist

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### Pesticide Act

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### Off Road Vehicle Act

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**S0259.16.2** Identify the hazards of working in an energized environment.

**Review Unit: S0246.1.2**

**Circuit Identification**
- Distribution circuit identification - tree barrier conductor, underground conductor found overhead
- Service wire identification - triplex, open bus
- Crossarms / pole top
- Neutral identification

**Electrical System Configuration**
- Loop feeds
- Radial feeds
- Communications conductors – overhead
- Television conductors – overhead
- Underground utilities - natural gas markers, communication - pedestals

**Electrical Equipment Identification**
- Switches
- Insulators
- Transformers
- Lightening arresters
- Pole anchors
- Guy wires
S0259.16.3 Identify all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; hazards to the public.

**Review Unit: S0246.1.3**

**Tree hazards**
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs
- Compression and tension wood
- Wind-thrown trees
- Storm damage

S0259.16.4 Identify the hazards of working in an energized environment.

**Review Unit: S0246.1.2**

**Circuit Identification**
- Transmission circuit identification
- Underground hardware identification – pad mounted transformers, pole markers
- Restricted conductors
- Defective poles

**Electrical Equipment Identification**
- Reclosures
- Capacitors

S0259.16.5 Identify and describe how to handle, store and dispose of hazardous materials, commonly found in the work place.

**Materials**
- Pesticides

**Handling and disposal**
- Storage
- Notification to governing bodies e.g. fire department pesticides storage

**Evaluation Methods:**
On going written and practical testing
Number: S0260

Title: Utility Arborist Theory II

Duration: 36 Total Hours

Theory: 36 hours Practical: 0 hours

Prerequisite: Arborist Theory I

Cross-reference to training standard: U6040.14, U6041.01 - .07, .10, U6042.01 - .03, .06, .07, .09, U6043.01 - .04, .08 - .10, .12, U6044.01 - .03, U6045.01, .02, .05, .06, .08, .09, .13 - .15, .18, .19, 21, .22, .24, U6046.03, .10, .12 - .15, U6047.01 - .03, .05 - .07, .09, .10, U6051.19

General Learning Objective:

Describe how to plan work safely, identify electrical hazards, identify other hazards outside of the electrical environment, use of various knots and hitches in the Utility Arboricultural trade, pruning and removing of trees in proximity of electrical conductors, ascending, descending and performing an aerial rescue, rigging principals and how to manage fire and dangerous goods.

Learning Outcomes and contents:

S0260.17.1 Plan all work operations safely, in compliance with provincial and municipal legislation and regulations.

Review Unit: S0246.1.1

Determine required personal protective equipment
- Fall protection/work positioning systems
- Rubber Gloves
- Flame resistant clothing

Determine job site limits
- Safe limits of approach
- Overhead utilities
- Buried utilities

S0260.17.2 Describe inspecting, adjusting, maintaining and wearing required personal protective equipment.
Review Unit: S0247.2.7

Rubber gloves
- CSA approved
- Voltage class
- Pre-use inspection
- Air test
- Expiry date
- Leather covers

Flame Resistant clothing
- Correct fit
- Repair
- Cleaning
- Appropriate ASTM standard

S0260.17.3 Describe methods of eliminating or controlling electrical hazards.

Review Unit: S0246.1.2

Barriers to Electrical Energy
- Application of Utility Work Protection Code
- Use of hold offs for equipment protection
- Use of cover up
- Use of insulated aerial device

S0262.17.4 Describe how to manage all other potential hazards on the work site, including hazards in trees; overhead, on or under the ground; and hazards to the public.

Review Unit: S0246.1.3

Mechanical tools and equipment
- Hydraulic tools

S0260.17.5 Describe proper use of knots and hitches.

Rigging Knots (9 knots)
- Bowline tied away
- Jacked Bowline
- Slippery bowline
- Stilson hitch
- Timber hitch
- Marline hitch
- Machard Tresse
• Slippery knot
• Quick hitch

S0260.17.6 Describe the types and purposes of typical pruning processes and the tools and equipment required.

Review Unit: S0247.2.11

Considerations required for pruning operations.

Clearance cycles
• Cycle length
• Voltage
• Proximity
• Customer consideration
• Species characteristics
• Tree condition
• Skirts
• Overhang

Mechanical tools and equipment
• Hydraulic tools
• Pruner
• Saw
• Circular saw
• Chainsaw

Chainsaw use aloft
• Secured to climber
• Start in branch union, chain brake on
• Climber secured with secondary fall protection system e.g. work positioning lanyard
• Smooth controlled cuts
• Chainsaw shut off between climber’s movements

S0260.17.7 Describe typical tree removal processes.

Review Unit: S0247.2.14

Felling Trees in proximity to energized apparatus
• Conductor location
• Pole hardware e.g. guys, primary conductors, service conductors
• Use of guide rope
• Perpendicular felling
• Skirt hazards
• Parallel felling

Felling assist devices
- Ropes
- Tackle blocks
- Mechanical assists

Use of ropes and knots
Sectionalizing tree

S0260.17.8 Describe aerial device rescue and escape methods.

