



Initial Safety Meeting Checklist

Site Crew Detail

Date – Location – Supervisor or Bullbucker – Alternate – Crew Members – Other Crew(s) in area.

Communication Procedure

Man-check system – other crews and equipment in area – safe working distance to workers, machines, helicopters.

First Aid Coverage

First Aid attendant – location of F/A supplies – radio check-in/check-out – radio frequencies – GPS coordinates – emergency phone #'s – access/egress evacuation routes – designated emergency facility – designated aircraft

PPE and Falling Tools

Current Map

Operating commitment attached – sensitive sites (wetlands) creeks/RMA requirements – boundaries/flagging colours

Hazardous Weather Conditions:

Wind – rainfall – snow – fog – slope stability – avalanche

Tree Hazards:

Overhead hazards – root conditions – tree lean – defects

Safety Concerns:

Review site-specific Safe Work Procedures

Special Procedures:

Fall away/yard away – right-of-way – variable retention

Falling Method:

Hand-falling – mechanized falling

Yarding and Loading Method:

Skyline – grapple – helilog – ground skid – landings – type and location of equipment – roadside and cut-to-length

Environmental Management System:

Discuss spill plans – location of spill equipment

Traffic Control:

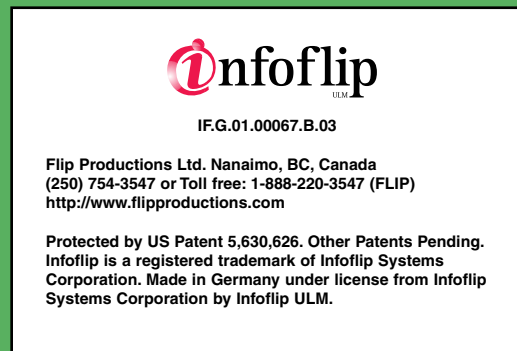
Status of road (private/public) – public access via trails – traffic control system – location of signs

Fire Hazard Information:

Fire Regulations MOF – location of fire equipment – current trained personnel – response plan – firefighting procedures

Other Concerns:

Windthrow – rock outcroppings – loose rocks – sink holes – snow depth/load – powerlines – other industrial activities



FallSafe: Universal Safety Principles

1. Plan the work/work the plan.
2. Identify/remove obstructions to safe fall of tree.
3. Maintain control of the tree;
Maintain control of the work area;
Maintain control of yourself.
4. Watch for/recognize dangers and deal with them.
5. Work from clear-to-safest position.
6. Have a Plan B.
7. Find alternatives to falling, i.e., blasting, machine assistance.
8. Do not be afraid to ask for help from your partner.
9. Tell your co-workers if they are not working safely.
10. Never stop learning.
11. Exercise your freedom to choose to do the right thing and follow safe work procedures at all times.

Remember that if you encounter an unsafe situation or falling difficulty, **stop work!** Note that the OH&S Regulation supercedes all other legislation. Seek qualified assistance to determine a safe alternative. A professional faller does not compromise safety.



1 Working Safely

Always work safely! If you are unable to do your work safely, report the situation to a supervisor/bullbucker. It is their responsibility to ensure that your safety is not compromised. A faller is obligated to perform work safely.



Reporting Unsafe Work

- Stop work; report unsafe condition to a supervisor or employer.
- Supervisor investigates immediately.
- Supervisor remedies unsafe work or informs worker that work **IS** safe.
- If worker still claims that conditions are unsafe, supervisor or employer must investigate with worker and worker from joint committee, from trade union, or any other worker.
- If investigation does not resolve matter, supervisor/employer **AND** worker must notify the Board.

The OH&S Regulation describes the proper process to refuse unsafe work. Every worker has an obligation to report such situations to their supervisor/ employer and if it can not be resolved to call WorkSafeBC and use the *Workers' Compensation Act* process. It is important to note that a worker as defined under the *WC Act* can not be fired or

discriminated against for bringing up health and safety issues.

Personal Safety Program

Although the OH&S Regulation was written to provide a safe working environment, workplace safety cannot be legislated. It starts with every worker's personal safety attitude and habits. Develop your personal safety program and continually strive for improvements of your own safety habits and those of others!

