Unit	1028
Title	Describe and Operate Chainsaw
Document type	Learning Resource

BC **Forest Safety**

In consultation with industry subject matter experts, the BC Forest Safety Council (BCFSC) facilitated the production of this material.

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Unit Introduction

By the end of this unit you will be able to demonstrate your knowledge of:

- Chainsaw components and safety features
- Chainsaw inspection and maintenance procedures
- Safe handling and transport of the chainsaw
- Basic chainsaw operation and ergonomics
- Hazards related to chainsaw use
- Basic bucking
- Limbing and taping

Section 1028-1: Chainsaw Components and Safety Features

What you will learn in this section

By the end of this section you will be able to demonstrate your knowledge of the following key points:

1.1 Components of a chainsaw

1.2 Safety features of a chainsaw

Key Point 1.1: Chainsaw Components

The components listed in Table 1 and in Figure 1 are components common to all chainsaws. The location of components may be different from chainsaw to chainsaw.

Component	**Purpose**
1. Bar tip	Allows the chain to travel around the tip of the bar with minimum wear. Can be replaced as required.
2. Guide bar	Holds the chain
3. Chain	Cuts the wood
4. Chain brake	Stops the chain by banding the clutch
5. Handle bar	Allows operator to hold chainsaw
6. Spark plug	Combusts fuel/air mixture
7. Air filter	Prevents debris from entering carburetor
8. Throttle lock	Prevents unwanted activation of throttle
9. Fuel tank and cap	Holds fuel in chainsaw
10. Pull cord	Used to start chainsaw
11. Anti-vibration mounts	Minimizes vibration to the operator
12. Oil tank and cap	Holds oil in chainsaw
13. Muffler	Reduces noise levels
14. Decompression switch	Temporarily releases cylinder compression to assist starting the chainsaw
15. On/off switch	Turns the chainsaw on or off
16. Choke	Used for cold start of the chainsaw. Chokes air supply to provide a richer fuel mixture.
17. Rear hand guard	Protects chainsaw operators throttle hand

(pistol grip)	
18. Chainsaw sight lines	Allows operator to check intended direction for tree falling
19. Bar nut	Holds guide bar in position
20. Dogs	Helps control the chainsaw by providing a solid pivot point
21. Chain catcher	Designed to catch a thrown chain

Table 1: Components of a chainsaw

The items identified in RED in Figure 1 are considered the critical safety features of a chainsaw.

Figure 1: Components of a chainsaw.

Learner Activity

Instruction: Match the chainsaw **component** to its **purpose.**

Component	Purpose
Bar tip	Cuts the wood
Guide bar	Prevents debris from entering carburetor
Chain	Prevents unwanted activation of throttle
Chain brake	Used for cold start of the chainsaw. Chokes air supply to provide a richer fuel mixture.
Handle bar	Allows operator to hold chainsaw
Spark plug	Turns the chainsaw on or off
Air filter	Holds guide bar in position
Throttle lock	Designed to catch a thrown chain
Pull cord	Holds the chain
Anti-vibration mounts	Helps control the chainsaw by providing a solid pivot point
Muffler	Stops the chain by banding the clutch
Decompression switch	Allows operator to check intended direction for tree falling
On/off switch	Minimizes vibration to the operator
Choke	Temporarily releases cylinder compression to assist starting the chainsaw
Rear hand guard (pistol grip)	Allow the chain to travel around the tip of the bar with minimum wear. Can be replaced as required.
Chainsaw sight lines	Used to start chainsaw
Bar nut	Protects chainsaw operators throttle hand
Dogs	Combusts fuel/air mixture
Chain catcher	Reduces noise levels

Now check your answers on the next page.

Answer

Match the chainsaw **component** to its **purpose.**

Component	Purpose
Bar tip	Allow the chain to travel around the tip of the bar with minimum wear. Can be replaced as required.
Guide bar	Holds the chain
Chain	Cuts the wood
Chain brake	Stops the chain by banding the clutch
Handle bar	Allows operator to hold chainsaw
Spark plug	Combusts fuel/air mixture
Air filter	Prevents debris from entering carburetor
Throttle lock	Prevents unwanted activation of throttle
Pull cord	Used to start chainsaw
Anti-vibration mounts	Minimizes vibration to the operator
Muffler	Reduces noise levels
Decompression switch	Temporarily releases cylinder compression to assist starting the chainsaw
On/off switch	Turns the chainsaw on or off
Choke	Used for cold start of the chainsaw. Chokes air supply to provide a richer fuel mixture.
Rear hand guard (pistol grip)	Protects chainsaw operators throttle hand
Chainsaw sight lines	Allows operator to check intended direction for tree falling
Bar nut	Holds guide bar in position
Dogs	Helps control the chainsaw by providing a solid pivot point
Chain catcher	Designed to catch a thrown chain

Key Point 1.2: Safety Features of a Chainsaw

The information in table 2 is provided to help you understand the safety features of a chainsaw, their purpose, and how they help you control hazards or reduce the risk of injury.

Note: MSI stands for Musculoskeletal Injuries.

Chainsaw Safety Features Worksheet

Safety Feature	Purpose	Control
Full wrap handlebar	Positioned on the chainsaw body to keep the chainsaw balanced	Keeping the chainsaw balanced helps maintain control of the chainsaw
	Designed to hold hand in natural position	Reduces MSIs
	Allows for secure hand placement while using the chainsaw in a variety of positions; left or right handed or with chainsaw turned on either side	Correct grip allows operator to maintain control of the chainsaw Reduces MSIs
	Allows the chainsaw to be used with a pulling chain	Reduces MSIs
Heated handlebar	Keeps hands warm in cold weather	Reduces MSIs
Pistol grip	Flared design protects the hand also known as rear hand guard	Flared bottom portion of the handle protects the operator's hands from brush and limbs and thrown chain
	Houses the throttle lock and trigger assemblies	Prevents the throttle trigger from being pressed accidentally while the engine is running
	Flared design allows the operator's foot to hold the chainsaw on the ground for cold start	Secures the chainsaw while being started

Chain brake **(critical safety feature)** *Note: Never remove or modify the chain brake, OH&S Regulation 12.72(2)*	Stops the chain from turning	Stops the chain when a chainsaw kickback situation occurs
	Is activated mechanically by the chain brake handle or by an inertia mechanism	Designed to activate and stop the chain if control of the chainsaw is lost, e.g. in the event of a slip, trip or fall
	Should be engaged when starting the chainsaw and when walking from cut to cut or more than 3 meters	Prevents the chain from rotating during cold start
	Guards hand and knuckles when gripping the front handle	Guards hand and knuckles from a thrown chain or debris
Chain catcher **(critical safety feature)**	Designed to catch a thrown chain	Prevents thrown or broken chain from hitting the operator or gas tank at the rear of the chainsaw
	Made of aluminum or plastic	Reduces damage to chain
	Positioned in front of handlebar	Full wrap handlebars do not constitute a chain catcher
On/Off switch	Turns chainsaw on and off	Allows for quick emergency shutdown. If On/Off switch is faulty, use choke.
Muffler and spark arrestor	The spark arrestor is a screen or perforated metal plate that stops hot carbon from being blown out of the engine	Prevents fires, which is important in the fire season Protects operator from hot carbon particles
	The muffler reduces the engine noise	Reduces noise level and helps prevent hearing loss
Sprocket nose bar tip	Allows the chain to rotate around the end of the bar at high speed with minimal friction	Upper quadrant of the bar tip is the kickback hazard zone Allows tighter chain tension which prevents chain derailments and premature chain and bar wear

Chainsaw dogs	Keeps chainsaw in a stable position while making cuts	Helps operator maintain control of the chainsaw
	Helps support the weight of the chainsaw when cutting	Reduces fatigue Reduces MSIs
Sightlines	Designed to assist the operator to more accurately align where the chainsaw is cutting in the tree for directional control	Guides the operator in the construction for sighting undercut direction and maintaining adequate holding wood for directional control
Throttle lock **(critical safety feature)**	Prevents throttle trigger from being accidentally pressed when engine running	Reduces likelihood of chain spinning while chainsaw is carried with one hand
Anti-vibration mounts	Reduces amount of engine vibration transmitted to handles and operator's hands and arms	Helps prevent "white finger syndrome" or Raynaud's syndrome which can result in blood vessel and nerve damage

Table 2: Chainsaw safety features and their purpose

Section 1028-2: Chainsaw Inspection and Maintenance

What you will learn in this section

By the end of this section you will be able to demonstrate your knowledge of the following key points:

2.1 How to inspect and maintain a chainsaw

2.2 Chainsaw parts and chain maintenance

2.3 Spare parts and tools related to a chainsaw

Key Point 2.1: How to inspect and maintain a chainsaw

Tools and Equipment

Important tools and equipment needed for maintenance of a chainsaw include:

- Round chain file sized to your chain cutter teeth, with handle
- Flat file, with handle where applicable, for guide bar maintenance and adjusting raker height (used in conjuction with a depth/raker gauge)
- Tuning screwdriver for carburetor adjustments
- 4mm Allen key
- 5mm Allen key for muffler screws
- T27 Torx driver
- Bar wrench to fit spark plug and bar nut
- Depth/Raker gauge for chain specifications
- Needle nose pliers for general maintenance
- Manufacturer's manual for the make and model of chainsaw
- File guide for angle setting
- Grease gun compatible with your guide bar
- Tool bag to carry the above tools

Some optional tools are:

- Rasp for cleaning wedges
- Pocket knife

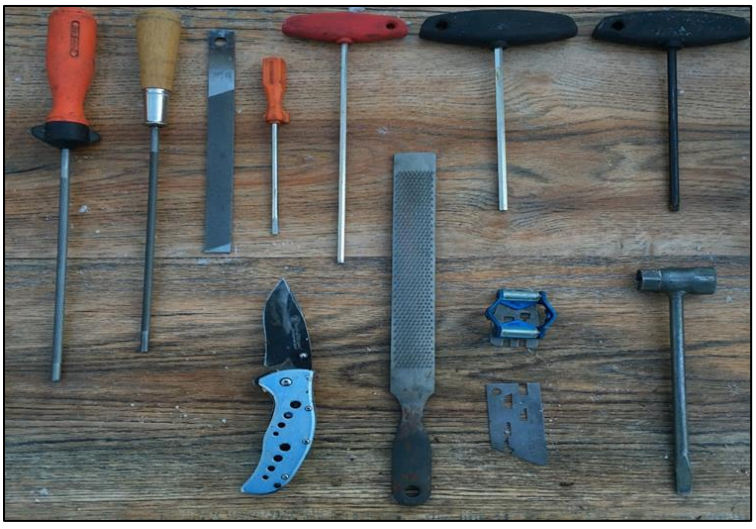


Figure 2: Chainsaw tools

PPE Reminder
Use of compressed air and power tools increases the risk of eye injury. Safety glasses must be worn. Gloves should also be worn to protect your hands from cuts and abrasions.

Maintenance

When servicing chainsaw parts, follow the maintenance procedures detailed in the manufacturer's instruction manual for the make and model of the chainsaw being used. Do not throw the operators manual away as OHS Regulation requires that it be readily available in the workplace.

General Inspection

Inspecting the chainsaw is a part of your work activity. Any sign of damage means that a more thorough inspection is required as there may be other problems.

Chainsaw Maintenance Checklist

Here is a list of daily, weekly, and periodic steps to maintain your chainsaw.

Daily

- ☐ Clean dirt, oil, and wood chip accumulations from the engine and starter housing.
- ☐ Inspect air filter for damage, debris, or icing. Clean or replace, as required.
- ☐ Check throttle lock, chain brake and chain stopper.
- ☐ Check on/off switch and choke control for easy operation.
- ☐ Check all screws, nuts, and anti-vibration mounts. Tighten, as required.
- ☐ Inspect starter cord for wear and tear. Replace, if required.
- ☐ Clean out sprocket tip. Check sprocket for easy rotation. If not rotating easily, replace tip.
- ☐ Inspect chain for kinks, twists, cracks, and wear. Replace, if necessary.
- ☐ Sharpen cutter teeth, adjust raker height and adjust chain tension.
- ☐ Run engine and adjust carburetor as required for smooth operation.
- ☐ Increase throttle and engage chain brake to test. Note ease of brake handle movement.

- ☐ Clean out guide bar groove.