Assess the Emergency
Observation of the scene
- Electrical Conductors/Contact
- Struck by limbs, tree sections, lightning
- Is victim pinned
- Medical conditions (bug/animal bites, heat exhaustion, etc)
- Try to communicate with the victim
- Verbally

Assess the victim’s condition
- Is victim able to descend by him/her self
- Is victim unconscious
- Is victim unresponsive
- Is victim bleeding profusely

Determine need for EMS
- Determine feasibility/appropriateness of aerial rescue
- Electrical Conductors/Contact
- Rigging systems hazards
- Ground hazards
- Rescuer’s competency in performing aerial rescue
- First Aid training
- Climbing ability
- Availability of appropriate equipment and personnel

Initiate EMS response
- Aerial Device Rescue
- Use of emergency pump
- Use of lower controls
- Transfer from a disabled aerial device into a tree
- Use of lifeline and controlled descent device
- Apply Emergency First Aid
- Aerial device Escape
- Use of rescuing devices

S0260.17.9 Describe methods to prune and remove trees using an aerial device in proximity to energized electrical apparatus.

Review Units: S0247.2.6; 2.7; 2.11
Inspect, adjust and wear fall protection equipment according to manufacturer’s recommendations
Load tools, equipment and materials into bucket
Access aerial device bucket and secure fall protection system according to manufacturer’s instructions
Operate aerial device control’s while accessing desired work location
  • Monitoring limits of approach
  • Monitoring boom position, over roadways, near adjacent trees, poles, electrical conductors
  • Position bucket in optimum positions to reduce body strains while performing work
Operate tools aloft
Hand Tools
  • Handsaw
  • Fiberglass Reinforced Plastic (FRP) Pole pruner
  • Fiberglass Reinforced Plastic (FRP) Pole saw
  • Rigging ropes
  • Friction saver
  • Slings
  • Whoopie
  • Nylon web
  • Rope
Loppers
Secateurs
Friction devices
Friction savers / cambium savers
Connectors
  • Carabiners
  • Clevis
Felling levers
Wedges
Rigging blocks
  • Wire rope
  • Synthetic rope
Tackle blocks
  • Multi-sheave block
Rope pullers
Gas Powered Tools
  • Chainsaw
Hydraulic tools
  • Pruner
  • Saw
  • Circular saw
  • Chainsaw
Tool disinfection as required

Sectional removals from aerial device
- Conductor location
- Directional free fall away from energized conductor
- Conventional rigging, guide ropes, pull ropes
- Rigging using lowering devices

Control movement of cut limbs and trunk sections from aerial device
- Conductor location
- Raise/lower limbs using ropes and mechanical advantage
- Cut limbs so they will not span conductors
- Control limbs using hinge cuts
- Lower cut limbs using friction devices
- Top tree using ropes and rigging equipment
- Creating false crotch

Secure aerial device for travel according to manufacturer’s instructions
Aerial device rescue using appropriate methods
Aerial device evacuation using appropriate methods

S0260.17.10 Describe methods of herbicide application

Identify differing conditions of right of way in order to select application method.
- Species
- Brush densities
- Environmental conditions
- Terrain
- Soil type

Application methods
- Broadcast
- Stump treatment
- Basal treatment
- Soil sterilant
- Stem foliar

S0260.17.11 Identify appropriate communication skills to deal effectively with customers and in the workplace.

Speak effectively
- Give directions or responses
- Clear enunciation
- Accurate and concise speech
- Coherence of message
• Use of proper language for listener
• Monitor resultant response or action

Solve problems on job
Function as part of a team
Develop personal and work related goals
Work in a responsible manner
Solve problems occurring on the job
Function as part of a team/crew
Develop personal and work-related goals
Work in a responsible manner

Evaluation Methods:
Written testing
Number: S0261

Title: Utility Arborist Practices II – Tree Climbing

Duration: 144 Total Hours

Theory: 0 hours Practical: 144 hours

Prerequisite: Arborist Practices I

Cross-reference to training standard: U6040.02 - .11, .13, .14, U6041.01 - .07, .09 - .11, U6042.01 - .03, .05, .06, .08, .09, .12 - .15, U6043.02, .05 - .11, U6044.04 - .07, U6045.01 - .07, .10 - .24, U6046.03 - .16, U6047.04 - .09, .11, U6048.01 - .14, U6049.01 - .10, U6050.01 - .09, U 6051.11, .19

General Learning Objective:

Demonstrate a knowledge of how to plan work safely, utilizing safe work practices, pruning and removing of trees in proximity of electrical conductors, ascending, descending and performing an aerial rescue, inspect, adjust and maintain personal protective equipment and fall protection equipment utilized in the Utility Arboricultural trade and managing fire, waste and dangerous goods.

Learning Outcomes and contents:

S0261.18.1 Demonstrate compliance with provincial acts, regulations and municipal bylaws through appropriate job planning.

Interpret job documents
- Plans and specifications
- Work orders
- Scope of work
- Equipment required
- Personnel required
- Materials required
- Worksite hazards
- Traffic hazards

Other requirements
Determine required personal protective equipment
- Head protection
- Eye protection
- Hearing protection
- Foot protection
- Face protection
- Hand protection
- Chainsaw protection

Determine job site limits
- Property lines
- Safe limits of approach to electrical conductors
- Overhead utilities
- Buried utilities

Identify job sequences, hazards and required barriers to hazards
- Job / task sequence
- Identified hazards
- Identify barriers
- Identify tools/equipment required
- Identify appropriate job communications
- Identify when to reevaluate hazards and barriers

Interpret job documents
- Cycle clearance requirements
- Determine required personal protective equipment
- Fall protection/work positioning systems
- Flame resistant clothing

S0261.18.2 Demonstrate safe work practices when working within proximity to energized electrical apparatus.