Maintain control of yourself: be **mentally and physically fit (3)**. Always expect the unexpected. Wear appropriate clothing, always use **PPE (2)**. Ensure equipment is in good working order. Follow safe work procedures, and know when to ask for assistance or when to refuse unsafe work. Strive to improve; learn from others.

Maintain control of the work area: plan the safest sequence of falling trees and follow this plan. Choose a good position for safe bucking. **Post and barricade (10)** work area as required and limit access only to supervision, training, or when assistance is required. Always follow the **two tree-lengths rule (10)**. Check on your fellow workers at least every 20 minutes and always follow established **man-check procedures (9)**.

Maintain control of the tree: **assess every tree (17)** for lean and defect. Construct proper falling cuts. Have **wedging tools (8)** at the base of every tree. Set a wedge in every backcut as soon as possible. Avoid unnecessary **brushing (16)** and **pushing (27)** of trees. Do not hesitate to ask for assistance to solve a falling difficulty.



2 Clothing & Personal Protective Equipment

Clothing

Have full body protection for any anticipated weather conditions, i.e., rain gear. Wear comfortable close-fitting clothing in layers so that you can regulate body temperature. Wool is recommended in cool and wet conditions. Do not cover **hi-vis apparel (3)**. A neck shroud helps to prevent sunburns and rain/snow from falling down your neck. Keep spare clothing available in your pack and vehicle.



Safety Headgear

All head gear must be high-vis orange or red, and meet CSA or ANSI standards, with acceptable suspension (4-point minimum). Check and replace brittle or damaged suspension. Do not place anything between shell and suspension, i.e., pressure dressing or gloves. Do not use head gear that is missing components or is damaged or modify hard hat shell, i.e., drill holes. Note that regulations govern head gear in use with ATV and snow machine applications.



Eye and Face Protection

Safety glasses or goggles alone do not give adequate protection as they do not protect face from flying or falling debris. Use a wire-mesh face screen that easily flips up when not required. Wear safety lens sunglasses to reduce glare when **working in snow (31)**.



Hearing Protection

Hearing protection must be worn. Maintain it to manufacturer's standards, i.e., replace cushions when



saturated or hardened. Earmuffs and earplugs can provide equal hearing protection but earmuffs are recommended. Muffs are

Typical Daily Noise Exposures (Decibels)

Chokerman	79
Faller	103
Yarder Operator	93
Loader Operator	90
Landing Man	103
Heavy Duty Mechanic	90

Average exposure above 85 over an 8-hr day can cause hearing damage.

easier to put on and lift off, protect the outer ear, side of face and head, and provide warmth in **cold and rain (30)**. Do not modify earmuffs.

Hand Protection

Protect hands against abrasions, cuts, scrapes, cold and wet, and while handling the chainsaw, i.e., while filing and handling the chain. Gloves also provide grip on the saw.

Leg Protection

Protective pants are mandatory for fallers and can prevent abrasions and bruising. They do not prevent penetration of the chain but can lessen the severity of the cut and protect the legs during kickback. Replace torn or damaged pants, or repair according to manufacturer's instructions prior to use.

Safety Footwear

Wear well-constructed work boots. Uppers must be a minimum 8" (20 cm) in height to provide good ankle support. Use "Logger's Tie" to keep boots laced to the top. Caulked boots are required when walking on logs. Choose between rubber, leather, or insulated caulked boots, or snow shoes. Inspect and replace caulks and laces as needed.



"Logger's Tie"



3 Safety Equipment and Personal Well-Being



Hi-Vis Apparel

Brightly coloured clothing allows you to be seen at a distance, both during regular **man-checks (9)** and in case of an injury. It also makes it easier to see other fallers or workers in close proximity. Hi-vis apparel can be a vest or modified clothing, and is mandatory for fallers whose location must be regularly checked, and when working close to moving equipment.

Remember to use **PPE (2)** for head, face, eyes, hearing, hands, legs and feet and that it must meet CSA standards and regulations.



Mental/Physical Fitness

Arrive for work physically fit and well-rested, and not under the influence of alcohol or drugs. If you are taking medication, know the side effects. Eat a balanced diet of nutritional foods.