Weekly

- ☐ Clean debris from cooling fins on engine cylinder and cylinder head.
- ☐ Clean carburetor body and air box.
- ☐ Dress the guide bar:
    - ☐ Inspect rails for wear and file off any burrs on rails
    - ☐ Check for adequate oiler operation
    - ☐ Check guide bar alignment and replace, if required
    - ☐ Rotate bar before re-installing
- ☐ Inspect muffler and spark arrestor screen. Clean or replace, as required.
- ☐ Inspect spark plug for condition and gap. Clean and re-set gap or replace if needed.
- ☐ Clean starter recoil assembly and inspect for cracks. Inspect starter cord for wear and check knots at both ends.
- ☐ Grease or oil needle bearings in clutch drum. Replace bearings if side movement is excessive.

Periodically

- ☐ Inspect and replace fuel filter as necessary
- ☐ Inspect electrical wires for integrity.
- ☐ Inspect clutch and drive sprocket mechanism for wear. Replace springs, if broken.
- ☐ Clean drum and clutch shoe surfaces with solvent.
- ☐ Inspect fuel and oil caps.
- ☐ Flush fuel and oil tanks.
- ☐ Inspect chain brake band for wear and replace if necessary.
- ☐ Inspect idle and dog screws as well as vibration mounts and tighten as necessary.
- ☐ Inspect chainsaw body and replace parts if necessary.

Pre-start procedure

- ☐ Check that chain brake mechanism is in working condition.
- ☐ Ensure chain catcher is in place.
- ☐ Test throttle lock and trigger function.
- ☐ Ensure chain is sharp and tension is set as per manufacturer's specification.

- ☐ Check that all attachment bolts, anti-vibration mounting, and screws are in place and secure.
- ☐ Top up the fuel and oil reservoirs and clean all traces of fuel and oil from chainsaw. Ensure fuel and oil caps are securely fastened.

Key Point 2.2: Chainsaw parts and chain maintenance

There a few different varieties of chain an operator may encounter but most commonly used is a 3/8 pitch chisel skip tooth chain which is considered a crosscut chain. The crosscut chain is designed to cut across the wood. It has features that are meant for steep cutting angles. It is the ideal chain for most applications within the professional environments for bucking and falling.

Some specific applications may require different chain types. Ripping, which is cutting wood lengthwise with the grain, is an application with a specific type of chain but is not required unless ripping is the primary task for longer durations. The ripping chain is designed to cut along the wood grain in a parallel manner. It is an ideal chain for making planks and boards from larger timbers. With its specific features and specialty, it is used for milling and other projects that require smoother wood surfaces.

For a more detailed understanding of these unique situations seek qualified assistance and follow manufactures specifications.

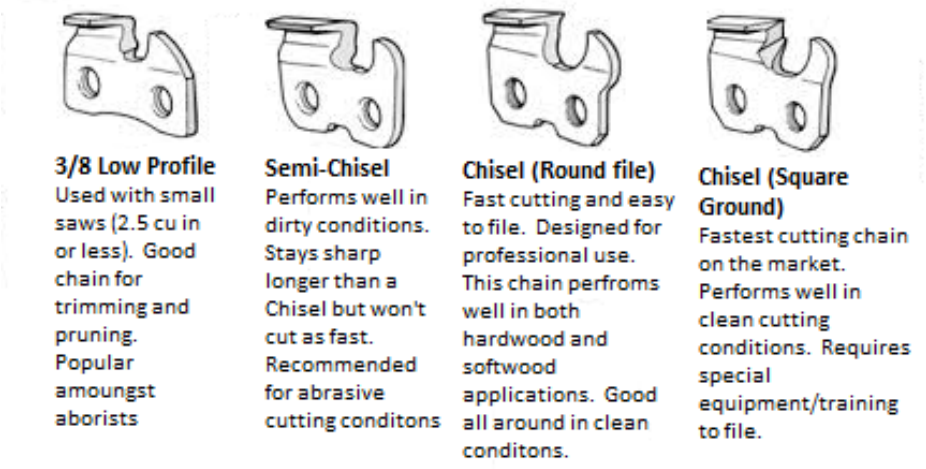


Figure 3: Types of chain

Chain components

Figure 4 shows common chain components.

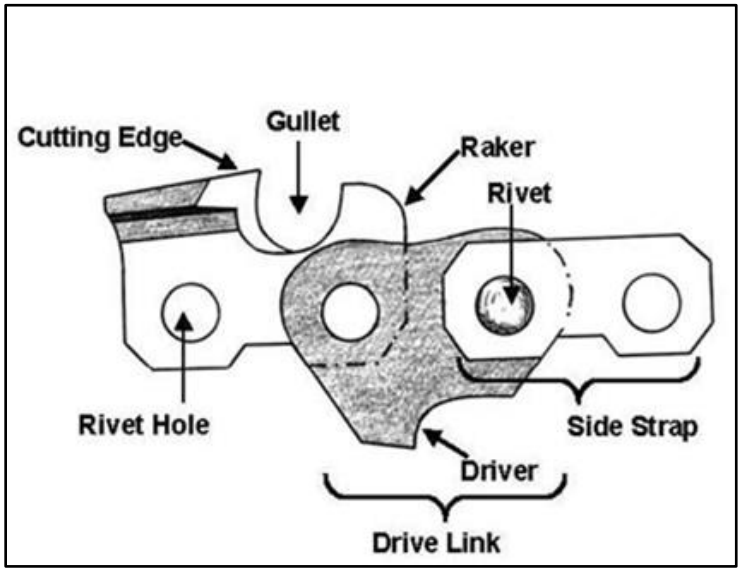


Figure 4: Components of a chain

Component	Purpose
Drive links	• With the drive sprocket, drive the chain around the guide bar and hold the chain in the bar *Note: Drive links are triangular to allow free travel around drive sprockets and bar tip.* • Cleans the bar groove of dust particles and transports chain oil for lubrication of the parts
Side straps	• Separates the cutter teeth and drive links *Note: Corners should be slightly rounded to minimize binding.*
Rivet and rivet holes	• Ties the chain together and permits it to remain flexible
Raker	• Rakers determine the thickness of the chip to be cut and guides the wood to the cutter tooth • The leading edge of rakers is to be rounded off or sloped 10 degrees forward to meet manufacturer's specifications
Gullet	• Gullets gather the cut chips and must be reformed whenever the chain has been sharpened
Cutting edge	• Cutting edges are shaped like and cut like a chisel • The tooth tapers in from front to back and allow easy cutting without becoming bound in the cut

Table 3: Components and purpose of a chain

File the Chain

Before filing the chain, make sure you have the necessary tools including:

- Bar wrench
- Raker gauge
- File guide
- Flat file
- Round file with handle
- Gloves
- Safety glasses

Figure 5: Filing tools

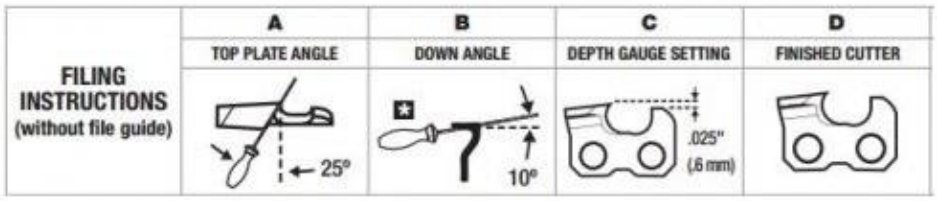


Figure 6: Filing instructions without using a file guide

Figure 7: Raker guage on chain

An alternative to filing the chain is grinding.

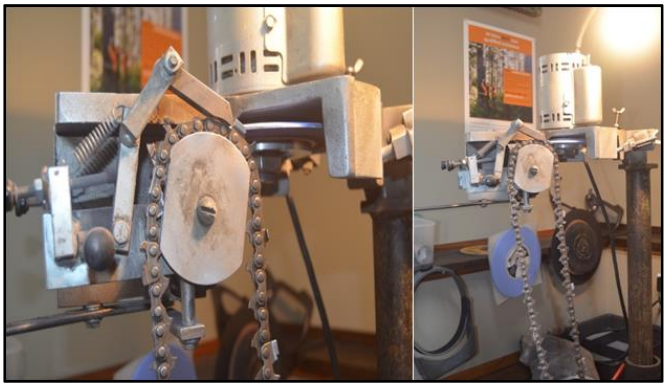
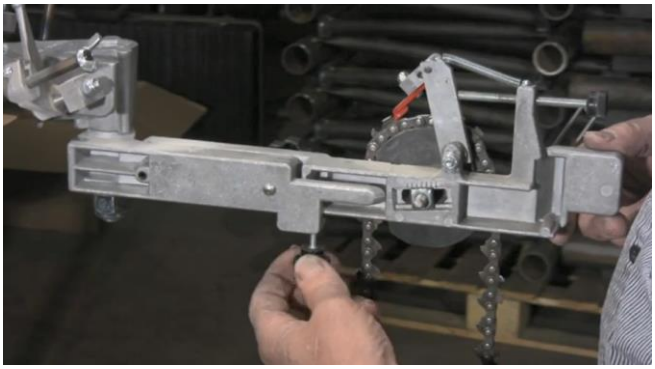


Figure 8: Grinder



Simington Chain Grinder provides informational videos on grinding chain at http://simingtonchaingrinder.com/how-to-videos/

	Watch the videos about filing a chain with a raker gauge and depth gauge: https://www.youtube.com/watch?v=tQtHdRDxF8E https://www.youtube.com/watch?v=LyleuCA1JDM

Learning Point

Use a safety chain, for example, an anti-kickback chain as these chains are designed to reduce the likelihood of chainsaw kickbacks.
What added feature makes it anti-kickback?

This key point will be further covered in the field.

Key Point 2.3: Spare parts and tools related to a chainsaw

A well prepared chainsaw operator will have all tools and spare parts readily available at the worksite whether it be in a shop location or in the field. Creating a well-rounded arsenal of tools and spare parts will aid in safety and productivity. Each operator should have a field kit that will allow for basic in field repairs as well as a more robust maintenance kit available on site.

In addition to the tools and equipment listed in Key Point 2.1 the following are spare parts and tools related to a chainsaw:

- Spare chain
- Spare bar or bar tip (not shown)
- Air filter
- Starter rope and handle
- Sprockets
- Spark plugs
- Screws
- Sprocket retaining clips (E clips)
- Clutch bearings
- Chainsaw mounts
- Clutch springs or spare clutch (not shown)
- On/off switch and wire
- Starter assembly (recoil spring)
- Assortment of nuts and bolts
- Chain tensioner
- Oil worm gear
- Fuel filter
- Chainbrake band
- Bar nuts
- Throttle cable

A complete spare chainsaw will meet the requirements of the spare parts listed above.

Figure 9: Spare parts for chainsaw.

IMPORTANT!

Not all spare parts are required to be in the active work area. However, some are common parts to have with you so that you have the ability to conduct repairs in the field, limiting time loss due to breakdowns.
Consult your Trainer for suggested ‘carry with you’ spare parts.

Section 1028-3: Safe Transport and Carrying of a Chainsaw

What you need to know about this section

By the end of this section you will be able to demonstrate your ability in the following key point:

3.1 How to secure a chainsaw for transport

Key Point 3.1: How to secure a chainsaw for transport

Potential Hazards

When transporting a chainsaw potential hazards include:

- Cuts from exposed chain and dogs
- Exposure to fuel spills in vehicle
- Possible fuel fire
- Unsecured tools become projectiles in a vehicle, aircraft or boat

Vehicle

When transporting the chainsaw by vehicle the following must be considered:

- Chainsaw, fuel and oil must not be transported inside the passenger compartment of a vehicle.
- Tie down and secure chainsaw(s) and equipment in open boxes, canopy or headache rack to stop them from causing damage or harm.
- Hand tools and equipment must be stowed securely, in a separate area from the passenger compartment, to avoid the risk of these items becoming airborne or flying around in and from the vehicle.
- Implementing a system to protect the chain with a bar cover, removing the chain and wrapping it around the handlebar or using a carrying case to prevent injuries and damage to associated equipment is recommended.

Figure 10: Chainsaws, tools and equipment secured in vehicle

ATV

When transporting the chainsaw by ATV the following must be considered:

- A system to securely tie down chainsaw during transport is required.
- Hand tools should be stowed securely to avoid the risk of becoming airborne or flying around during transport.
- Protect the chain with a bar cover to prevent injuries and damage to associated equipment.
- Secure gas and oil containers away from sparks and hot surfaces and check for potential leaks.
- A carrying case for a chainsaw is a convenient way to store and transport the chainsaw. The case can also serve as a spill containment system.