Environmental hazards identified
- Darkness
- Wet/ice/snow conditions
- Wind
- Thunder & lightning
- Temperature extremes

Tree hazards controlled
- Hangers and split branches
- Deadwood
- Excessive fill over root zone
- Compression and tension wood
- Spring poles
- Barber chair
- Chicot
- Widow maker
• Free-standing tree
• Falling debris
• Wildlife
• Severed limbs
• Adjacent trees

Ground hazards identified
• Debris
• Unstable ground
• Slippery ground
• Slopes/uneven ground
• Wildlife, holes and dens
• Trip hazards
• Deep snow

Underground hardware identified
• Natural gas markers
• Water line markers
• Electrical transformers
• Septic systems, wells
• Communication lines

Poisonous plants identified and controlled
• Poison Ivy
• Poison Oak
• Poison Sumac
• London Plane Tree
• Poison Parsley

Application of Electrical Utility Safety Rule Book
• Application of appropriate safe limits of approach
• Notification Controlling Authority
• Application of appropriate job planning
• Application of Utility Work Protection Code
• Use of hold offs for equipment protection
• Use of cover up
• Isolation/de-energization of circuits

Establishing clear communication between workers
Maintaining distances between workers and equipment

• Notification Controlling Authority
• Application of Utility Work Protection Code
• Use of rubber gloves
• Use of live line tools
Tree hazards
- Root, stem/trunk and branch rot and cavities
- Cracks, seams and ribs
- Wind-thrown trees
- Storm damage

S0261.18.3 Demonstrate inspecting, adjusting, maintaining and wearing required personal protective equipment.

**Review Unit: 2.7**

**Fall Protection**

**Full Body Harness**
- CSA or Equivalent approved
- Cuts, buckles operational
- Shock Absorbing Lanyard
- CSA or Equivalent
- Cuts, snaps working

**Rubber gloves**
- Voltage class
- Pre-use inspection
- Air test
- Expiry date
- Leather covers

**Flame Resistant clothing**
- Correct fit
- Repair
- Cleaning

S0261.18.4 Demonstrate pruning woody plants in proximity to energized electrical apparatus.

Considering required pruning operations.
- Clearance cycles
- Cycle length
- Voltage
- Proximity
- Customer consideration
- Species characteristics
- Tree condition
- Skirts
- Overhang
Identify pruning cut location on tree
  • Collar
  • Branch bark ridge

Pruning cuts
  • Drop cut
  • Hinge cut
  • Snap/bypass cut
  • Jump cut
  • Stub cut
  • Thinning cuts
  • Heading cuts

Pruning methods
  • Crown thinning
  • Side pruning
  • Dead wooding
  • Crown cleaning
  • Crown raising
  • Crown reduction
  • Pollarding
  • Crown restoration
  • Overhang pruning
  • Directional pruning

Raise/lower limbs using ropes only no mechanical advantage
  • Cut limbs so they will not span conductors
  • Control limbs using hinge cuts
  • Use of ropes and knots
  • Lower cut limbs using friction devices, wraps around tree
  • Top tree using ropes and rigging equipment
  • Creating false crotch for rigging
  • Use of ropes and knots
  • Control of cut sections
  • Control cut sections without rigging systems
  • Free falling to ground
  • Manual manipulation e.g. hinging, cut and throwing limbs
  • Assess weight and controllability of limb
  • Species consideration, breakage, weight
  • Environmental conditions
  • Use appropriate knots
  • Inspect worksite
  • Hangers removed
  • Rigging equipment removed
  • Chainsaw use aloft
  • Secured to climber
• Start in branch union, chain brake on
• Climber secured with secondary fall protection system e.g. - work positioning lanyard
• Smooth controlled cuts
• Chainsaw shut off between climber’s movements

S0261.18.5 Demonstrate removing woody plants in proximity to energized electrical apparatus.

Review Unit: S0247.2.4

Identifying tree to be removed
Determine removal method
Factors affecting removal method
• Crown condition
• Stem condition
• Root condition
• Lean
• Living/dead
• Central leader/multi-stemmed
• Structural defects
• Site conditions
• Job requirements
• Potential hazards
• Conductor location
• Lodged trees

Felling Zone preparation
• Tree condition – dead, living, diseased
• Property considerations
• Personnel location
• Traffic control
• Potential targets and hazards removed

Danger Zone preparation
• Escape route developed
• Personnel out of Zones
• Property considerations
• Height of tree
• Use ropes and knots as required
• Felling cuts
• Conventional notch
• Humboldt notch and back cut
• Boring and back cut
• “V” notch and back cuts
• Side notching
• Modifying the hinge to adjust direction of fall
Felling Trees in proximity to energized apparatus
- Conductor location
- Pole hardware e.g. guys, primary conductors, service conductors
- Use of guide rope
- Perpendicular felling
- Skirt hazards
- Parallel felling

Felling assist devices
- Tackle blocks
- Mechanical assists

Sectional removals
- Directional free fall away from energized conductor
- Conventional drop rigging
- Rigging using lowering devices

Removal of trees that have fallen during storm conditions
- Electrical hazards (isolated and de-energized)
- Energy forces (conductor, tree)
- Surrounding hazards
- Mechanical means of removal
- Removal methods from ground
- Removal methods from aerial lift

Inspect worksite
- Hangers removed
- Rigging equipment removed

S0261.18.6 Demonstrate the selection, use of, and inspection of hand tools and tree maintenance equipment according to manufacturer’s recommendations.