Dehydration

Dehydration reduces mental and physical performance. Hard physical work causes a fluid loss between 0.5 and 1.0 litres per hour so drink small amounts of water or warm liquids regularly throughout the day. This is especially important during very hot and cold temperatures. Dehydration contributes to frostbite and hypothermia. Avoid drinking untested water, i.e., from streams.

Frostbite and Hypothermia are very serious conditions and can lead to loss of extremities, coma and death. Wear appropriate clothing (three layers or more) and insulated **footwear (2)**. Protect exposed areas (face, ears, hands, etc). Use heated shelter, vehicle, or build a fire at first indication of symptoms; stay warm.

Heat Stress

Wear protective clothing, try to work and rest in cool areas, take advantage of the shade during falling; continuously drink water.

Muskuloskeletal Injuries (MSI)

These soft tissue injuries, i.e., sprains, strains and tears, account for numerous injuries to fallers. Walking on logs and uneven terrain, carrying equipment and saw all day, working in awkward positions for extended periods all contribute to **MSI (14) (15)**. Warm-up exercises and regular stretching will reduce the potential for injury.



Warm-up Exercises

Warm up muscles before stretching; this usually happens when you walk into your work area. Complete **stretches (4)**; stretch larger muscles first; hold stretches for minimum of 20–30 seconds but do not overstretch causing pain. Daily stretching will increase muscle flexibility so be persistent and keep at it.

Other Safety Equipment

- Personal First Aid kit
- Pressure dressing
- Whistle
- Radio
- Dust mask
- Portable pocket mask
- Latex gloves
- Bear spray
- Bee sting kit
- Portable fire extinguisher

4 Stretches

- Always **warm up (3)** before stretching.
- Maintain a neutral posture while stretching.
- Stretch only until there is a gentle pull in the muscles.
- Stretch larger muscles first.
- Hold stretches for at least 20–30 sec.
- If you have very inflexible muscles and can not complete the full movement do what you can without pain.

Do not stretch to the point of pain as it could tear the muscles.



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• Repeat stretch in opposite arms and legs.
Quads – Hold tree for balance; grasp ankle from behind; keep knees together and pointed towards the ground; hold body upright; pull gently until you feel a stretch at the front of the thigh. Reduces tightness from walking downhill or holding one position for long periods.

Hamstring – Place one leg on object no higher than knee; both legs straight; stand tall with back straight; shoulders back; bend body forward at hip. Lengthens hamstring muscles in back of thigh.

Hips – Hold tree for balance; grasp knee with opposite hand; pull knee up and across body; do not twist lower back.

Forearm – Place palms together; forearms parallel to ground; rotate hands forward and down. Maintains flexibility in grasping and maneuvering chainsaw and axe.

Hand – Lock wrist in straight position; grasp



the four outstretched fingers with other hand; gently stretch them backwards. Counteracts tightness caused by gripping of chainsaw.



Chest – Hands clasped behind back; roll shoulders back and down; push chest out; raise arms with hands clasped. Maintains flexibility of shoulders.

Neck – Face forward; slowly lower ear to shoulder until a stretch is felt on opposite side. Increases flexibility for **tree assessment (17)**. Stop if dizziness occurs.

Front Shoulder – Place straight arm against tree at shoulder height; slowly turn body away from arm. Keeps chest muscles flexible and maintains a balanced posture.

Shoulder – Raise arm to shoulder height and grasp above elbow with opposite hand; pull arm gently across chest. Keeps shoulders and upper arms flexible.



Calf – Foot against tree; toes pointed upward; keep back and leg straight; slowly pull body towards tree. Stretches lower leg and ankle.



Achilles – Foot against tree; toes pointed upward; heel planted; pull body towards tree while bending knee; keep torso straight. Stretches achilles tendon of heel.

