

# ASWP 06 R0

## Rigging Trees



### Revision History

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

## ARBORIST SAFE WORK PRACTICES

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

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# 1.0 Introduction

This document outlines the requirements for rigging trees or sections of trees.

## 2.0 Hazards

The following hazards have been identified to aid in establishing and maintaining a safe work environment when rigging trees or sections of trees:

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

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

## 3.0 Legislation / Safe Work Practices

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

- ASWP01 General Legislation
- ASWP02 Work in a Safe Environment
- ASWP02 Protect Self and Others
- ASWP02 Arborist Job Planning
- ASWP03 Ascending Trees
- ASWP04 Working at Heights
- ASWP12 Chain Saw Operation

Legislation	RRO / RSO	Section Referenced
<a href="#">Industrial</a>	851 / 90	22, 23, 39, 41, 42, 43, 45, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 73, 79, 80, 81, 82, 83, 84, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 139
<a href="#">Construction</a>	213 / 91	43, 52, 53, 54, 55, 67, 68, 69, 93, 94, 95, 96, 112, 113, 150, 151, 152, 153, 154, 156, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 183, 186, 188

## 4.0 Mandatory Information / Work Practices

The following are the general mandatory requirements for an arborist rigging trees or sections of trees. In addition to these requirements, the work practice contains specific requirements that must also be followed.

- All rigging and pulling equipment must be inspected prior to use (follow manufacture's instructions)
- All appropriate Personnel Protective Equipment must be worn during rigging operations
- Establish appropriate job plan (refer to ASWP02 Job Planning)
- All persons at the work site shall know the Emergency Response Plan (refer to ASWP02 Job Planning)
- All trees must be inspected for hazards prior to climbing, (Refer to ASWP03 Ascending Trees) and (ASWP04 Working at Heights)
- All trees must be inspected for hazards prior to rigging or cutting (Refer to ASWP05 Tree Removal and ASWP12 Chain Saw Use)
- Those engaged in rigging shall have an understanding and are competent in:
  - Loads and forces applied to rigging equipment, rigging and anchor points
  - Manufacturer's specifications and compatibilities of all components
  - Loads (e.g. dynamic, static and shock)
  - Unbalanced loading of limbs
  - Estimating loads, wood weights (refer to Appendix C Ontario Green Wood Weight Chart)
  - Reaction wood
  - Tension and compression wood
- Synthetic slings must have a load rating capacity label attached
- All ropes slings blocks connecting devices and any other equipment used in rigging operation must not be subjected to forces greater than the manufacture's recommended safe working loads (SWL) or working load limits (WLL)
- A minimum safety factor of 5:1 must be incorporated into a rigging system
- The rigging system design should be so that the rope is the weakest link in the system
- Establish and review communication systems during operation including hand signals or 2 way radios
- All personnel must be aware of all hazards and barriers within the Drop Zone
- All personnel must ensure there are no obstacles or hazards within the Drop Zone
- All ground assistants involved in a rigging procedure must receive prior training and instructions appropriate for their given situation

## 4.1 Site Inspection

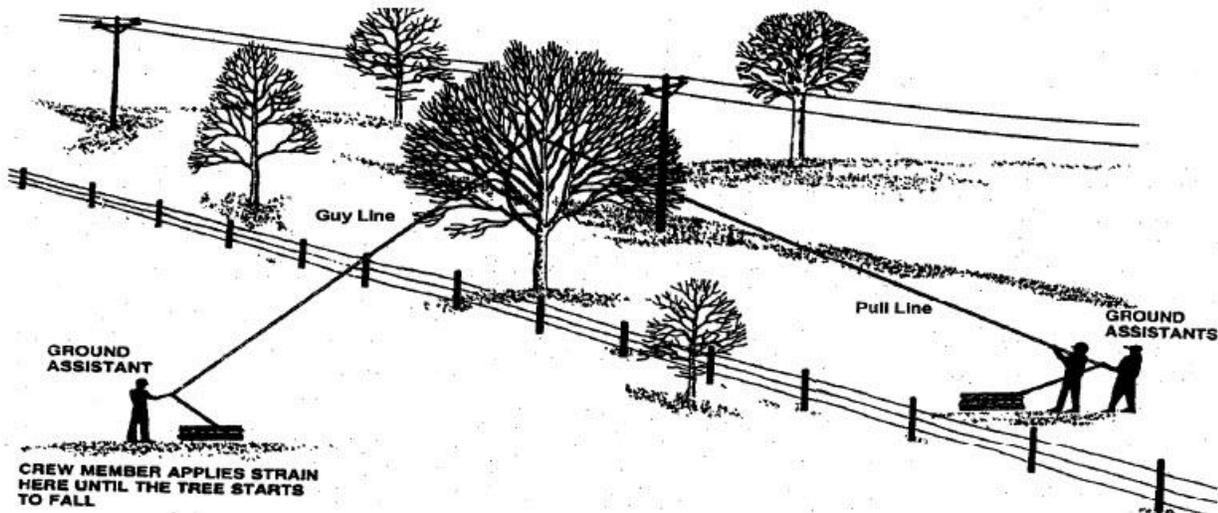
A thorough inspection of the worksite should be completed identifying all hazards with a job plan in place (Refer to ASWP02 Job Planning for additional information)