Review Unit: S0247.2.4

Mechanical tools and equipment
- Hydraulic tools
- Pruner
- Saw
- Circular saw
- Chainsaw

S0261.18.7 Demonstrate various methods of ascending and descending trees to access required work position.

Review Unit: S0247.2.8
Techniques used to ascend/descend trees
- Use of ladder
- Use of spurs
- Belay technique
- Secured body thrust on belay
- Secured body thrust with climbing hitch
- Secured footlock
- Split tail

S0261.18.8 Demonstrate controlling underbrush in proximity to transmission and distribution voltage conductors.

Prepare underbrush felling area
- Establish escape route
- Limits of approach (distance from conductors)
- Eliminate/control hazards
- Identify felling area

Fell underbrush using predetermined methods
- Directional felling techniques using clearing saw and chainsaw

Site clean-up
- Handle/dispose of underbrush debris
- Piling brush for chipping
- Lifting/carrying brush
- Loading brush on vehicle/trailer
- Chipping brush
- Disposal/recycling
- Reduce stump height
- Apply herbicide techniques
- Simulate stump application using water
- Simulate brush application using water

Use clearing saw on worksite
Determine clearing saw selection
Job size
Size of wood to be cut
Power to weight ratio
Pre-operational inspection/maintenance
- Chassis
- Anti-vibration mounts
- Blade
- Provisions for repair
- Fluid levels
- Throttle lock-out
- Engine operation

Operation
Starting/stopping clearing saw
- On ground
- On operator

Secure/prepare work area

Working position

Ongoing inspection and maintenance

Refueling/lubricants

Blade sharpening/replacement

Use of chainsaw

Evaluation Methods:
On-going practical/performance testing, supplemental and written testing, as appropriate
Number: S0262

Title: Utility Arborist Practices II – Aerial Device

Duration: 24 Total Hours

Theory: 0 hours  Practical: 24 hours

Prerequisite: Arborist Practices I

Cross-reference to training standard: U6040.12, U6041.04, .07, U6042.06, U6043.04, .06, .10, U6044.06, .07, U6046.01 - .05, .07 - .11, .16, U6047.07, .08, U6048.01 - .14, U6050.01 - .09

General Learning Objective:

Demonstrate a thorough working knowledge of aerial devices used in utility arboriculture practices.

Learning Outcomes and contents:

S0262.19.1 Demonstrate the preparation of an aerial device.
   Preparation as per manufacturers’ instructions
   Pre-operational checks
   • PTO check
   • Aerial device circle check
   • Bucket inspection
   • Dielectric test certificate
   • Electrical integrity of boom
   • Holding valve check
   • Safety interlock check
   • Control valves checks
   • Hydraulic system check
   • Leaks
   • Loose fittings
   • Hydraulic oil level
   • Breather cap
   • Fall protection systems inspection
   • Bucket escape equipment check
   • Bucket rescue equipment check
   • Outriggers and pads inspection
   • Wheel chocks
Aerial device set up
- Traffic control devices
- Vehicular
- Pedestrian
- Traffic control person
- Vehicle warning lights
- Site selection
- Surface slope/terrain
- Overhead obstructions
- Removal/stowing of covers
- Stabilizing vehicle
- Axle lockouts
- Vehicle parking brake
- Wheel chocks
- Setting outriggers and pads
- Engaging PTO
- Rescue ropes
- Equipment holders (e.g. chainsaw scabbards)
- Connect hydraulic tools

Select and use personal protection equipment
- Foot protection
- Eye protection
- Hand protection
- Head protection

Fall protection systems
- Full body harness, adjust and fit
- Shock-absorbing lanyard, inspect for wear
- Attach fall protection system to anchor point
S0262.19.2 Demonstrate aerial device escape and rescue procedures.

Source of problem
- Investigation/diagnosis of cause
- Control/correction/alleviation
- Condition of operator
- Calling for assistance/EMS

Escape from a disabled aerial device
- Operator functional
- Proximity of energized conductors
- Use of emergency pump
- Use of lower controls
- Transfer from a disabled aerial device into a tree
- Use of lifeline and controlled descent device

Rescue of a disabled operator
- Lower control use
- Positioning bucket to flat surface
- Tipping bucket
- Using a rescue rig
- Removing disabled worker
- Emergency first aid as required

S0262.19.3 Demonstrate aerial device preventative maintenance.

Manufacturer’s instructions
Lubrication
Cleaning
Legislative requirements
S0262.19.4 Demonstrate the use of an aerial device in utility arboricultural.