Helicopter and airplane

When transporting the chainsaw by helicopter or airplane include:

- Chainsaw, fuel and oil must not be transported inside the passenger compartment of a helicopter or airplane.
- A system to securely tie down and secure the chainsaw and equipment in transport is required.
- Secure chainsaw(s) and equipment in an area separated from the crew in a secured location where it will not cause damage.
- Hand tools and equipment should be stowed securely to avoid the risk of these items becoming airborne or flying around in the transport unit.
- A system to protect the chain and dogs with a bar cover or carrying case to prevent injuries and damage to associated equipment is recommended. In some instances, the chain may need to be removed and wrapped around the handlebar.
- Secure gas and oil containers in an area to mitigate spills. These containers must not be placed within the passenger compartments.

Figure 11: A chainsaw with the dogs guarded

Note: When a worker is required to pack a chainsaw for long distances and chooses to carry it on his/her shoulder, the chain must be removed

or guarded and the chainsaw dogs guarded in a manner so that they cannot cause injury.

Section 1028-4: Potential Risks Related to Chainsaw Use

What you need to know about this section

By the end of this section you will be able to demonstrate your knowledge of the following key points:

4.1 Hazards related to refueling a chainsaw

4.2 Potential immediate risks related to chainsaw use

4.3 Potential long term risks related to chainsaw use

Note: This section speaks to the hazards and risks associated with chainsaw use. Your Trainer will explain and demonstrate how to control each hazard.

Key Point 4.1: Hazards Related to Fueling a Chainsaw

Fuel and Oil

When fueling and oiling a chainsaw:

- Place chainsaw in a cleared area and allow engine to cool.
- Do not smoke.
- Keep chainsaw away from open flames.
- Keep personal fire extinguisher readily available.
- Wear personal protective equipment
- Ensure fueling takes place at a minimum of 10 ft from a watercourse

CAUTION!
Under hot conditions, fuel tanks can pressurize and expel flammable gas.
Slowly open fuel tanks to reduce the risks of eye injury and burns from ignited fuel sprayed on workers.

A fuel geyser is the rapid release of heated fuel in a closed container when a fuel container is depressurized. Watch the video below for an example of a fuel geyser.

https://www.nwcg.gov/committees/equipment-technology-committee/national-fuel-geyser-awareness

Key Point 4.2: Potential Immediate Risks Related to Chainsaw Use

Some immediate hazards and risks related to chainsaw use are:

- Kickbacks
- Projectiles from chain
- Crush and struck by object injuries
- Chain is thrown
- Burns
- Exhaust emissions
- Slips, trips and falls
- Puncture wounds from chainsaw dogs

Kickbacks

Kickbacks result from the unexpected upward movement of the guide bar when the moving chain contacts a solid object.

Kickback usually occurs in the “kickback zone” or upper-end portion of the chain/bar assembly.

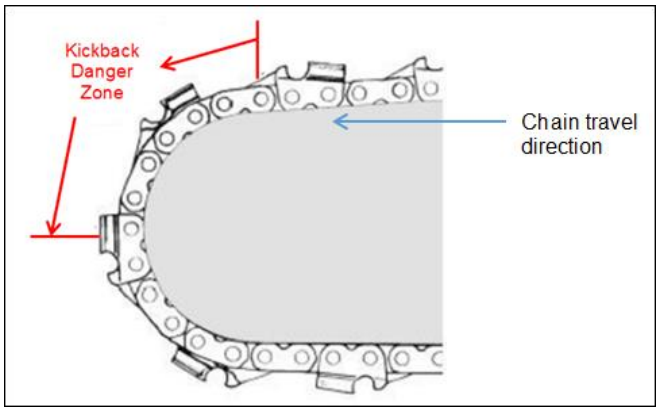


Figure 12: Kickback zone

Kickbacks can cause injuries including:

- Lacerations
- Dismemberment
- Punctures
- Abrasions
- Strains and sprains
- Muscle damage and bruising from chainsaw body striking worker

Measures to prevent kickback include:

- Ensure correct filing of chain teeth and raker height so chain will wear smoothly through the wood instead of grabbing or tearing the wood which could result in kickback
- Ensure chain brake is maintained and functioning
- Ensure correct chain tensioning
- Position body properly while handling the chainsaw to control how the bar and chain pivot when a chainsaw kickback occurs
- Always grip your chainsaw firmly with both hands
- Wrap thumbs around the handle bars to meet the fingers for a secure grip
- Maintain solid footing, good balance, and a natural posture when cutting
- Avoid letting the kickback zone contact anything while the chain is moving
- Avoid cutting above chest height
- Avoid over-reaching while operating a chainsaw
- Anti-kickback chain can help reduce frequency of a kickback in normal operation
- Learn to control the location of the bar tip by feel, avoiding potential kickback
- Know where the tip is and what it could potentially hit. Look to see where the tip will go prior to cutting
- Keep head and upper body to the side of the cut
- Use chainsaw left handed only as necessary

Figure 13: Potential kickback

Projectiles

Projectiles can come from a running chainsaw chain sending loose wood and debris flying. Wedges can act as projectiles as they can pop out of cuts which are more likely to happen in frozen wood.

Ensure the wedge is placed in the right cut and do not strike it forcefully until you are sure it is set firmly.

Projectiles usually occur below the “kickback zone” or bottom of the chain/bar assembly.

Projectiles thrown from a chainsaw can cause:

- Lacerations and punctures
- Eye and face injuries
- Muscle damage and bruising from object striking worker
- Abrasions and scratches

Measures to prevent projectiles from being thrown from the chainsaw include:

- Avoiding letting the projectile zone contact loose material while the chain is moving
- Running the chainsaw at full throttle when cutting
- Keeping the chain properly tensioned and filed
- Discarding the chain when it is at the wear mark
- Avoiding cutting above chest height and over-reach while operating a chainsaw
- Avoiding cutting where bottom of bar can send projectiles towards face
- Ensuring that wedges are set firmly before striking
- Using the weather appropriate wedges for working in cold weather
- Using an anti-kickback chain can help reduce frequency of projectiles in normal operation.
- Cutting whiskers with the back of the bar

Crush and Struck By Object Injuries

Crush and struck by object injuries occur when rocks or portions of standing trees or logs drop, slide, pivot or roll onto the worker. These injuries occur in a variety of ways and can have severe career altering effects.

CAUTION!

Being aware of potential log movement, chain reactions, and overhead hazards is extremely important to worker safety.

Injuries resulting from being crushed or struck by objects:

- Severe internal bleeding
- Broken bones
- Damage to organs
- Lacerations
- Contusions

How to prevent crush and struck injuries:

- Constantly assess work area for overhead and ground hazards
- Assess and plan for log movement prior to bucking
- Assess supporting limbs on logs
- Work from the high side of hazards that can roll or fall downhill
- Do not work below materials that can be impacted by your current activity
- Safely buck logs or portions of logs that are in your working area or escape route
- Avoid standing in potential pinch points

Major crush injury initial treatment measures:

- Major crush injuries may cause internal bleeding that is not immediately visible
- Prevent shock
- Reduce exposure to the elements and keep the person warm
- Provide rapid transport to medical aid
- Provide oxygen, if available
- Stabilize broken bones to reduce injury aggravation

Chain Thrown

A chainsaw chain flying loose from the bar can cause lacerations to the worker and damage to the chainsaw bar and chain. A thrown chain usually results from cutting small diameter material that is flexible or pinches the moving chain, such as brushing out.

To prevent a chain being thrown:

- Ensure chain catcher is functional
- Move smoothly when cutting brush and branches
- Keep the chain properly tensioned and filed
- Avoid cutting above chest height
- Avoid over-reaching while operating a chainsaw
- Avoid cutting where the top of the bar can catch on loose material
- Ensure trigger hand protection is in place (flared handle)
- Avoid using bars with a worn out tip
- Avoid using chains with worn out drivers

Burns

Burns occur when workers come into contact with the hot muffler of a chainsaw, ignited gasoline, sun exposure, or wildfire hazards from working around actively burning trees and logs. These injuries can result from short duration contact with hot substances to long term sun exposure.

Types of Burns

- First degree burns affect the outer layer of skin
- Second degree burns affect sub layers of skin and cause blistering

- Third degree burns affect all layers of skin down to muscle tissues and cause fluid loss

Burn prevention measures:

- Prevent spills of gasoline onto hot mufflers and open flames when fueling
- Ensure pressure release valve on chainsaw fuel tank is maintained to reduce pressure build up
- Allow chainsaw muffler to cool before fueling and transport (if placed on shoulder)
- Wear long-sleeve (flame resistant) clothing and gloves when working on actively burning wildfires.

Burn injury initial treatment measures:

- Burn injuries will cause fluid loss and blistering. Do not pop blisters
- Cool burns with clean water to prevent further damage
- Prevent shock for major burns
- Reduce exposure to the elements
- Provide rapid transport to medical aid
- Provide oxygen, if available

Slips, Trips, and Falls

Long term injuries have resulted from seemingly minor slips, to falls from heights greater than 3 meters (10 feet) onto irregular surfaces. Slips, trips, and falls are a constant hazard for workers in forested environments and are often preventable through worksite planning and ergonomic work habits.

Slips resulting from loose bark on a log and unstable ground conditions can happen quickly without giving you time to react. Often the consequences are minor, but they can become a longer-term injury if not treated with rest and proper care. Holes and tears in PPE can also cause slips, trips, and falls.

Trips are often a result of not clearing the worksite and believing that your ability to move around is sufficient which is often true until your focus is directed elsewhere or the need for rapid action is suddenly and unexpectedly required. Trips can become especially hazardous when you are packing heavy loads and your ability to brace against a trip is impeded.

Falls on uneven terrain from heights above 3 meters (10 feet) can result in a serious injury. If working above 3 metres (10 feet), you are expected to have fall arrest gear on, but this may not be practical for safety reasons. To prevent injury, it is recommended that workers avoid situations that expose them to a falling hazards.

Exhaust Emissions

Carbon monoxide can be deadly in confined spaces and has cumulative effects on the blood stream and a person’s mental alertness. Although chainsaw operation takes place outdoors, there

are situations where short-term confined space conditions can expose workers to carbon monoxide. Tree wells in winter can cause a confined space that will elevate the levels of carbon monoxide.

Decision-making can be impaired and it is very difficult to self-diagnose these effects. If in a confined pocket using a chainsaw regularly, there is a chance exhaust emissions can begin to impair your judgment.

Monitor exposure to higher levels of exhaust and be aware that your mental focus can become reduced.

Key Point 4.3: Potential Long Term Risks Related to Chainsaw Use

Some long term exposure injuries related to chainsaw use are:

- Musculoskeletal injuries (MSI)
- Vibration disease
- Hearing loss

Common Musculoskeletal Injuries

Sprains and strains

Operating a chainsaw requires a variety of different body positions that can expose a worker to injury from repetitive motions or sudden jarring actions. For example, overextension or trying to free a pinched chainsaw by pulling aggressively can result in strains. Strains can also occur from heavy lifting. A strain is an acute chronic soft tissue injury that occurs to a muscle, tendon or both.

MSI injuries can be avoided by working smoothly and re-positioning body for correct ergonomics.

Back injuries

A chainsaw is a heavy piece of equipment. Working hunched over, with the weight of the chainsaw hanging from your arms, causes considerable strain on an operator's back. When making the bucking cut on a log, support the weight of the chainsaw by bracing your forearms on your thighs or knees as well as using the dogs as much as possible.

Resting the chainsaw on your thigh when bucking and limbing takes the weight off your lower back muscles. Keep close to the chainsaw - this will also reduce the risk of kick-back. Aim to work at a height where you can easily support the chainsaw on the tree without hunching over.

REMINDER

Maintaining a straight back and upright stance will prevent lower back injuries over the long term. Ensure the bar you are using is appropriate so as not to overreach.

Vibration Disease

Hand-arm vibration injuries

Long term exposure to chainsaw vibrations can cause white finger vibration syndrome and lead to tendonitis.

To avoid these types of injuries, wear gloves and ensure that you:

- Use the correct grip on the handlebar as this allows the operator to maintain control of the chainsaw
- Use a heated handlebar as it will keep hands warm in cold weather
- Use a full wrap handlebar as this limits back-barring, thus reducing MSI and kickback
- Use the chainsaw dogs to support the weight of the chainsaw when cutting, thus reducing fatigue and MSI
- Check the anti-vibration mounts as they reduce the amount of engine vibration transmitted to handles and operator's hands and arms. This will prevent white finger syndrome or Raynaud's disease which can result in blood vessel and nerve damage
- Perform chain maintenance as per the manufacturer's specifications to avoid vibration issues

Your Trainer will demonstrate techniques to help avoid back and hand-arm vibrational injuries.