5 Chainsaws and Other Equipment

Hand Tools and Other Equipment

- **Axe/wedges (8)**
- Bucking tape
- Files/raker gauge
- Falling belt
- Fuel containers
- Wrenches
- Screwdrivers
- Grease gun

Spare Saw Parts

- Air/fuel filter
- Starter rope
- Chain catcher
- Spark plug
- Sprocket
- Bar and bar tip
- Chains
- Nuts and bolts

Choosing a Chainsaw

Being a professional begins with the selection and care of your equipment. Use a professional chainsaw model with adequate-size dogs and a chain brake meeting current CSA standard. Manufacturer's full-wrap handlebars are required. This provides maximum control of the chainsaw in all cutting positions and allows the chainsaw to always be used with a pulling chain to avoid **kickback (7)**. Minimize **backbaring (14)**.

Choose chainsaw and bar length compatible with timber size and activity, i.e., use a longer bar for large diameter timber and limbing/bucking. Match powerhead to bar length, and bar length to body height to reduce **MSI (14) (15)**. Have a spare chainsaw readily available and carry spare chainsaw parts.



Carrying a Chainsaw by Hand

SWP

Establish and use a good, safe **access/egress trail (9)**; mark it with ribbon; always wear **caulked footwear (2)**.

- ① Clear trail to eliminate trips, slips and falls when carrying gear.
- ② Carry chainsaw with bar and chain pointed behind you.
- ③ Shut the chainsaw off when carrying it for a distance.
- ④ When chainsaw is idling, activate the chain brake to prevent chain from rotating if the trigger catches a stick or branch.
- ⑤ Carry chainsaw on the low side or down slope, away from the body so that it can be released safely in the event of a fall or if it is caught on an obstruction.



Note: if you choose to carry the chainsaw on your shoulder, guard the dogs and chain, or flip the chain off the bar and wrap it around the handlebar. Avoid contact with the hot muffler.

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- ⑥ Carry gas and oil in the other hand.



SWP

Chainsaw Refueling

- Use approved gas and oil storage containers.
- Refuel on a stump or on ground free from debris, brush or snow. Do not refuel on the stump of the last tree felled to avoid exposure to overhead hazards from an unsettled canopy.
- After refueling, place gas and oil where they are safe from falling activities. Plan your work so that you can rotate back to where the gas and oil containers are stored before running out of fuel.

Engine Problems	Possible Solutions
Engine is difficult to start or runs poorly at idle	• Check spark plug and replace if necessary
Chain is rotating during idle	• Adjust the idle
Chainsaw is racing at idle	• Adjust the carburetor • Check for broken clutch spring
Chainsaw backfires/sputters	• Check for fuel contamination • Clean/replace fuel intake filter
Chainsaw is sluggish due to inadequate air intake	• Clean or replace air filter • Fuel mixture too rich

6 Chainsaw Maintenance and Filing

Chainsaw Maintenance Checklist

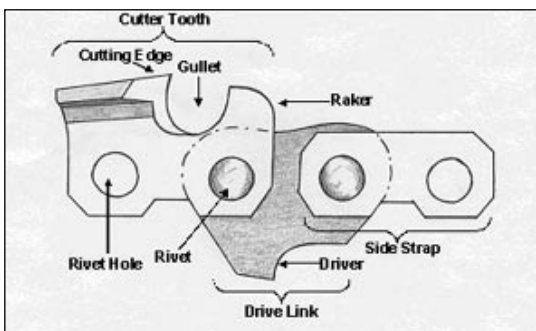
- Keep the chainsaw clean. Remove oil, sawdust and dirt.
- Inspect air filter for damage, debris or icing. Clean or replace as required. Clean around carburetor
- Clean out dirt, oil and wood chip accumulation from around the starter recoil assembly. Inspect for cracks.
- Inspect rewind cord for wear. Replace if worn.
- Inspect and clean cooling fins and air intake.
- Inspect guide bar for damage and wear. File off the burrs.
- Check guide bar trueness and rail wear. Replace if required.
- Clean out guide bar groove. Ensure adequate oiler operation. Rotate bar before reinstalling.
- Check bar tip sprocket for easy rotation. If not rotating freely or has excessive play, replace the tip. Grease when required.
- Check the proper functioning of the chain brake mechanism.
- Clean oily wood chips, snow or ice from around brake band.
- Inspect floating drive sprocket for wear, clean clutch shoes, check spring and drum, replace if worn; grease as required.
- Inspect chain for kinks, broken links, and excessive wear.
- Check and adjust chain tension and file chain as required.
- Test anti-vibration mounts. Replace chain catcher if missing.
- Inspect muffler and spark arrestor screen; replace as needed.
- Ensure the muffler mounting bolts are tight.
- Check spark plug. Replace if engine is performing poorly.
- Secure handlebar bolts and screws. Replace if missing.
- Tighten all bolts and screws and replace if any are missing.