Loading tools, equipment and materials into bucket
- Job requirements
- Manufacturers’ instructions
- Hydraulic tool attachment
- Emergency equipment
- Coordination with ground crew

Aerial device operation
- Manufacturer’s instructions
- Mounting/dismounting bucket using 3 points of contact
- Ground person responsibilities
- Engaging PTO
- Upper/lower controls
- Raise bucket
- Rotate boom
- Lower bucket
- Work positioning
- Limits of Approach maintained
- Transfer between bucket and tree
- Fall protection system attached
- Monitor aerial device condition
- Emergency hydraulic shut-off
- Hydraulic failure procedures
- Engine failure procedures

Aerial device movement with operator in bucket
- Short distances
- Speed and direction of movement
- Operator & bucket security
- Boom positioning
- Surface conditions
- Disengaged PTO

Aerial device transport
- Manufacturer’s instructions
- Legislative requirements
- Securing aerial device for transport
- Stowing and securing boom
- Retracting outriggers
- Disengage PTO
- Debris removal
S0262.19.5 Demonstrate pruning and removing trees with aerial device in proximity to energized electrical apparatus.

Inspect, adjust and wear fall protection equipment according to manufacturer’s recommendations
Load tools, equipment and materials into bucket
Access aerial device bucket and secure fall protection system according to manufacturer’s instructions
Operate aerial device controls while accessing desired work location
  - Monitoring limits of approach
  - Monitoring boom position, over roadways, near adjacent trees, poles, electrical conductors
  - Position bucket in optimum positions to reduce body strains while performing work
Operate tools aloft according to pre-determined methods while working from bucket
Hand Tools
  - Handsaw
  - Fiberglass Reinforced Plastic (FRP) Pole pruner
  - Fiberglass Reinforced Plastic (FRP) Pole saw
  - Rigging ropes
  - Slings
  - Whoopie
  - Nylon web
  - Rope
Friction savers / cambium savers
Connectors
  - Carabiners
  - Clevis
Rigging Blocks
  - Synthetic rope
  - Tackle blocks
  - Multi-sheave block
Gas Powered Tools
  - Chainsaw
Hydraulic Tools
  - Pruner
  - Saw
  - Chainsaw
  - Circular saw
Sectional removals from aerial device
- Conductor location
- Directional free fall away from energized conductor
- Conventional rigging, guide ropes, pull ropes
- Rigging using lowering devices

Control movement of cut limbs and trunk sections from aerial device
- Conductor location
- Raise/lower limbs using ropes and mechanical advantage
- Cut limbs so they will not span conductors
- Control limbs using hinge cuts
- Lower cut limbs using friction devices
- Top tree using ropes and rigging equipment
- Creating false crotch

Secure aerial device for travel according to manufacturer’s instructions

Evaluation Methods:
On going written testing and practical evaluation
Number: S0263
Title: Utility Arborist Equipment II – Brush Chippers and Aerial Devices
Duration: 12 Total Hours
Theory: 6 hours Practical: 6 hours
Prerequisite: Arborist Equipment I

Cross-reference to training standard: U6040.12, U6041.04, .07, U6042.06, U6043.04, .06, .10, U6044.06, .07, U6046.01 - .05, .07 - .11, .16, U6047.07, .08, U6048.01 - .14, U6050.01 - .09

**General Learning Objective:**

Demonstrate a thorough working knowledge of brush chippers and aerial devices used in utility arboricultural practices.

**Learning Outcomes and contents:**

S0263.20.1 Perform basic chipper maintenance.

**Review Units: S0250.5.5 to 5.8**

- Inspect as per manufacturers instructions
- Inspect guards
- Check fluids
- Check directional control arm if equipped
- Demonstrate how to change blades
- Demonstrate how to cycle blade bolts
- Demonstrate how to rotate anvil
S0263.20.2 Describe preparation for using aerial device

Types of aerial devices
Legislated requirements
Manufacturers’ instructions
Pre-operational checks
- PTO check
- Aerial device circle check
- Bucket inspection
- Dielectric test certificate
- Electrical integrity of boom
- Holding valve check
- Safety interlock check
- Control valves checks
- Hydraulic system check
- Leaks
- Loose fittings
- Hydraulic oil level
- Breather cap
- Fall protection systems check
- Bucket escape equipment check
- Bucket rescue equipment check
- Outriggers and pads inspection
- Wheel chocks

Aerial device set up
- Traffic control devices
- Vehicular
- Pedestrian
- Traffic control person
- Vehicle warning lights
- Site selection
- Surface slope /terrain
- Overhead obstructions
- Removal/stowing of covers
- Stabilizing vehicle
- Axle lockouts
- Vehicle parking brake
- Wheel chocks
- Setting outriggers and pads
- Engaging PTO
- Rescue ropes
- Equipment holders (e.g. chainsaw scabbards)
- Connect hydraulic tools
Personal protection equipment
- Foot protection
- Eye protection
- Hand protection
- Head protection

Fall protection systems
- Full body harness
- Shock-absorbing lanyard

S0263.20.3 Describe the use of aerial device for utility arboricultural operations.