Step	Action
<p>Inspect tree for hazards (Figure 1) <b>Figure 1</b></p> 	<p>Inspect tree for hazards including but not limited to:</p> <ul style="list-style-type: none"> <li>• Lean</li> <li>• Crown weight distribution</li> <li>• Insect damage</li> <li>• Foreign bodies in tree (staples, nails, wire, etc.)</li> <li>• Structural deficiencies such as decay, cavities, cracks splits, rot etc.</li> <li>• Overhead utilities</li> <li>• Broken tops or limbs</li> </ul>
<p>Identify hazards within the Drop Area</p>	<p>Hazards include but not limited to:</p> <ul style="list-style-type: none"> <li>• Electrical</li> <li>• Traffic and pedestrian</li> <li>• Ground conditions / slope</li> <li>• Chicots</li> <li>• Climatic conditions / wind, snow loading, etc.</li> <li>• Slips, trips and fall hazards</li> </ul>
<p>Set control measures</p>	<p>Barriers include but not limited to:</p> <ul style="list-style-type: none"> <li>• Maintaining appropriate Limits of Approach</li> <li>• Ensure rigging equipment and tools are inspected and maintained (refer to manufacturer's instructions)</li> <li>• Identify and establish a Drop Zone</li> <li>• Utilize traffic and pedestrian control measures</li> <li>• Removing chicots</li> <li>• Lower stumps within the felling area</li> <li>• Positioning of climber and fall protection equipment (refer to ASWP03 Climbing Trees)</li> <li>• Positioning of aerial device and operator to perform work (refer to ASWP11 Aerial Device Operation)</li> </ul>
<p>Determine rigging equipment required to complete the work</p>	<ul style="list-style-type: none"> <li>• Identify rigging locations in the tree which will support the forces applied by the rigging equipment</li> </ul>
<p>Inspect tools and equipment to be used</p>	<ul style="list-style-type: none"> <li>• Ensure tools and equipment are free of defects and readily available (Refer to Manufacture's Instructions)</li> <li>• Ensure tools are sharp (Refer to Manufacture's Instructions)</li> </ul>

## 4.2 Rigging Tree for Felling

Step	Action
<p>Determine appropriate attachment point(s) in the tree being rigged</p> <p><b>Note:</b> All trees should have a pull rope installed into the tree, if the tree could fall in another direction then the intended direction of fall.</p>	<ul style="list-style-type: none"> <li>• Place rope(s) at least 2/3 the distance up the tree (Figure 2) from the point intended for the cut location</li> <li>• Consider when roping a tree:               <ul style="list-style-type: none"> <li>○ Multi-stemmed trees</li> <li>○ Split trees</li> <li>○ Diseases, tree defects, etc.</li> </ul> </li> </ul> <p><b>Note:</b> Ropes must be of sufficient length to keep all workers and equipment out of the Drop Zone during felling operations.</p>
<p>Install Split Prevention system (if required)</p>	<ul style="list-style-type: none"> <li>• Ensure split prevention system is in place if required</li> </ul> <p><b>Note:</b> Split prevention system must be able to withstand the loads applied to the tree being removed.</p>
<p>Install a guide rope (if required)</p> <p><b>Note:</b> All trees shall have a guide rope installed if they could fall in a direction other than intended.</p>	<ul style="list-style-type: none"> <li>• Guide rope (Figure 2) should be placed at least 2/3 the distance up the tree from the point intended for cutting</li> </ul> <p>A guy rope:</p> <ul style="list-style-type: none"> <li>• Helps keep the tree directed in the intended direction of fall</li> <li>• Prevents the tree from felling in an unintended direction of fall (e.g. overhead utilities, building, etc.)</li> </ul>
<p>Install additional rigging equipment to be used (if required) for a re-direct or mechanical advantage</p>	<ul style="list-style-type: none"> <li>• Install:               <ul style="list-style-type: none"> <li>• Slings</li> <li>• Blocks</li> <li>• Pulleys</li> <li>• Connecting Devices</li> </ul> </li> <li>• Ensure rigging system and equipment are in appropriate locations and ready to use</li> </ul>
<p>Determine method required to pull tree over</p>	<ul style="list-style-type: none"> <li>• Use of ground persons (Figure 2)</li> <li>• Mechanical pulling devices</li> <li>• Mechanized pulling devices</li> </ul>
<p>Begin procedure for cutting tree</p>	<ul style="list-style-type: none"> <li>• Follow ASWP05 Tree Removal</li> <li>• Prior to cutting, operation must be stopped and all personnel must receive and confirm that everyone is ready for the “Back Cut”</li> </ul>