Replace or repair defects and make necessary adjustments. Refer to the chainsaw manufacturer's manual for further information.

Filing the Chain

Proper chain maintenance and filing improves safety and productivity by reducing **kickback (7)**, chain bar and sprocket wear, and fatigue to the faller.

A properly filed chain allows the chainsaw to cut utilizing just the weight of the chainsaw. Filing includes correct cutter tooth angles and raker depths. The chain cuts the wood beginning with the top corner of the tooth and the cutting edge as it is pulled through the wood. Depth of the cut is determined by the height of the raker. Chains can be hand-filed or ground, and the use of a raker gauge is highly recommended. Also refer to the chain manufacturer's handbook for hand-filing, grinding and maintenance information.






7 Safe Chainsaw Handling Procedures

SWP

Safe Chainsaw Handling

Always start chainsaw in an area with good footing, away from people and clear of obstructions, limbs or debris that could cause a kickback. Use proper starting techniques. Engage chain brake before starting saw and when moving from cut to cut.


- Maintain **firm comfortable grip** to keep control of chainsaw. This provides for reaction time in case of kickback. 
- Place one hand on handlebar, the other on pistol grip and throttle. Hook thumb under handlebar to stop hand from slipping onto chain in case of kickback. Use **well-fitting gloves** for safer grip.
- **Keep handlebar arm straight.** This creates a pivot point at the shoulder which tends to toss the chainsaw over the shoulder of the faller and to the clear when a kickback occurs.
- **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. -Never "one-hand" the chainsaw. 
- Hold chainsaw close to the side of your body. Never over-reach while operating chainsaw as this increases the risk of injury from falls, back strain, fatigue and kickback. Holding chainsaw closer to the body provides more control. **Warm up (3)** and **stretch (4)**.
- **Never stand directly behind chainsaw** or straddle it. Work to one side of chainsaw to minimize injury potential. Learn to use the chainsaw both left- and right-handed. This allows you to use chainsaw in two safe positions.
- **Pull chainsaw smoothly out of cuts.** Jerking causes loss of control, uncertain footing, back, arm or shoulder strains. 

Kickback

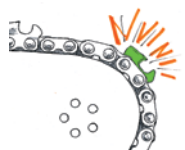
This is the dangerous and unexpected upward thrust of the guide bar and chain when the moving chain contacts a solid object.

SWP

Prevent Chainsaw Kickback

- Ensure properly **filed chain (6)** and raker heights, well-maintained chain brake, and properly tensioned chain; consider using safety or anti-kickback chain.
- Ensure proper body positioning to control kickback; do not over-extend your reach with the chainsaw. Dog in where necessary to stabilize the saw. Always use the saw with a pulling chain. Avoid **backbaring (14)** to reduce the risk of kickback from the chainsaw being pushed towards you. 
- Ensure the bar tip does not contact any obstructions while the chain is moving; know where the bar tip is at all times.
- Remove brush and saplings from around falling and bucking area; while limbing, take caution with **limbs under tension (34)**.
- Chop or knock out undercuts with the **axe (8)**.
- Start a wedge in backcuts as soon as possible; it acts as a guard if the chainsaw kicks back.

Kickback Zone



SWP

Safe Boring Procedures

- Ensure chain teeth and rakers are properly **filed (6)**.
- Use proper stance and secure footing.
- Keep both hands firmly on the chainsaw, hold the chainsaw close and to one side of your body and keep handlebar arm straight.
- Apply consistent equal pressure as you feed chain into cut. Do not force chain into cut. Keep focused when exposing the bar tip.
- Feel for increase/decrease of pressure in the tree tension as the chain is being fed into the cut. Pressure indicates that the **bind (36)** is causing the cut to close which results in a pinched bar or kickback.