Loading tools, equipment and materials into bucket
- Job requirements
- Manufacturers’ instructions
- Legislated requirements
- Hydraulic tool attachment
- Emergency equipment
- Coordination with ground crew
- Aerial device operation
- Manufacturer’s instructions
- Legislative requirements
- Mounting/dismounting bucket using 3 points of contact
- Ground person responsibilities
- Engaging PTO
- Upper/lower controls
- Raise bucket
- Rotate boom
- Lower bucket
- Work positioning
- Limits of Approach maintained
- Tree pruning from bucket
- Tree sectional removal from bucket
- Tree maintenance from bucket
- Transferring between bucket and tree
- Fall arrest system
- Monitoring aerial device condition
- Emergency hydraulic shut-off
- Hydraulic failure
- Engine failure
- Aerial device movement with operator in bucket
- Short distances
- Speed and direction of movement
• Operator & bucket security
• Boom positioning
• Surface conditions
• Disengaged PTO

Aerial device transport
• Manufacturer’s instructions
• Legislative requirements
• Securing aerial device for transport
• Stowing and securing boom
• Retracting outriggers
• Disengage PTO
• Debris removal

S0263.20.4 Describe aerial device escape and rescue procedures.

Source of problem
• Investigation/diagnosis of cause
• Control/correction/alleviation
• Condition of operator
• Calling for assistance

Escape from a disabled aerial device
• Operator functional
• Proximity of energized conductors
• Use of emergency pump
• Use of lower controls
• Transferring from a disable aerial device into a second aerial device

Transferring from a disabled aerial device into a tree
Use of lifeline and controlled descent device/technique

Rescue of a disabled operator
• Lower control use
• Positioning bucket to flat surface
• Tipping bucket
• Using a rescue rig
• Removing disabled worker
• Emergency medical procedure

S0263.20.5 Describe aerial device preventative maintenance.

• Manufacturer’s instructions
• Lubrication
• Cleaning
• Legislative requirements
• Electrical theory testing of aerial device
• Preconditioning
S0263.20.6 Describe hydraulic theory and basic hydraulic system components.

Hydraulic Theory
Definitions
Force
Pressure
Pascal’s Law
Law of Conservation of Energy
Liquid as a Force multiplier
Atmospheric pressure
Energy in an Hydraulic System
Hydraulic Safety and Inspection
Hydraulic Components
• Hydraulic pump
• Hydraulic oil filter
• Oil reservoir
• Lower control pressure relief valve
• Selector valves
• Outrigger control valves
• Emergency by-pass valve
• Upper arm drive cylinders
• Holding valves
• Directional control valves
• Fluid site glass indicator
• Emergency lowering devices
• Actuators
• Pressure gauges
• Hydraulic motors

S0263.20.7 Identify Basic Hydraulic components

• Hydraulic Components
• Hydraulic pump
• Hydraulic oil filter
• Oil reservoir
• Lower control pressure relief valve
• Selector valves
• Outrigger control valves
• Emergency by-pass valve
• Upper arm drive cylinders
• Holding valves
• Directional control valves

Fluid site glass indicator
Emergency lowering devices
• Actuators
• Pressure gauges
• Hydraulic motors
Number: S0264

Title: **Utility Arboricultural Sciences II**

Duration: 15 Total Hours

Theory: 9 hours  Practical: 6 hours

Prerequisite: Arboricultural Sciences I

Cross-reference to training standard: U6041.02, .03, U6044.01, .02, U6045.07 - .09, U6047.10, U6051.05, .08, .18

**General Learning Objective:**

Demonstrate a knowledge of how to identify various woody plants, growth factors of woody plants, compartmentalization of woody plants, diseases and disorders of trees that could be harmful to the integrity of the electrical system, evaluate the condition of anchor points in trees used for fall protection, evaluation of work operations within environmentally sensitive areas.

**Learning Outcomes and contents:**

S0264.21.1 Identify the impact and mode of action of systemic and contact herbicides on woody and herbaceous plants.

- Determination of best control methods
  - Environmental factors
  - Efficacy
  - Application restrictions
  - Pesticide label
  - Specificity

Describe application techniques
- Stem Foliar
- Broadcast Foliar
- Basal Bark
- Cut stump

Describe off target impacts e.g. Agriculture crops

S0264.21.2 Describe the impact of work operations on environmentally sensitive locations.

- Herbicide application
- Soil erosion/compaction
Specie at Risk
Slope/aspect
Water
ANSI sites

S0264.21.3 Identify appropriate pruning methods according to tree health and cycle clearance.

Characteristics related to pruning technique used
- Species cycle clearances
- Growth characteristics
- Shape tree for aesthetics
- Disease prevention
- Branch Collar
- Branch bark ridge
- Branch protection zone
- Shoot invigoration
- Sucker growth
- Coppice growth
- Epicormic branching/ watersprout production
- Lateral prunes

S0264.21.4 Identify diseases, disorders, wounds and defects of woody plants

Diseases
- Pathogens that cause disease - fungus, bacteria, virus
- Disease cycle
- Pathogen requirements
- Host environments
- Environmental condition requirements

Structural defects of woody plants
- Included bark
- Splits/cracks

Leaf diseases
- Deciduous
- Coniferous
- Signs and symptoms
- Potential damage caused

Branch and stem diseases - e.g. Cytospora canker, Hypoxylon Canker
- Signs and symptoms
- Potential damage caused

Root diseases - e.g. Armilleria root rot
- Signs and symptoms
- Potential damage caused

Vascular diseases - e.g. Dutch elm disease
• Signs and symptoms
• Potential damage caused

Disorders

Biotic Disorder
• Wood boring insects – Heartwood borer, Locust borer
• Shoot borer – Bronze Birch Borer
• Stem borer - Asian Long Horn Beetle,
• Emerald Ash Borer,
• Dutch Elm