REMINDER

Keeping your hands warm by wearing gloves and using a heated handlebar will reduce your risk of MSI.

Loss of hearing

Loss of hearing usually results from working without ear protection in environments where noise levels exceed 85db for long periods of time. This occurs when workers do not protect themselves against noise levels in excess of 85db.

Hearing loss prevention measures:

- Wear hearing protection that has a Noise Reduction Rating (NRR) that brings noise levels into a safe range

Safe Work Procedures for Reducing MSI

Safe work procedures for chainsaw use contain specific steps or instructions which attempt to reduce MSI. Following these procedures will help you avoid musculoskeletal injuries.

The following safe work procedure is for reducing MSI injuries:

1	Maintain a firm, comfortable grip to keep control of chainsaw.

	• This allows for reaction time in case of chainsaw kickback, which, if you are not prepared, can cause pulled or torn muscles.
2	Use well-fitting gloves for proper grip, so that you don't have to hold the chainsaw too tightly or fight its movement.
3	Keep handlebar arm straight. • This creates a pivot point at the shoulder and tends to toss the chainsaw over the shoulder of the chainsaw operator and to the clear when a chainsaw kickback occurs.
4	Maintain solid footing, good balance, and a natural posture when cutting. • Stand with one leg forward and one leg back to form a stable stance.
5	Hold chainsaw close to the side of your body. • Never over reach while operating a chainsaw as this increases the risk of injury from falls, back strain, fatigue, and chainsaw kickback. The closer you hold the chainsaw to your body, the more control you have.
6	Learn to use the chainsaw in both the left and right-handed positions. • This allows you to use the chainsaw in two safe positions.
7	Pull the chainsaw smoothly out of cuts. • Jerking the chainsaw can cause loss of control, uncertain footing, and back, arm, or shoulder strain.

Figure 14: Correct body posture when bucking.

Self-Quiz

1. What is the purpose of chainsaw dogs? (1028.1.1)
   - ☐ Prevents unwanted activation of throttle
   - ☐ Protect chainsaw operators throttle handle
   - ☐ Allows operator to hold chainsaw
   - ☐ Controls chainsaw by providing a solid pivot point
2. What is NOT a control of the chain brake? (1028.1.2)
   - ☐ Prevents the chain from moving when starting
   - ☐ Guards hands from debris
   - ☐ Allows for automatic stopping of the chain
   - ☐ Prevents thrown chain from hitting the operator
3. What prevents the throttle trigger from being accidently pressed when the chainsaw is running? (1028.1.2)
   - ☐ Throttle grip
   - ☐ Throttle lock
   - ☐ Throttle arrestor
   - ☐ Throttle kickback
4. What is a control of the throttle lock? (1028.1.2)
   - ☐ Reduces fatigue
   - ☐ Reduces likelihood of chain spinning
   - ☐ Helps maintain control of the chainsaw
   - ☐ Stops the engine when a kickback occurs
5. What critical safety features must be working if the chainsaw is to be used? (1028.1.2)
   - ☐ Chain brake, chain catcher, throttle lock
   - ☐ Throttle lock, decompression switch, chain brake
   - ☐ Anti-vibration mounts, chain catcher, decompression switch
   - ☐ Decompression switch, chain catcher, throttle lock
6. What does NOT need to be inspected weekly on a chainsaw? (1028.2.1)
   - ☐ Sprocket tip

- ☐ Carburetor
- ☐ Starter cord
- ☐ Fuel cap

7. What should be checked daily on a chainsaw? (1028.2.1)
   - ☐ Starter recoil assembly
   - ☐ Dog screws
   - ☐ Oil needle bearing
   - ☐ Air filter

8. What can be done when handling a chainsaw to reduce risk of MSI? (1028.4.3)
   - ☐ Keep your hands warm
   - ☐ Hold handle with thumbs up
   - ☐ Hold chainsaw in front of your body
   - ☐ Pull out of cuts rapidly

Now check your answers on the next page.

Self-Quiz Answers

1. What is the purpose of chainsaw dogs? (1028.1.1)

   Answer: **Controls chainsaw by providing a solid pivot point**

2. What is NOT a control of the chain brake? (1028.1.2)

   Answer: **Prevents thrown chain from hitting the operator**

3. What prevents the throttle trigger from being accidently pressed when the chainsaw is running? (1028.1.2)

   Answer: **Throttle lock**

4. What is a control of the throttle lock? (1028.1.2)

   Answer: **Reduces likelihood of chain spinning**

5. What critical safety features must be working if the chainsaw is to be used? (1028.1.2)

   Answer: **Chain brake, chain catcher, throttle lock**

6. What does NOT need to be inspected weekly on a chainsaw? (1028.2.1)

   Answer: **Fuel cap**

7. What should be checked daily on a chainsaw? (1028.2.1)

   Answer: **Air filter**

8. What can be done when handling a chainsaw to reduce risk of MSI? (1028.4.3)

   Answer: **Keep your hands warm**

Section 1028-5: Basic Chainsaw Operation and Ergonomics

What you need to know about this section

By the end of this section you will be able to demonstrate your knowledge or ability in the following key points:

5.1 What personal protective equipment (PPE) are related to chainsaw use

5.2 The importance of chainsaw size and bar length suitability for the job including advantages and disadvantages

5.3 When a chainsaw should not be operated

5.4 How to carry a chainsaw to and from the worksite and from cut to cut safely

5.5 How to operate a chainsaw in the work area using safe work procedures

5.6 How to conduct basic bucking and cutting sequences in a controlled environment

5.7 How to buck correctly to reduce MSI

Key Point 5.1: Personal Protective Equipment related to Chainsaw Use

Personal Protective Equipment (PPE) that may be used in a forestry operation is described in unit 1003 Describe Personal and Worksite Safety.

For safe chainsaw operations, the PPE described in this section focuses on:

- Hand protection
- Leg protection
- Eye and face protection

PPE

Chainsaw operators must wear PPE when handling a chainsaw. It is required that all PPE be kept in good condition and checked regularly by workers and supervisors.

OHS Regulation for workers with respect to PPE includes:

- Inspecting PPE before use
- Wearing appropriate clothing and PPE for work activity
- Maintaining PPE in good working condition

Recognize the Hazard

PPE is equipment designed to protect specific areas of a person from injury or disease. Each device has a specific function and contributes to an operator's overall safety. PPE does not prevent injury but can greatly reduce the likelihood and severity of injury.

Hand Protection

Consider the following when choosing gloves.

Weather conditions and time of year:

- Warm trigger finger mitts are available for use in cold weather
- Leather and other smooth fabrics become slippery in wet weather
- Select gloves made of materials that will keep the hands warm, even when wet, such as wool gloves
- Have multiple pairs readily available

Personal preference:

- Hand size

- Fit is good and comfortable
- Good grip - gloves with rubber mesh woven into the fabric help keep a firm grip on the chainsaw.

Figure 15: Work gloves

Leg Protection

Chainsaw operators need to wear leg protection to protect the legs from:

- A running or thrown chainsaw during chainsaw kickback or if the chain breaks
- Abrasions and bruising

Protective pants

- Leg protection is mandatory for buckers and fallers
- Approved leg protection does not prevent penetration of the chain but can lessen the severity of a cut
- Protective pants or full-length chaps with snaps must meet the requirements of the current WorkSafeBC Standard and be properly labeled
- Protection must meet the current Threshold Chain Speed (TCS) rating specified in the standard, minimum 3600 feet per minute (fpm)
- 4100 fpm leg protection should be used as a best practice
- Protective pants or chaps contain ballistic nylon or Kevlar pads with a high resistance to chainsaw cuts
- Protective pants or chaps should not be worn if torn or damaged
- A professional uses the best protective pants for greater protection
- In wildfire situations, chainsaw operators must wear non-synthetic, fire-resistant pants or non-synthetic fire resistant base layers under chaps

CAUTION!

Protective pants will not stop a running chain. Pads are constructed of loosely woven Kevlar thread that are designed to get pulled into the drive sprocket causing the chain to stop. **The chainsaw can cut through the pad before it stops!**

Figure 16: Protective pants

The CSA chain speed rating for leg protection pads: a minimum rating of 3600 ft. /minute (1098 m/minute). Some oil/gas sectors requires 4100 ft. /minute (per OHS Regulation 8:21 and PPE 1-1997).

Table 4 provides a summary of required PPE and identifies the OHS Regulation that pertains to the PPE identified.

Summary of PPE

Key Topics	Statement or Question	Safe Work Practice	OHS Regulation
Safety headgear	A bucker is observed wearing a yellow hard hat that is faded and has a broken suspension. Is this acceptable safety headgear?	No • Yellow is not an acceptable colour, must be high visibility colour that contrasts with the background against which the worker is working • Fading is an indicator of sun deterioration	26.7 (2) 8.11 (6)

Key Topics	Statement or Question	Safe Work Practice	OHS Regulation
		• Damaged headgear is unacceptable and must be removed from service	
Eye and face protection	A bucker returns to the stump and starts the chainsaw to trim the whiskers off and does not lower the face shield. Is this acceptable?	No The face shield/face screen must be down whenever the chainsaw is cutting wood as splinters and stump pull tends to fly towards the face and eyes of the bucker	8.17 (1)
Hearing protection	Hearing protection must be worn while running a chainsaw. True or false? List falling activities when hearing protection is not worn.	True - hearing protection is not worn when: • Walking in and out of the falling area • Listening for your partner • Tapping wedges on dangerous trees	7.13 7.14
Hand protection	Do buckers wear gloves? List the hand hazards associated with falling.	Yes, the hand hazards are: • Walking in/out, for example, slips, falls, abrasions and punctures from brush • Filing and adjusting chain, for example, cuts from chain • Operating chainsaw, for example debris from cutting • Weather, for example, wet and cold	8.19 (1) (2)
Leg protection	On Thursday the chain flies off and ripped the	Yes • For the pants to remain effective	8.21 (1) (2)

Key Topics	Statement or Question	Safe Work Practice	OHS Regulation
	buckers pant pads. Does the bucker need to replace them for one last day of work that week?	they must have the trouser material intact and the pad must not be torn or cut. • Torn fabric can cause hang ups and tripping hazards.	
Footwear	Caulk footwear comes with rubber or leather soles. When is a leather sole caulk boot not recommended?	In snow. Snow builds up on the leather between the caulks.	8.22 (1) 8.23 (1) (2)
High visibility (hi-vis) apparel	A bucker is working in an area, The buckers whereabouts must be checked frequently. When leaving work, the bucker must pass through an active logging landing. What apparel is required? Why is the apparel required?	High visibility clothing or vest and headgear. Must be visible for routine checks and when endangered by mobile equipment.	26.7 (1) (a)(b) 26.7 (2) 8.25
Whistle	The bucker notices that he/she has lost his/her whistle. Is this an important item to have on his/her person when bucking timber? Give your reasons.	Yes, the whistle is the accepted standard to call for help, notifying others he/she is injured and needs assistance. It must remain on his/her person at all times. It must be worn where it is accessible by mouth, for example, pinned the suspenders	26.28 (2)

Key Topics	Statement or Question	Safe Work Practice	OHS Regulation
First Aid kit and pressure dressing	There are three buckers on a heli-block with a Level 3 First Aid Kit. Where should the first aid kit be located? Where should the personal first aid kit be located? Where should pressure dressings be located? Is it a good idea to place the pressure dressing in your hard hat for safe keeping?	The Level 3 First Aid Kit must be accessible by all the buckers and in a common place known to the buckers, for example, located at the pad, in a weather proof container. The personal first aid kit should be located on the bucker's person, for example, pocket or belt. One pressure dressing in the personal first aid kit and one pressure dressing should be kept on the buckers person at all times, even when walking in/out, for example, in an accessible pocket. No, a pressure dressing should not be kept in the hard hat as it interferes with and reduces suspension travel. The hard hat can be knocked off the head and out of reach.	3.16

Table 4: Summary of PPE

Key Point 5.2: The Importance of Chainsaw Size and Bar Length Suitability

Chainsaw Criteria

When determining the suitability of a chainsaw, ensure that:

- A professional model with a full-wrap handlebar is used
- The chainsaw meets the CSA Standard Z62.1-95
- The chainsaw has a functioning chain brake, throttle lock, and chain catcher in place
- The chainsaw and bar length are compatible with the average timber size and work activity
- The chainsaw powerhead is suitable for the bar length
- The ratio of body height to bar length is considered to reduce MSI

Chainsaw

Choosing the appropriate chainsaw size is a key component of safety and productivity as an operator. Understanding the specifics of the task at hand as well as how the wood cuts (hard or soft) will help you to select the best chainsaw for the job.