8 Axes and Wedges

Axe Requirements

Minimum acceptable standard is an axe with a 3.5 lbs head and a 17" handle measured from the end of the handle to where it fits into the head; however, a full-size axe (minimum of 3.5 lbs and 27" in overall length) is recommended to ensure fluid motion and good body posture; let the weight of the axe do the work. Too light an axe head and too short a handle will result in stress injuries to hands, forearms, elbows, shoulders, neck and back.



- Carry axe by hand, or in an approved holder and carrying loop on the outside of the belt – never tuck the axe through the belt.
- **Avoid pushing (27)**; keep a spare full-size axe readily available.
- Keep axe head secured, i.e., pinned.

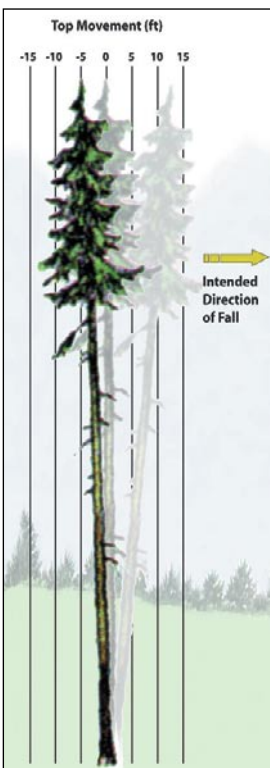
Wedges

Wedging tools must be immediately available at the base of every tree being felled. Carry at least 3 wedges in your wedge pouch suitable for timber type and weather conditions; have spare wedges available. Use winter wedges when wedging **frozen wood (31)**.



The Physics of Wedging

- A wedge acts as a lever, and lifts the tree towards the intended direction of fall.
- When striking the wedge the force applied to the wedge travels up through to the top of the tree, therefore it is important to pause before striking again to allow the top to move and tree to lift.
- If a thick wedge, i.e., double taper, is used to start lifting the tree, it may simply just compress into the wood instead of lifting the



tree. This could result in the wedge flying out back at the faller.

- Using too thick of a wedge to start can also result in the holding wood breaking and the tree falling over backwards towards the faller. Use two thinner wedges, i.e., single taper, to start with instead and strike alternately.

Remove thick bark: Remove thick bark of Douglas fir, Larch and Cottonwood with chainsaw or axe. Expose white wood/sapwood so that wedges can be set into solid wood and that you can see the backcut open or close. Wear appropriate **PPE (2)**.

Wedging Example

Consider the following example: a 2-ft diameter tree is 120 ft tall, and leans back 5 ft from vertical. Using a 1" wedge, this tree can be moved 5 ft towards the direction of fall which will take the tree to plumb. By either stacking two 1" wedges or using a 2" wedge the tree can be moved an additional 10 ft which should make it fall. Remember to use sawdust when **stacking wedges (21)**.

Axe Uses

- Set and drive wedges.
- Chop/clean out undercuts.
- Check soundness of stem and root condition.
- Clear dirt/debris around tree before making cuts.
- Use as plumb line to determine lean of tree.
- Chop burrs off wedges.

Wedge Uses

- Keep backcut open.
- Prevent pinching of chain and bar.
- Lift tree to start the fall.
- Assist in tree placement.
- Guard against chainsaw kickback.
- Correct wedging reduce fatigue and body strain.

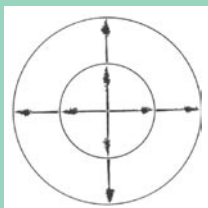
Key Safe Practices



Plan
Your Work



Avoid Unnecessary
Brushing



Maintain Safe
Distances



Remove Dangerous
Trees Progressively



Work in
Safe Areas



Use Proper
Felling Cuts

9 Planning – Safety Meetings – Man-Checks

Falling Plan

The supervisor/bullbucker conducts an initial walk through the area to assess the terrain and general lean, identify potential hazards and to create a falling plan for safe falling and bucking, based on the harvesting method. This plan must be communicated to fallers and affected workers.

Falling Plans Must Consider

- Communication, First Aid
- Terrain and other hazards
- Access and egress trails
- Crew transportation
- Harvesting methods
- Minimum distance between fallers, i.e., 2 tree-lengths
- Safe opening of falling face.