Diseases
Cankers, Basidiocarps, Galls (14 examples)
• Cytosopora Canker
• Hypoxylon Canker
• Armilleria Root Rot
• Butternut Dieback
• Yellow Birch Canker
• Ash Die Back
• Black Knot Of Cherry
• Eutypella Canker
• Necteria Canker
• Annoosum Root and Butt Rot
• Pine Gall Rust
• White Pine Blister Rust
• Wet Wood
• Slime Flux

Abiotic Disorder
• Carpenter ants
• Evidence of frass
• Animal damage
• Porcupin
• Beaver
• Sap sucker damage
• Wood pecker damage

Human damage
• Soil compaction
• Change of grade
• Over watering
• Under watering
• Contact with equipment
• Off-target pesticide damage
• Improper pruning

Environmental
• Lightening strikes
• Nutrient deficiencies
• Frost cracks
• Included bark
• Temperature extremes, sun scald
• Pollution (air, soil, salt)

2.4.6 Identify the physical condition and soundness of interim and final anchor points based on tree size, condition and species.

S0264.21.5 Identify the physical condition and soundness of interim and final anchor points based on tree size, condition and species.

Select anchor points
Interim anchor point
• Type of load applied
• Loading from stem of tree
• Other loads on the limb (foliage, snow, torque, etc.)
• Tree species
• Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season/ambient temperature

Final anchor point
• Type of load applied
• Loading from stem of tree
• Other loads on the limb (foliage, snow, torque, etc.)
• Tree species
• Cross sectional area of limb
• Condition of wood
• Angle of branch attachment
• Size of branch relative to stem
• Characteristics of branch union
• Season/ambient temperature
Number: S0265

Title: Utility Arborist Hand Tools II

Duration: 6 Total Hours

Theory: 0 hours  Practical: 6 hours

Prerequisite: Arborist Hand Tools I

Cross-reference to training standard: U6040.13, U6042.06, U6043.04, .06, .11, U6044.03, .07, U6045.15, .17, U6046.11, .14, .15, U6047.03, .04, .06, .09, U6049.01 - .10

General Learning Objective:

Demonstrate knowledge of how to select, adjust, maintain and store, tools and equipment commonly used in the Utility Arboricultural trade.

Learning Outcomes and contents:

S0265.22.1 Select, inspect, adjust, maintain, set-up, and store live line tools according to manufacturers’ recommendations.

Considering required pruning operations.
- Clearance cycles
- Cycle length
- Voltage
- Proximity
- Customer consideration
- Species characteristics
- Tree condition
- Skirts
- Overhang

Live Line Tools
- Fiberglass Reinforced Plastic Pole pruner
- Fiberglass Reinforced Plastic Pole saw

Select appropriate tool
- Pruning methods
- Voltage level
- Diameter of limb
- Work to be completed

Inspect
- Defects
• Test sticker (legible and current)
• Loose components
• Leaks
• Maintain Sharpen blade
• Lubrication
• Spot clean
• Daily clean
• Wipe with drying agent

Storage
• Store in appropriate location

S0265.22.2 Select, inspect, adjust, maintain, set-up, and store live line tools according to manufacturers’ recommendations.

Live Line Tools
• Telescopic measuring stick
• Hydraulic pruner
• Hydraulic pole saw
• Hydraulic circular saw
• Hydraulic chainsaw

Electrical testing of live line tools
• CSA standard ASTM standard
• Preconditioning requirements
• AC / DC voltage
• Procedural testing
• Theory

Select appropriate tool
• Pruning methods
• Voltage level
• Diameter of limb
• Work to be completed

Inspect
• Defects
• Test sticker (legible and current)
• Loose components
• Leaks

Maintain
• Adjust stroke
• Sharpen blade
• Lubrication
• Spot clean
• Daily clean
• Wipe with drying agent
Storage
  • Store in appropriate location

Evaluation Methods:
On going written and practical evaluation
**Arborist/Utility Arborist**

Number: S0266

Title: **Utility Arborist Tree Identification II**

Duration: 33 Total Hours

Theory: 33 hours  Practical: 0 hours

Prerequisite: Arborist Tree Identification I

Cross-reference to training standard: U6042.03, U6043.01, U6044.01, U6047.01, U6051.12

**General Learning Objective:**

Demonstrate a thorough working knowledge of tree genera, species and cultivars by identifying 45 plants commonly found in Ontario.

**Learning Outcomes and contents:**

S0266.23.1 Identify 45 common woody plants in all seasons according to species and morphological characteristics using the International System of Plant Nomenclature.