There are many saws available from different manufacturers. It is a requirement to select a chainsaw that is manufactured for professional use and is equipped with a full wrap handle bar.

The following chart shows saws most commonly used by Professionals in Western Canada.

Chainsaw	Specifications
Husky 390 XP	Cylinder displacement – 88 cm3 Bar length – 20-36 inches Weight (excluding cutting equipment) – 16.1 lbs
	
Husky 372 XP	Cylinder displacement – 70.7 cm3 Bar length – 20-28 inches Weight (excluding cutting equipment) – 15 lbs
	
Stihl MS 661	Cylinder displacement – 91.1 cm3 Bar length – 20-36 inches Weight (excluding cutting equipment) – 16.5 lbs
	

Stihl MS 461	Cylinder displacement – 76.5 cm3 Bar length – 16-32 inches Weight (excluding cutting equipment) – 15 lbs
	

Bar Length

Chainsaw operators should choose the bar length and chainsaw size for the job based on timber type and size and the size of the chainsaw. Bar length should not exceed manufacturer's recommendation for chainsaw size

Bar Length	Disadvantages
If too short	• Difficult to match cuts from one standing position without using double bar technique • May cause operator to extend reach causing neck, shoulder, back, arm or wrist strain (MSI) • Puts operator into a position for chainsaw kickback because bar tip isn't cutting across length of log • Chain speed will exceed feet per second rating of protective pants
If too long	• Kickback due to the tip of the bar hitting an object (ground, rock, stump, tree) on the other side of the log or tree • Tends to unbalance chainsaw • Chainsaw may not have required power to turn length of chain effectively while cutting resulting in slower chain speed, preventing smooth cutting

CAUTION!

There is an extreme kickback hazard when using a bar that is too short for the chainsaw. The chain will fun faster when using a small bar versus using a long bar.

Learner Activity

Match the disadvantage with TL (too long) or TS (too short).

TL/TS	Disadvantage
	Hard to reach the bottom corner
	Can kickback due to the bar not going through the log/tree all the way
	Will cause drag on chainsaw performance
	May cause operator to extend reach causing neck, shoulder, back, arm or wrist strain (MSI)
	Tends to unbalance chainsaw by affecting safe handling and control
	May cause operator to fatigue
	Causes strain to arms, shoulder, neck or back (MSI)
	Kickback due to the tip of the bar hitting an object (ground, rock, stump, tree) on the other side of the log or tree
	Difficult to match cuts from one standing position
	Puts operator into a position for chainsaw kickback because bar tip isn't cutting across length of log
	May cause operator to become fatigued
	May stick out, hit objects, and cause kickback

Now check your answers on the next page.

Answer

Match the disadvantage with TL (too long) or TS (too short).

TL/TS	Disadvantage
TS	Hard to reach the bottom corner
TS	Can kickback due to the bar not going through the log/tree all the way
TL	Will cause drag on chainsaw performance
TS	May cause operator to extend reach causing neck, shoulder, back, arm or wrist strain (MSI)
TL	Tends to unbalance chainsaw by affecting safe handling and control
TS	May cause operator to fatigue
TL	Causes strain to arms, shoulder, neck or back (MSI)
TL	Kickback due to the tip of the bar hitting an object (ground, rock, stump, tree) on the other side of the log or tree
TS	Difficult to match cuts from one standing position
TS	Puts operator into a position for chainsaw kickback because bar tip isn't cutting across length of log
TL	May cause operator to become fatigued
TL	May stick out, hit objects, and cause kickback

Key Point 5.3: When a Chainsaw Should Not be Operated

Chainsaws have primary safety features built into them. The main features include a chain brake, a chain catcher, and a throttle lock. However, there are other situations where a chainsaw should not be used.

CAUTION!

Do not operate a chainsaw if the :

- Chain catcher is missing
- Chain brake is not working
- Throttle trigger lock is not working
- Clutch is dragging causing the chain to move along the bar when chainsaw is idling
- Anti-vibration mounts are broken

Chain Catcher

The chain catcher seems like an insignificant component but without it, the operator is subject to substantial risk if the chain is thrown. The chain catcher is conveniently located to take the brunt of the force when a chain is thrown which reduces risk to the operator's legs and the chainsaw gas tank.

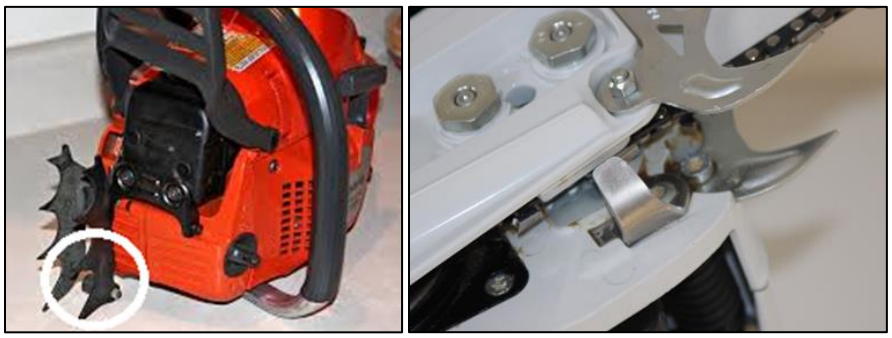


Figure 17: Chain catcher

Chain brake

The chain brake is a spring actuated band that clamps down on the clutch drum. It is engaged either manually by the handle or through inertia after a sudden force such as a kickback. Most often the chain brake will fail at the band itself. The only way to test the fail point is to test it visually or with the chainsaw running. The simple 'click' of the handle will not indicate whether or not the band is intact.

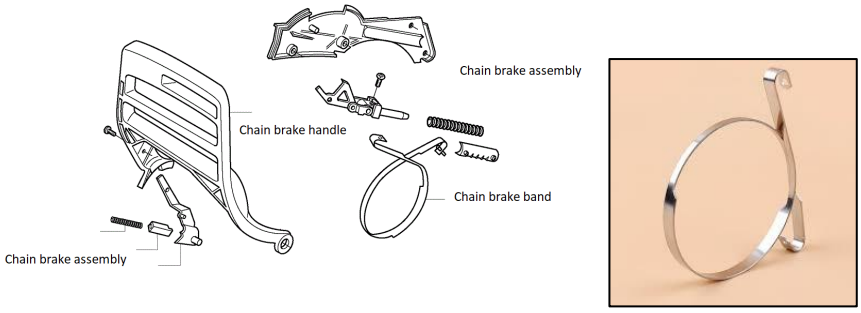


Figure 18: Chain brake

Throttle lock

If the throttle lock is broken it will allow for the trigger to be depressed freely. This could result in injury during a slip or unexpected increase in throttle while walking or working with the chainsaw.

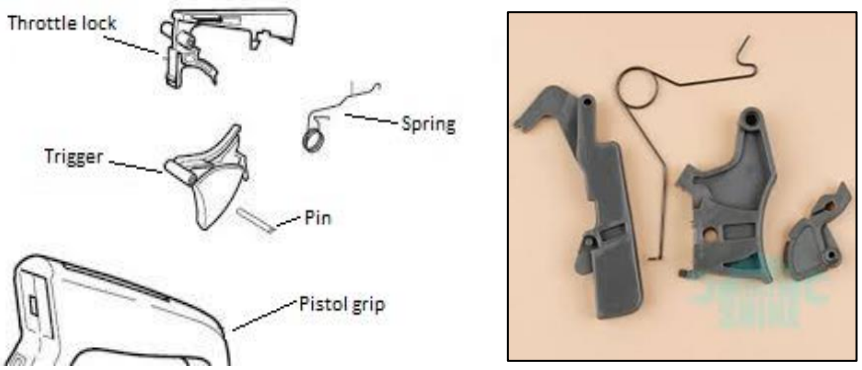


Figure 19: Throttle lock

Dragging Clutch

In the clutch assembly of a chainsaw, there are several springs. If one of them is broken, the shoe will go up against the clutch drum which engages the chain. Forestry hip chain string can be drawn into the clutch impacting performance and causing additional friction and chain engagement. This situation can create a dragging clutch.
When the chainsaw is in the idle mode, the chain will still move around slowly instead of stopping making a dragging clutch a safety hazard. If this situation exists, do not operate the chainsaw.

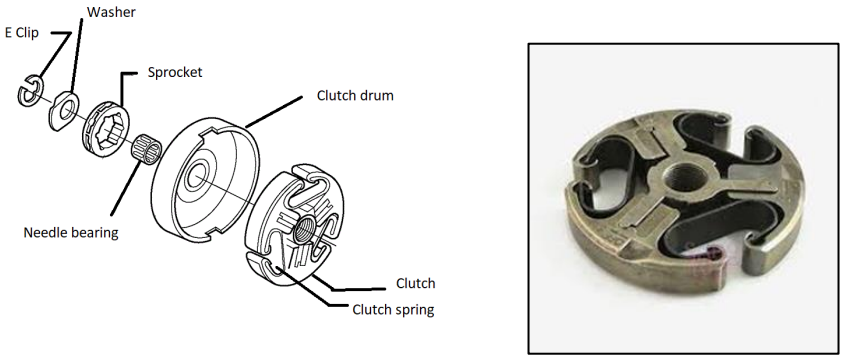


Figure 20: Dragging clutch

Anti-vibration mounts

If anti-vibration mounts are worn out or broken the chainsaw handle will feel loose and vibration will transfer to the handle, affecting the safe operation of the chainsaw.

Figure 21: Anti-vibration mounts

STOP!

If any of the critical safety features of the chainsaw (Chain Brake, Chain Catcher, or Throttle Lock) are missing or broken or if the clutch is dragging or the anti-vibration mounts are broken, **do not operate the chainsaw!**

Key Point 5.4: How to Carry Chainsaw

Safe Work Procedure when Transporting the Chainsaw by Hand

Chainsaws need to be transported with care to prevent injury to workers and damage to the chainsaw. Some safe work practices are listed below.

1. Plan your route to eliminate trips, slips, and falls when carrying gear. When necessary, make two trips.
2. Shut the chainsaw off when carrying it for a distance.
3. If chainsaw is running, activate chainbrake to prevent the chain from rotating if the trigger is caught by a stick or a branch.
4. Common practice is to carry chainsaw with the bar and chain pointed behind you but circumstances may require the bar and chain be pointed in front of you.
5. Carry the chainsaw away from the body so that it can be released safely in the event of a fall or if it is caught on any obstruction.
6. Avoid contact with the hot muffler.
7. Carry gas and oil in the other hand to assist with balance.
8. Pack tools on a belt.
9. To prevent injuries, carry the axe by hand or in an approved carrier.

Figure 22: Correct way to carry chainsaw, tools and equipment.

Figure 23: Chain removed and dogs guarded for transport

Figure 24: Chain cover and dogs guarded for transport

CAUTION!

When operators are required to pack a chainsaw for long distances and choose to carry it on their shoulder, the chain and dogs must be removed or guarded.

Key Point 5.5: How to Operate the Chainsaw

Operating the chainsaw smoothly takes time and training. Understanding the risks associated with chainsaw use and developing good body position to handle the chainsaw safely and efficiently is critical. Trainers often refer to this good body position as the “fighter stance”. Feet and hands are placed for balance, stability, and reactivity.

Chainsaw operators are trained to run the chainsaw both right and left handed so that overreaching can be avoided and safe bucking positions can be used in specific circumstances. The desired operating “grip” is to be right handed.

Watch the video on correct tance for bucking, limbing and taping and falling trees.

https://www.youtube.com/watch?v=Ap5TXRUEEqw&feature=youtu.be

Starting chainsaw

There are four approved techniques to start a chainsaw. Your Trainer will further review the approved technique for your industry during field training.

1. Cold start on the ground with the chainsaw secured with knee or foot
2. Cold start with the chainsaw secured between the knees

3. Warm start, drop start. This is the least preferred method of starting a chainsaw as it is not secured. It is to be used only with a warm chainsaw
4. Perform a controlled start which consists of the tip of the bar over a log, with the bar lying flat, with right hand on the pistol grip. This technique is used If you are using a long bar.

Ensure to wear PPE when operating a chainsaw including hard hat, face and hearing protection, cut resistant leg protection, hi-vis, close fitting clothing, work appropriate boots and gloves. Also ensure the chainsaw has been inspected using the following checklist prior to starting.