Initial Safety Meeting

At the initial safety meeting, supervisor/bullbucker, fallers and engineer if required, review the falling plan map and discuss falling plan objectives, placement of fallers, **First Aid coverage (11)**, problem areas or specific hazards, and special procedures required. Fallers must be able to match the falling plan map to the actual falling area. They must know all pertinent information including the falling boundaries, road and landing locations, harvesting methods, riparian areas, wildlife tree patches, and their respective flagging colours, paint and/or blazes applicable in the area. Access and egress trails must be established and marked. See **Initial Safety Meeting Checklist** on back cover.



Written Man-Check Procedures

Being isolated from other workers in the area can not always be avoided.

- Pre-plan for circumstances or potential hazards that could isolate the faller, and decide on the procedures that must be in place to resolve the isolation problem. Qualified assistance must be readily available to fallers in case of difficulty, emergency or injury.
- Develop procedures to establish a man-check system that occurs at regular intervals; be specific about method (radio, phone), and frequency, i.e., start of day, every 20 – 30 min, and end of day.
- Establish **First Aid coverage (11)** and First Aid procedures including how to call for help; communicate this to all workers.



Start-of-Day Check-In

Know the man-check procedure before starting work. It is your responsibility that the procedure is in place and working before you start work. If there is no system in place, ask supervisor/bullbucker.

Check at Regular Intervals

- Make visual or verbal contact with faller; wear **hi-vis apparel (3)**.
- Shut off chainsaw regularly and listen for your partner, do a radio check.
- Checks should be frequent enough (20 – 30 min) that assistance can be rendered if needed. When **working in snow (31)** or in temperatures below – 20°C perform man-checks more frequently.

End-of-Shift Check-Out

- Must include individual or group check-out system to account for all workers before leaving the work area.

No Response to Man-Check

- If you can not see or hear your partner, try to contact him or walk over to check him. Do not rely on sounds of an idling chainsaw: it can idle for hours on its own. Be aware of potential hazards.
- If you hear a whistle or a call for help, alert First Aid, then go to render assistance immediately; take what is needed for a potential rescue, i.e., tools, chainsaw and First Aid kit.
- Ensure that it is safe to enter falling area of the injured worker, and deal with any potential hazards prior to rendering assistance.

10 Falling Areas and Active Falling Areas

Faller Responsibilities

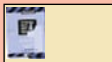
The faller is responsible for all workers including supervisors while they are in the falling area and the active falling area. Make sure the falling area including the active falling area is clear of workers. The faller can only grant permission to enter the falling area and the active falling area

Falling Area

The falling area is the working area of the faller identified by signage, or signage, barricades and flagging.

Active Falling Area

The active falling area is the area within a two tree-lengths radius of where a faller or mechanized falling equipment is located and equipped so as to be able to fall timber.



when all falling and bucking activity has stopped and there is no potential hazard caused by the falling activity, i.e., stumps, runaways, rocks, etc.

SWP

Entering a Falling Area or Active Falling Area

- Contact the faller by radio. If the faller does not have a radio or is too far away to hail, always approach from the high side; stay outside the two tree-lengths area.
- Wait for the faller to stop and shut off the chainsaw, then hail and establish eye contact; identify yourself.
- Ask the faller if it is safe to enter; if something is cut up do not enter until the faller says that it is safe to do so.
- Confirm with the faller the safest route through the area. If changes are made to the route, notify the faller.
- The faller stops all work while individuals or machines are moving through the area. Notify the faller when you are clear.

Access is Permitted ...

- ... to a worker, other than the faller, to be at the base of the tree being felled if the worker is
- a supervisor or manager controlling the operation,
 - training as a faller,
 - required to assist the faller to overcome a falling difficulty.

SWP

Barricading and Posting a Falling Area

- If falling creates a hazard for road traffic it is the faller's responsibility to close and barricade the road. Post a sign, i.e., "Danger – Falling Area – Road Closed – Do Not Enter". A rope across the road must accompany the closure sign. The sign can be supported by a rope that is well marked with flagging tape and clearly visible to oncoming traffic.