**Review Unit: S0252.7.1 (Common core)**

<table>
<thead>
<tr>
<th>DECIDUOUS – ALTERNATE ARRANGEMENT</th>
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</thead>
<tbody>
<tr>
<td>Common Name</td>
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NOTE: The following lists are for utility arborists only

### COMPATIBLE PLANTS

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Speckled Alder</td>
<td><em>Alnus rugosa</em></td>
<td>Betulaceae</td>
</tr>
<tr>
<td>2 Dogwood</td>
<td><em>Cornus spp</em></td>
<td>Cornaceae</td>
</tr>
<tr>
<td>3 Beaked Hazel</td>
<td><em>Corylus cornuta</em></td>
<td>Betulaceae</td>
</tr>
<tr>
<td>4 Leatherwood</td>
<td><em>Dirca palustris</em></td>
<td>Thymelaeaceae</td>
</tr>
<tr>
<td>5 Witch-Hazel</td>
<td><em>Hamamelis virginiana</em></td>
<td>Hamamelidaceae</td>
</tr>
<tr>
<td>6 Canada Plum</td>
<td><em>Prunus nigra</em></td>
<td>Rosaceae</td>
</tr>
<tr>
<td>7 Gooseberries &amp; Currents</td>
<td><em>Ribes spp</em></td>
<td>Saxifragaceae</td>
</tr>
<tr>
<td>8 Black Elderberry</td>
<td><em>Sambucus canadensis</em></td>
<td>Caprifoliaceae</td>
</tr>
<tr>
<td>9 Red Elderberry</td>
<td><em>Sambucus pubens</em></td>
<td>Caprifoliaceae</td>
</tr>
<tr>
<td>10 Maple-leaved Viburnum</td>
<td><em>Viburnum acerifolium</em></td>
<td>Caprifoliaceae</td>
</tr>
<tr>
<td>11 Hobble Bush</td>
<td><em>Viburnum alnifolium</em></td>
<td>Caprifoliaceae</td>
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<tr>
<td>12 Nannyberry</td>
<td><em>Viburnum lentago</em></td>
<td>Caprifoliaceae</td>
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<tr>
<td>13 High Bush Cranberry</td>
<td><em>Viburnum trilobum</em></td>
<td>Caprifoliaceae</td>
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### POISONOUS PLANTS

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Family</th>
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<tbody>
<tr>
<td>1 Poison Parsley</td>
<td><em>Carum petroselinum</em></td>
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<tr>
<td>2 Poison Oak</td>
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<tr>
<td>3 Poison Ivy</td>
<td><em>Toxicodeudron radicans</em></td>
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</tr>
<tr>
<td>4 Poison Sumac</td>
<td><em>Toxicodeudron vernix</em></td>
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</tbody>
</table>

Evaluation Methods:
Weekly identification testing and sample collection.
Utility Arborist Level 2

Number: S0267

Unit title: Utility Arborist Transmission Line Clearing II

Duration: 12 Total Hours

Theory: 6 hours  Practical: 6 hours

Prerequisite: N A

Cross-reference to training standard: U6040.14, U6041.05, .06, U6042.09, U6051.01 - .19

General Learning Objective:

Describe and demonstrate how to manage vegetation along transmission voltage corridors and rights of way.

Learning Outcomes and contents:

S0267.24.1 Identify Transmission Right of Way properties from drawings, maps specifications and system diagrams

- Identify system information including voltages, structures, and feeders, using maps, drawings and specifications.
- Identify right of way location using maps, drawings, specifications and system diagrams.

S0267.24.2 Demonstrate capabilities for communicating with other work groups, controlling authority and emergency contacts.

- Identify methods for communication, including cellular phones, mobile radios, and satellite phones.
- Establish requirement for notifying other work groups operating in the vicinity.
- Notify the controlling authority as required.
- Identify emergency contacts

S0267.24.3 Demonstrate ability to perform a condition patrol, identify and maintain Right of Way access points, identify and acquire required external permits, and comply with environmental regulations.

- Perform a condition patrol
- Identify hazards to line integrity
• Document information from patrol
• Measure width of Right of Way and document alterations to Right of Way
• Visually inspect structures, hardware, bridges, water crossings, presence of soil erosion, screens and condition of access roads
• Identify Right of Way access points
• Assess and identify requirement for external permits.
• Describe process for acquiring external permits
• Describe methods for complying with environmental regulations

S0267.24.4 Demonstrate ability to plan work, including selection of required tools, emergency response plan and required content for daily tailboard conference.

• Plan work
• Determine tools and equipment required
• Describe limitations of equipment, including off road vehicles
• Create emergency plan
• Establish required content for daily tailboard conference

S0267.24.5 Assess vegetation for compatibility within Right of Way and measuring height of trees and conductors.

• Identify compatible vegetation within the Right of Way
• Measure height of trees and brush
• Use of tree measuring devices e.g. clinometer, laser range finders and measuring sticks
• Measure height of conductor
• Use of tree measuring devices e.g. clinometer, laser range finders

S0267.24.6 Prune and remove incompatible vegetation in proximity of electrical apparatus, including maintenance of screens and buffers.

• Demonstrate live line techniques for use in transmission line clearing
• Determine standing and falling clearances (at maximum sag position) of dead, danger and live trees, for transmission line voltages from profile maps and condition survey data.
• Perform maintenance of screens and buffers
S0267.24.7 Select appropriate vegetation control methods.

- Describe use parameters for herbicide application, cutting and grubbing in the following locations; stations, buildings, generation facilities and Right of Ways.
- Identify restrictions to work use to do potential for soil erosion, presence of incompatible species, slope/aspect and presence of water.

S0267.24.8 Demonstrate herbicide application techniques using Integrated Pest Management principles

- Demonstrate broadcast spraying techniques
- Demonstrate basal bark application techniques
- Demonstrate stump spray techniques
- Demonstrate stem foliar techniques
- Demonstrate soil sterilization techniques

Evaluation Methods:
On going written testing and practical evaluation