Pre-start procedure

☐ Check that chain brake mechanism is in working condition.
☐ Ensure chain catcher is in place.
☐ Test throttle lock and trigger function.
☐ Ensure chain is sharp and tension is set as per manufacturer's specification.
☐ Check that all attachment bolts, anti-vibration mounting, and screws are in place and secure.
☐ Top up the fuel and oil reservoirs and clean all traces of fuel and oil from chainsaw. Ensure fuel and oil caps are securely fastened.

Cold starts on the ground

☐ Engage chain brake before starting.

☐ Place chainsaw on cleared area on the ground away from other personnel and fuel.

☐ Check that choke throttle control is set correctly.

☐ Press decompression valve on chainsaw.

☐ Grip starter rope handle firmly with appropriate hand.

☐ Pull starter rope to tension and then pull with a sharp upward motion using shoulder and arm.

Cold starts between your knees

☐ Engage chain brake before starting.

☐ Place chainsaw rear handle between your knees keeping chainsaw away from other personnel and fuel.

☐ Check that choke throttle control is set correctly.

☐ Press decompression valve on chainsaw.

☐ Grip starter rope handle firmly with appropriate hand.

☐ Pull starter rope to tension and then pull with a sharp upward motion using shoulder and arm.

Starting a warm chainsaw (drop starting or over a log)

☐ Engage chain brake before starting.

☐ With a warm chainsaw, hold chainsaw by the front handle in one hand, ensuring you are away from other personnel and fueling location. The bar must be forward and positioned so that if the pull cord gives unexpected resistance due to compression, the bar will not pull up towards the operator's head and neck. *If the bar is over a log then the hand is on the pistol grip as opposed to the front handle. DO NOT activate the throttle while starting the chainsaw or until the saw is secured with both hands.*

☐ Press decompression valve on chainsaw.

☐ Grip starter rope handle firmly with appropriate hand.

☐ Pull starter rope to tension and then pull with a sharp upward motion using shoulder and arm.

☐ While pulling the starter rope with one hand, push the body of the chainsaw down and away from you with the hand on the full wrap handle bar. By doing this you are using the weight of the chainsaw to assist in the starting process.

☐ Be aware this is the least secured method and should only be done on a warm chainsaw.

Operating chainsaw to test the chain brake

Once the chainsaw has been started using one of the above approved techniques, it is important that the chain brake is tested before using the chainsaw.

☐ Firmly hold the chainsaw using both hands with thumbs wrapped.

☐ Stand with secure footing and stance.

☐ Disengage chain brake.

☐ At a low rpm, engage and test chain brake.

Safe chainsaw handling guidelines

1.	Place left hand on the handlebar and right hand on the pistol grip and throttle. • It is a good practice to learn to use the chainsaw in both the left and right-handed positions. This allows you to use the chainsaw in two safe positions. • Generally the chainsaw is a tool that required the right hand to be on the pistol grip and left-handed use should be minimized. • Maintain a firm, comfortable grip to keep control of chainsaw. This provides for reaction time in case of chainsaw kickback. • Bucking pants are designed with more padding on the left

	leg. Chainsaws are set up to be operated right-handed, with the right hand on the trigger. That way, the bar is on the right-hand side, which is your strike zone. If your left hand is on the pistol grip, your whole body is exposed to the bar chain. • Use well-fitting gloves for proper grip. • Hook thumb under the handlebar to stop hand from slipping onto chain in case of chainsaw kickback.
2.	Keep handlebar arm straight. • This creates a pivot point at the shoulder and tends to toss the chainsaw over the shoulder of the bucker and to the clear when a chainsaw kickback occurs. • Never use the chainsaw with one hand.
3.	Maintain a solid footing and good balance. • Stand with one leg forward and one leg back to form a stable stance. • Cut saplings and brush low and flat to avoid angles cuts (punji sticks) that could injure anyone who slips, trips or falls • Work to one side of the chainsaw to minimize the potential for injury.
4.	Hold chainsaw close to the side of your body. • Never overreach while operating a chainsaw as this increases the risk of injury from falls, back strain, fatigue, and chainsaw kickback. The closer you hold the chainsaw to your body, the more control you have. • Never stand directly behind the chainsaw.
5.	Avoid operating or running a chainsaw within reach (10 ft.) of another person. • Never allow someone to stand directly in front of or behind you while you are using a chainsaw as the chain may break and debris may fly forward or backward. • Pull the chainsaw smoothly out of cuts. Jerking the chainsaw can cause loss of control, uncertain footing, and back, arm, or shoulder strain.

Figure 25: Operating the chainsaw with the right hand.

Figure 26: Operating the chainsaw with the left hand.

Key Point 5.6: How to Conduct Basic Bucking and Cutting Sequences in a Controlled Environment

A controlled environment is any environment where there is minimum potential hazards to the trainee during training. Controlled training generally does not occur in a work setting.

Safe Bucking Guidelines

- Always complete a hazard assessment BEFORE making any cuts
- Wear PPE at all times and ensure the face screen is pulled down for all bucking work
- Brush out work area to allow freedom of movement and remove any debris that could fall, trip you, or fly at you from the front or behind
- Plan for log movement and ensure that work area allows for adjustments to your position. Brush out escape route - do not buck without a clear escape route
- Ensure your footing is stable
- Learn to know and control the location of the bar tip by feel. It will help to avoid kickback situations and help keep the chain sharp
- Follow safe bucking procedures for top and bottom binds
- After each cut reassess to ensure it is safe to make the next cut as planned
- If your safety is compromised and the cut cannot be completed, stop and seek qualified assistance

Figure 27: Bucking

Simple bucking cut process

Before bucking a log:

- Assess work area
- Clear work area
- Plan for log movement
  - Identify pivot points
  - Identify bind
- Plan cut sequence
- Monitor log movement

Assess work area

- Take a good look around for hazards prior to cutting. In a logging environment it is not uncommon for limbs to be hanging in standing timber adjacent to felled timber.
- Observe ground conditions and plan for stable footing.
- Recognize areas that may need to be avoided are clearly identified.

Clear work area

- Remove brush, saplings or other obstructions in the bucking area.
- Learn to control the location of the bar tip by feel. It will help to avoid kickback situations and help keep the chain sharp.
- Clear work space of debris or obstacles to safe bucking.

Plan for log movement

- Choose safe side based on determined log movement potential.
- Logs will roll away on slopes unless affected by pivots.
- Place body uphill side and on the side of the cut away from the highest movement potential (this will determine whether the operator places the cut left or right handed).

Identify pivot points

A pivot point is any object on the ground or deck that causes timber to react in an unexpected manner when cut. The pivot point can cause one end to slide or roll away and the other end to swing towards the worker.

- If the operator hasn't noticed the pivot point and planned accordingly, serious injury could result to the worker.
- Look for stumps, rocks, limbs, other logs, ground debris, or any protrusions that can affect the balance of the log.
- Understand that the least amount of movement will happen at or near pivot points.
- First bucking cuts should be at or near pivot points.

Identify bind

- Determine which bind; top, bottom, or side is affecting where the planned cut is.

- Top bind - compression wood on top.
- Bottom bind - compression wood on bottom.
- Side bind - compression wood on side.

A bind creates two different pressures - compression and tension. Bind and gravity are major forces that the worker must be able to identify when planning bucking cuts. Be aware that there may be more than one bind in the tree you are bucking.
Bind is involved in virtually every bucking situation because of stumps, windfalls, or other objects that prevent the tree from lying flat and straight.

Tension
The wood on one side of the tree being pulled and stretches the wood fibers.

Compression
The other side of the tree is being squeezed and compresses the wood fibers.

Plan cut sequence
Plan cut sequence as per bind and prescribed safe work procedures below. The compression side is cut first in most bucking situations.

Safe work procedures

Let’s review the safe work procedures that should be used when bucking the following types of binds:

- Basic/small diameter cut top bind
- Basic/small diameter cut bottom bind
- Large diameter tree, top bind
- Large diameter tree, bottom bind

When reviewing the safe work procedures below, basic/small diameter refers to any log that is bar length or less and large diameter refers to any log that is bar length or more but not considered oversized or double bar in diameter.

Basic cut - top bind

A section of the tree between two areas supported by the ground, logs, stumps, or other debris will have tension on the bottom and compression on the top.

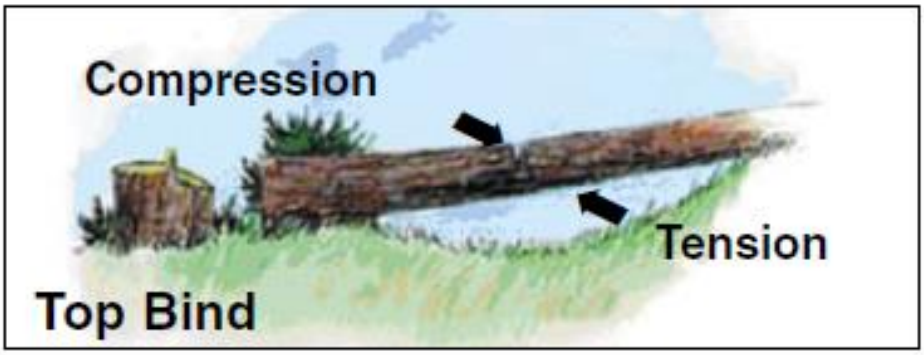


Figure 28: Top bind

To safely buck on a top bind:

1. Assess for overall safety of the bucking area, including overhead hazards.
2. Assess log for all potential movements and pivot points.
3. Ensure log is free of debris to prevent kickbacks.
4. Make bucking cuts from the high side.
5. Ensure the bucking area is clear of debris and escape routes are present.
6. Make a cut ¼ depth of log on compression side.
7. Finish cut from bottom to meet up with the first cut and watch for log movement.
8. Move to escape route as the cuts are completed.

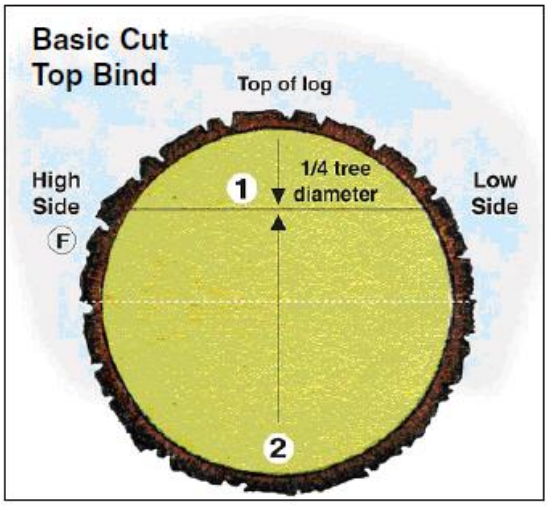


Figure 29: Basic cut, top bind

Basic cut - bottom bind

A section of the tree that is suspended or hanging out over the ground will have tension on the top and compression on the bottom due to gravity pulling it down.

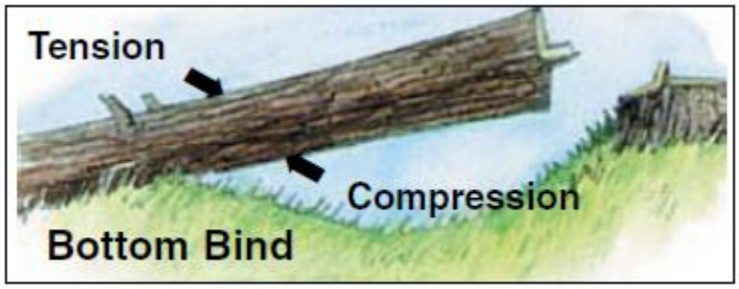


Figure 30: Bottom bind

To safely buck on a bottom bind:

1. Assess for overall safety of bucking area including overhead hazards.
2. Assess the log is assessed for all potential movements and pivot points.
3. Ensure log is free of debris to prevent kickbacks.
4. Make bucking cuts from the high side.
5. Check that the bucking area is clear of debris and escape routes are present.
6. Stand on the high side, safe side.
7. Make a cut ¼ depth of log on compression side.
8. Finish cut from top to meet up with the first cut and watch for log movement.
9. Move to escape route as the cuts are completed.