Figure 2

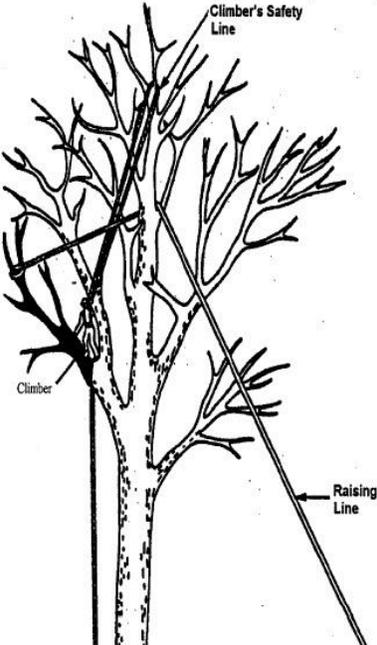


### 4.3 Rigging Sections of Trees Aloft

In some situations a tree will have to be rigged and sections of the tree cut and lowered to the ground because the tree cannot be removed in one piece. The following work practice outlines the process to sectionalize a tree for removal.

#### 4.3.1 Establish Rigging Points

Step	Action
Choose limbs or branch unions to run lines over/through or attach rigging blocks	<ul style="list-style-type: none"> <li>• Points for rigging must be in suitable locations that are of sufficient size and strength to carry loads applied</li> <li>• Rigging locations must be wide enough to allow free movement of rigging lines</li> <li>• Identify the path of travel for lowering limbs or sections of tree</li> </ul>
Install lines, slings and or rigging blocks (Figure 3)	<ul style="list-style-type: none"> <li>• Ensure rope size, strength; material and construction are appropriate for rigging line application</li> <li>• Ensure that anchor points are of sufficient size and strength, incorporating an applicable safety factor</li> <li>• Ensure ropes are compatible with other rigging devices such as friction devices, blocks or pulleys</li> <li>• Ensure rigging lines are attached using suitable knots and are at appropriate locations on the limb to be removed</li> </ul>

Step	Action
<p data-bbox="354 191 477 222"><b>Figure 3</b></p>  <p>The diagram shows a tree trunk with a climber positioned on a branch. A 'Climber's Safety Line' is attached to the climber and runs vertically up the trunk. A 'Raising Line' is attached to the trunk and extends downwards and outwards. Labels include 'Climber', 'Climber's Safety Line', and 'Raising Line'.</p>	
<p data-bbox="160 898 605 968">Climber secures to a safe work position</p>	<ul data-bbox="678 905 1455 1388" style="list-style-type: none"> <li>• Climber should move to a safe position prior to cutting</li> <li>• A safe work position should be such that injury will not result due to an inadvertent limb or tree section moving</li> <li>• Climber must have adequate balance and stability during cutting operation</li> <li>• Ensure all ropes are not in close proximity of proposed cutting location</li> <li>• A second fall protection attachment point must be used when using sharp tools refer to ASWP04 Working at Heights</li> </ul>
<p data-bbox="160 1423 574 1455">Prepare to start limb removal</p>	<ul data-bbox="678 1430 1382 1535" style="list-style-type: none"> <li>• Ensure that climber and ground assistants are prepared and in agreement as to timing and co-ordination of instructions</li> </ul>

### 4.3.2 Sectionalizing Trees

Step	Action
<p data-bbox="160 1759 574 1829">Position rope to achieve safe mechanical advantage</p>	<ul data-bbox="678 1766 943 1797" style="list-style-type: none"> <li>• Install pull rope</li> </ul>
<p data-bbox="160 1860 630 1929">Install split prevention system - if required</p>	<ul data-bbox="678 1860 1406 1929" style="list-style-type: none"> <li>• Ensure split prevention system is above the Fall Protection System</li> </ul>

Step	Action
	<p><b>Note:</b> Reverse Barber Chairing can occur where trees are excessively leaning, straight grained trees or have excessive mechanical loading due to pulling forces.</p>
Set notch	<ul style="list-style-type: none"> <li>• Refer to ASWP05 Tree Felling</li> </ul>
Communicate Back Cut is to be performed	<ul style="list-style-type: none"> <li>• Refer to ASWP05 Tree Felling</li> <li>• Place tension on pull rope</li> <li>• Prior to cutting, operation must be stopped and all personnel must receive and confirm that everyone is ready for the “Back Cut”</li> </ul>
Begin Back Cut	<ul style="list-style-type: none"> <li>• Monitor cut to ensure holding wood is not cut off completely</li> <li>• Monitor movement of the tree top</li> </ul>
Pull on pull rope	<ul style="list-style-type: none"> <li>• Apply constant tension on rope to tip over tree top</li> </ul>