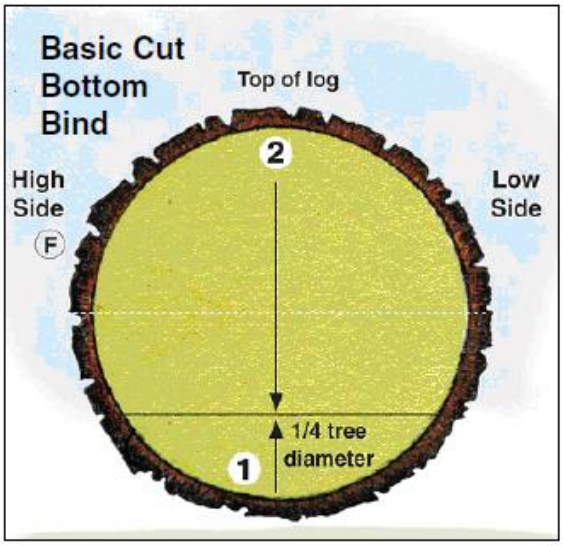


Figure 31: Cutting a bottom bind

Large diameter tree, top bind

To safely buck a large diameter tree with a top bind:

1. Stand on the high side.
2. Reach over and cut the low side to centre of tree.
3. At the top, line up the bar with the first cut and cut from the top down to 1/3 of the tree diameter.
4. Bore in a short way and down to create the holding wood.
5. Continue to bore into the centre of the tree and cut all the way down.

Note: If the holding wood does not break, cut it from the bottom up.

6. Move to the escape route as the cut drops.

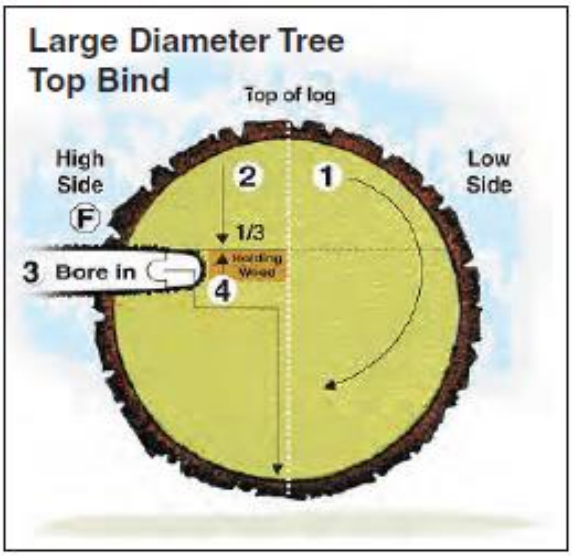


Figure 32: Large diameter tree, top bind

Large diameter tree, bottom bind

To safely buck a large diameter tree with a bottom bind:

1. Stand on the high side.
2. Reach over to low side and make a cut to ¼ of the tree diameter
3. At the top, line up the bar with the first cut and scribe over the top and down 3/4 tree diameter.

Note: Wood can be under extreme tension. Do not cut too deep when scribing.

4. From the bottom, line up the bar with the first cut
5. Underbuck from the bottom, up to ¼ tree diameter.
6. From the top, line up the bar with the first cut and chainsaw down to meet the bottom cut.
7. Move to escape route as the cut drops.

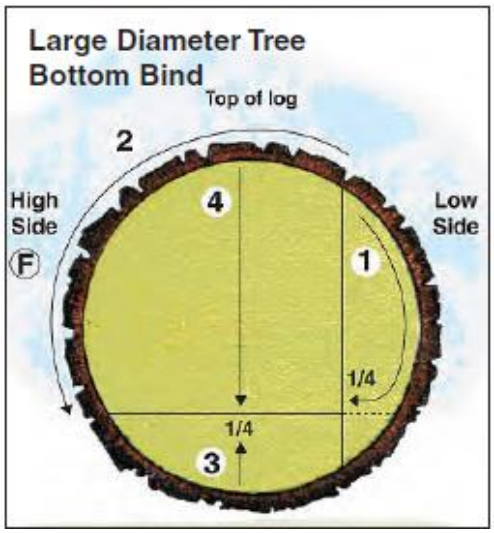


Figure 33: Large diameter tree, bottom bind

Side bind

Side bind occurs when a tree falls between two or more standing trees, logs, stumps, or other ground debris, causing it to bend to one side. This compresses the opposite side.

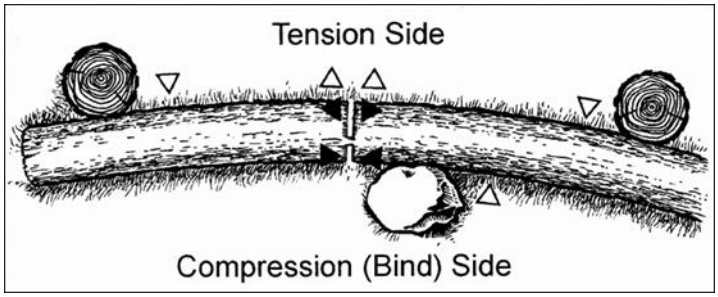


Figure 34: Side bind

1. Stand on the safe side or “inside the bow”.
2. Standing back, draw chainsaw down while cutting the compression side, making a cut to ¼ of the tree diameter.
3. At the top, reach over the log (or under buck depending on how high the log is suspended) cutting the far side of the log to be in line with the first cut.

Note: Wood can be under extreme tension. Do not expose yourself to undo risk while reaching over or under. Use only a comfortable “reach” within the limits of the bar length. Do not make cuts above shoulder height.

4. Complete the cuts in a defensive position monitoring movement as the cut drops.
5. Reassess prior to placing next cut including looking for dislodged debris around pivot points.

Exceptions to basic bucking sequence

The bucking environment is dynamic and is rarely confined to simple bucking techniques. There are two exceptions to the above-mentioned binds that need to be considered when situations present themselves. End bind and heavy bind are more common in steep or broken ground environments but must be managed at times on any work site. The following procedures are to account for those times.

Heavy bind

If there is extreme tension or compression, the final holding wood of the cut will break with sudden force. To control this reaction the bucker must slow the process by using a “V” notch cut on the top in top bind and into the underside in bottom bind.

Cut a V-notch so that the log will not split and will come down slower when making the tension cut. The V-notch only needs to be one to two inches wide at the widest part of the V-notch to be effective at causing the log to slowly close up.

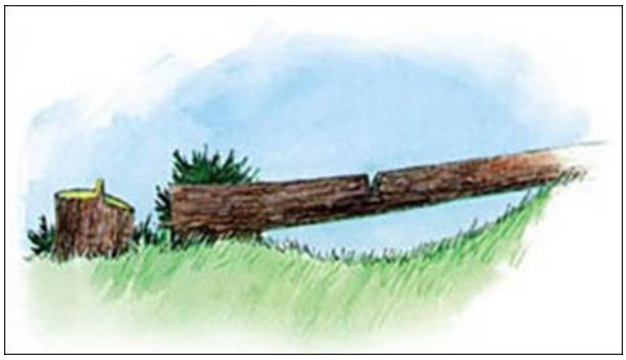


Figure 35: Heavy top bind

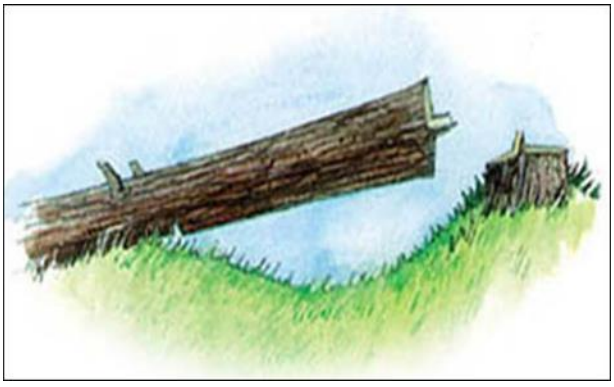


Figure 36: Heavy bottom bind

End bind

End bind occurs when a log is pointed up and down the hill. The force of gravity causes the top portion of the tree to push against the cut, in turn causing the chainsaw to get pinched. Wedges will need to

be inserted so your chainsaw does not bind. Caution must be taken when removing wedges if the log has not shifted. The removal of wedges may result in sudden movement of the log towards the worker.

The bucker always:

1. Assesses for overall safety of bucking area including overhead hazards.
2. Assesses the log is assessed for all potential movements and pivot points.
3. Ensures log is free of debris to prevent kickbacks.
4. Makes bucking cuts from the high side.
5. Checks that the bucking area is clear of debris and escape routes are present.
6. Makes a cut from the bottom up to ¼ diameter of log on the high side.
7. Starting at the top of the log, cut down far enough to safely insert a wedge.
8. Palm and set wedge.
9. Continue cutting down. When there is increased pressure on the bar, drive the wedge down further to relieve pressure.
10. Continue cutting until you meet the first cut, driving the wedge as required.
11. Continue cutting down. When there is increased pressure on the bar, drive the wedge down further to relieve pressure.
12. Continue cutting until you meet the first cut, driving the wedge as required.
13. Moves to escape route as the cuts are completed and drop.

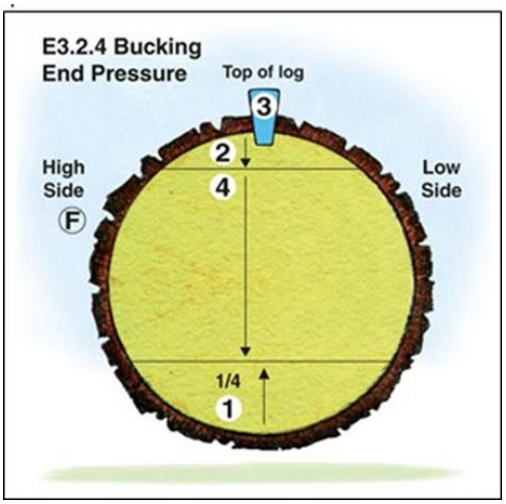


Figure 37: Cutting an end bind

Monitor movement

Monitor log movement as the cut nears completion or the cut begins to drop.

IMPORTANT!

Always reassess after each cut. As logs move and cuts are made, pivots and binds may change. It is vital for safety and production that assessment is ongoing and continuous.

Boring with the chainsaw

In some excessive bind situations, boring is useful for managing top and bottom binds close to the ground. However, boring can be dangerous and should never be done unnecessarily. When boring, the chain has a reduced cutting surface with increased tension. If correct procedures are not followed, this can cause severe chainsaw kickback.

Safe work procedure for boring with the chainsaw

To safely bore with the chainsaw, complete the following steps:

1. Use a correct stance.
2. Ensure secure footing.
3. Keep both hands firmly on the chainsaw.
4. Hold the chainsaw close and to one side of your body.
5. Keep handlebar arm straight.
6. Start cut with a higher throttle using the bottom of the bar tip and scribe down the front of the log, slowly easing the tip into the log where boring cut is determined.
7. Apply consistent equal pressure using your body position to feed the chain into the cut. Don't overreach and don't force it.
8. Keep focused when you are exposing the bar tip for kickbacks.
9. Once bar tip is sufficiently into the wood, twisting the bar slightly will reduce chatter. Apply gentle pressure forward to allow for smooth and straight forward movement of the chainsaw.
10. Feel for increase/decrease of pressure in the tension of the tree as the chain is being fed into the cut. Pressure indicates the bind is causing the cut to close, which results in a pinched bar or chainsaw kickback.

Figure 38: Boring into a log

Safe work procedure for horizontal boring

1	Make sure chain teeth and rakers are properly filed and chain is sharp and tight.
2	Check that your footing is firm.
3	Have a firm grip on the chainsaw handlebar with both hands: • Wrap your thumb securely around the handlebar to help control the chainsaw in case of kickback • Do not cut above shoulder height
4	Hold your handlebar arm straight and use the bottom of the tip to start the boring cut (the top portion is more likely to cause kickbacks). • Twisting slightly when the tip enters the wood (this will hold your saw in the wood)
5	Apply consistent and equal pressure as you feed the chain into the cut. • Do not force the chain into the cut.
6	Use your legs for extra power as you saw in maintaining a firm stance.
7	Cut at peak RPM throughout.
8	Be alert to an increase or decrease in tree tension as the chain is being fed into the cut. • Pressure indicates that the bind is causing the cut to close, which can result in a pinched bar or kickback.

Figure 39: Horizontal boring

Safe work procedure for vertical boring

1	Make sure your footing is firm. Do not stand directly behind the chainsaw rather to the side of the area being bored.
2	Have a firm grip on the chainsaw handlebar with both hands: • Wrap your thumb securely around the handlebar to help control the chainsaw in case of kickback. • Do not cut above shoulder height
3	Hold your handlebar arm straight and use the bottom of the tip to start the boring cut. • Angle in at 45 degrees, twisting slightly when the tip enters the wood (this will hold your saw in the wood).
4	Use your legs for extra power as you saw in and maintain a firm stance.
5	Start off slowly. • Feather the throttle, and then cut at peak RPM throughout.
6	Apply consistent and equal pressure as you feed the chain into the cut. • Do not force the chain into the cut.

Figure 40: Vertical boring

Key Point 5.7: How to Buck Correctly to Reduce MSI

Safe work procedures for bucking contain specific steps or instructions which attempt to reduce MSI. Following these procedures will help you avoid an MSI injury.

Safe Work Procedures for Reducing MSI

Follow these safe work procedures to reduce MSI injuries:

1. Maintain a firm comfortable grip to keep control of chainsaw. This provides for reaction time in case of chainsaw kickback.
2. Use well-fitting gloves for proper grip so that you do not have to hold the chainsaw too tightly or fight its movement.
3. Keep handlebar arm straight. This creates a pivot point at the shoulder and tends to toss the chainsaw over the shoulder of the bucker and to the clear when a chainsaw kickback occurs.
4. Maintain solid footing, good balance, and a natural posture when cutting. Stand with one leg forward and one leg back for a stable stance.
5. Hold chainsaw close to the side of your body when safe to do so. Never over reach while operating a chainsaw as this increases the risk of injury from falls, back strain, fatigue, and chainsaw kickback. The closer you hold the chainsaw to your body, the more control you have of the chainsaw.
6. It is a good practice to learn to use the chainsaw in both the left and right-handed positions. This allows you to use the chainsaw in two safe positions.
7. Pull the chainsaw smoothly out of cuts. Jerking the chainsaw can cause loss of control and can cause back, arm, or shoulder strain.

Figure 41: Correct bucking stance to reduce MSI

Section 1028-6: Limbing and Taping

What you need to know about this section

By the end of this section you will be able to demonstrate your knowledge and ability of the following key points:

6.1 Hazards related to limbing

6.2 Safe limbing procedures

6.3 Hazards related to taping and measuring

Key Point 6.1: Hazards Related to Limbing

Limbing is the process of removing branches with a chainsaw from a tree that has been felled. In some cases, limbing of trees takes place while the trees are still standing to remove branches that may allow fire to climb from the ground into the tree canopy.

Hazards associated with limbing include:

- Being struck by overhead debris/material
- Unexpected movement
- Cuts from the chainsaw
- Being struck by a limb or chainsaw as a result of limb compression or tension
- Chainsaw kickback
- A cut or puncture injury from angled cuts (pigs ears) and branch stubs
- Projectiles from the chain such as loose bark or small branches
- Falling from the log
- Slips, trips and falls

Note: During limbing, there is a greater chance of chainsaw kickback due to back-barring or striking other objects with the chain.

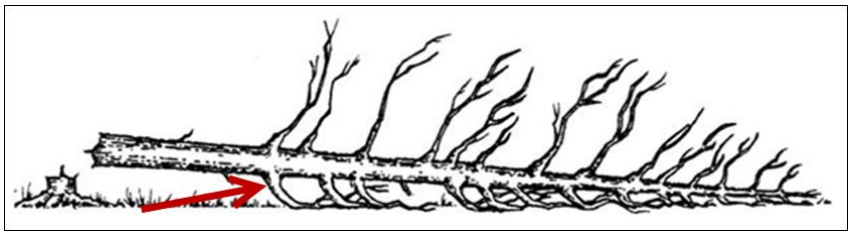


Figure 42: Beware of supporting limbs

Assessment

Always assess the tree before and throughout the limbing process.

Assessing includes:

- Checking the tree canopy for overhead hazards, such as hanging limbs and brushed dangerous trees
- Assessing the terrain to determine if the tree is stable and supported on the slope or ground
- Checking for hidden, loaded or supporting limbs/saplings
- Ensuring cuts or hidden pivot points will not cause the tree to move

Reference

InfoFlip Page 35

Read the section on *Limbing and Taping Hazards* on page 35 of the BC Faller Training Standard InfoFlip.

Key Point 6.2: Safe Limbing Procedures

Limbing Assessment

To complete a limbing assessment:

1. Assess the tree for stability before limbing and repeat throughout the limbing process.
2. Regularly look up into the canopy of the remaining trees for overhead hazards such as hanging limbs, brushed danger trees.
3. Assess terrain to determine if the tree is stable and supported on the slope or ground.
4. Check for hidden or supporting limbs. Ensure the limbs that are cut will not cause the tree to move and are not hiding pivot points.
5. Watch for loaded limbs that could spring up and hit you or throw your chainsaw when cut.
6. When assessment is complete remove hazards before starting to limb or buck. Fall danger trees or establish No Work Zones.

Limbing Cuts

Best practice is for the whole tree to be limbed from the butt to the top before bucking and/or measuring. Follow this safe work procedure when limbing:

1. Remove loose limbs that have landed on the tree.
2. Limb top and both sides of tree.
3. As you progress down the tree, determine supporting and loaded limbs.
4. Cutting supporting limbs requires planning for log movement.
5. Cut loaded limbs by releasing the tension.
6. Make the cuts flush at the base of the tree. Do not leave stubs that could create a tripping hazard or could cause puncture wounds such as “pig’s ears.” Be aware of how the tree is shifting as you are cutting.

Tips to support safe limbing

Remember these tips to support safe limbing:

- Know when to cut supporting limbs
- Use relief cuts to release tension on loaded limbs
- Make flush cuts at bole of tree (no pig’s ears)
- Limb top and both sides of tree
- Constantly reassess canopy for overhead hazards
- Chainsaw power head should not be above shoulder height

- Do not move the chainsaw across your body to cut a limb; position your body accordingly
- Ensure secure footing before making each cut
- Cut large limbs off in sections

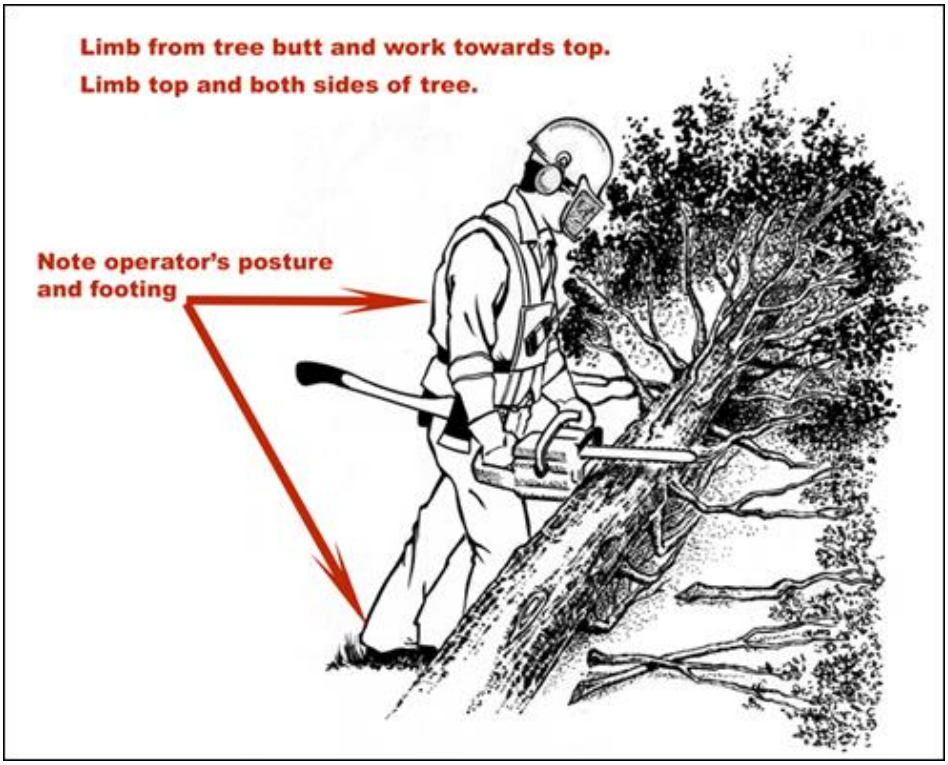


Figure 43: Safe limbing position from the ground

Figure 44: Safe limbing position while walking on the log

CAUTION!

Do not leave stubs (pig's ears) that can create a tripping hazard or cause puncture wounds.

Key Point 6.3: Taping and Measuring

Taping Safe Work Guidelines

Taping safe work guidelines include:

- Ensuring the tape is firmly set in log location to measure from.
- When rewinding tape, have gloved hand on tape to control tape speed and trajectory.
- Ensuring that face screen is down to protect from tape spring back.
- Avoid pulling heavily on tape that is stuck to prevent cuts to hand and damaging tape—it is best to walk back and free the tape.
- Select log lengths at or near pivot points.
- Assess log for defects and breakage to ensure optimal grade of the log and ideal log length for grading. Remember, when choosing where to buck the log, safety first, quality second.

When selecting the location to mark the log for bucking:

- Select lengths at or near pivot points.
- Assess log for defects and breakage.
- Assess grade and ideal log lengths for grade.
- Mark log with boot at identified location (avoid marking with chainsaw).

Figure 45: Marking log length/bucking location with boot and not chainsaw.

Taping Hazards

Taping hazards include the following:

- Slipping, tripping, or falling of the log
- Cutting fingers on the tape edge as it rewinds or when it is hung up (such as on limbs that have not been cut off)
- Being struck by the tape end as it rewinds
- Puncture wounds from the tape

Figure 46: Using tape measure to determine the appropriate log length, while limbing.

Self-Quiz

1. What can happen if the chainsaw bar is too short for the tree dimension? (1028.5.2)
   - ☐ Inability to complete cut
   - ☐ Strain to feet
   - ☐ Chainsaw is more balanced
   - ☐ Match cuts from one standing position is made easier
2. What is the minimum distance that a chainsaw should be operated from another person? (1028.5.5)
   - ☐ 5 ft.
   - ☐ 7 ft.
   - ☐ 10 ft.
   - ☐ 12 ft.
3. Where is the first cut placed for bottom bind? (1028.5.6)
   - ☐ On top
   - ☐ On underside
   - ☐ Closest to the operator
   - ☐ In middle of log
4. Where should bucking occur if there is a possibility that the log could pivot during bucking? (1028.5.6)
   - ☐ On high side of the log being pulled
   - ☐ At or near pivot point
   - ☐ Where the log is elevated
   - ☐ Where the log is on the ground
5. What is the depth of the first cut for basic cut top bind? (1028.5.6)
   - ☐ Top down ¼ depth
   - ☐ Bottom up ¼ depth
   - ☐ Top down until log moves
   - ☐ Bottom up until log moves
6. Which part of the chainsaw should be used to start boring? (1028.5.6)
   - ☐ Middle of bar

- ☐ Centre portion of bar tip
- ☐ Top portion of tip
- ☐ Bottom portion of tip

7. Where should the faller stand when boring vertically? (1028.5.6)
   - ☐ Below area being bored
   - ☐ Above area being bored
   - ☐ To the side of the area being bored
   - ☐ Behind the area being bored

8. When limbing, what can happen as a result of cutting hidden or loaded limbs? (1028.6.1)
   - ☐ Tree movement
   - ☐ Log marking for bucking changes
   - ☐ Visibility changes
   - ☐ Log can lose value

9. Which statement is true when limbing? (1028.6.2)
   - ☐ Limb side of tree first
   - ☐ Make flush cuts at bole of tree
   - ☐ Start limbing at top of log
   - ☐ Chainsaw can be above shoulder height when limbing

Now check your answers on the next page.

Self-Quiz Answers

1. What can happen if the chainsaw bar is too short for the tree dimension? (1028.5.2)

   Answer: **Inability to complete cut**

2. What is the minimum distance that a chainsaw should be operated from another person? (1028.5.5)

   Answer: **10 ft.**

3. Where is the first cut placed for bottom bind? (1028.5.6)

   Answer: **On underside**

4. Where should bucking occur if there is a possibility that the log could pivot during bucking? (1028.5.6)

   Answer: **At or near pivot point**

5. What is the depth of the first cut for basic cut top bind? (1028.5.6)

   Answer: **Top down 25%**

6. Which part of the chainsaw should be used to start boring? (1028.5.6)

   Answer: **Bottom portion of tip**

7. Where should the faller stand when boring vertically? (1028.5.6)

   Answer: **To the side of the area being bored**

8. When limbing, what can happen as a result of cutting hidden or loaded limbs? (1028.6.1)

   Answer: **Tree movement**

9. Which statement is true when limbing? (1028.6.2)

   Answer: **Make flush cuts at bole of tree**