- If falling does not create a hazard for the road traffic, post a sign, i.e., "Caution – Falling Area".
- If a road can not be closed, use flagpersons to ensure safe passage. Flagpersons must always follow the two tree-lengths rule.

Two Tree-Lengths Rule

Always maintain the minimum distance of two tree lengths between fallers and/or all other workers. The importance of this rule can not be over-emphasized.

11 Crew Transport and First Aid Coverage

Transportation of Tools, Fuel and Equipment

Do not carry chainsaws, tools, fuel, rigging or other equipment in the driver's cab or passenger compartment. Carry hazardous, flammable and volatile materials in an isolated compartment which is accessible only from outside the vehicle and fitted with an adequate ventilation and drainage facilities. Securely fasten tools, materials, and equipment. An approved firewall must separate inside compartments from the driver cab and crew compartment.

All drivers must have a valid driver's licence.

Driver Responsibilities

- Conduct and document a daily vehicle inspection.
- Be aware of weather and road conditions and drive accordingly.
- Do not rely on the radio for location of oncoming traffic.
- Board and discharge passengers in safe locations.
- Do not transport animals in the operator's cab or passenger compartment of any vehicle transporting workers.
- Turn off motor for refueling; all passengers must vacate vehicle.
- Do not pass a moving loaded logging truck while transporting workers in your vehicle, except under suitable road conditions and then only upon the signal from the driver of the logging truck that it is safe to proceed.
- Park vehicle facing the exit from the operating area, and a safe distance away from any activity, with clear access to camp/town.



Crew Responsibilities

Seat belts must be worn where provided. Smoking is not permitted in crew transport vehicles and fueling areas.

Communications

- Clear for oncoming traffic on right-hand side of the road except in designated areas. When stopping for any reason identify location and intentions; use flares or reflectors in case of breakdowns.
- All vehicles operating on radio-controlled roads must have a working two-way radio with the correct road channels, and must follow road use rules in effect. Identify location, intentions and confirm clearance before overtaking a vehicle.
- Restrict radio transmissions to calling road locations, emergency messages and important messages pertaining to operations.



Transportation by Other Means

The operators/owners of fixed-wing aircrafts, helicopters or marine crafts must provide an orientation of appropriate safety procedures to all passengers prior to departure. Users of snow machines and ATVs must follow manufacturer's operating guidelines. If safe work procedures are not available employers must develop and implement guidelines.



First Aid Coverage

For First Aid coverage to be effective in case of an emergency, everyone in the operation must know:

- The location of First Aid supplies, equipment and services.
- Emergency numbers and frequencies, who and how to call.
- Daily process to test communication system.
- Call-out locations, radio and cell phone dead zones.
- Information on how to transport an injured worker to medical aid, including workers requiring stretcher transport. An outline for basic treatment and injured worker care.

In an accident, a professional faller will perform effectively, keep a cool, clear head and follow emergency procedures.



12 Tree Species Group Hazards

Group 1 – Douglas Fir, Larch, Pine, Spruce

- Dead tops indicate a structural weakness
- Cracked, decayed, broken or hung-up limbs
- Split or cracked trunk
- Fungal fruiting bodies indicate sap, heart or root rot
- Excessive lean
- Root pull or lifting root mat
- Sapwood can become brittle in old growth fir and larch
- Sloughing bark, i.e., Douglas fir



Group 2 – Western Red Cedar and Yellow Cedar

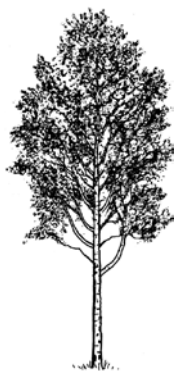
- Dead tops, i.e., candelabra or multi or single stem
- Dead multiple stems, i.e., widow makers, cracks or broken tops
- Hollow stems
- Structural damage, i.e., cracks, splits, scarring
- Burnt sections of stem from fire
- Loose slabs of sapwood on stem
- Tree lean due to wet soils, lifted root mat, shallow soils, steep slope, damage or root rot
- Brush growing on the tree stem, i.e., hides defects in the stem
- Brittle holding wood
- Internal cavities, i.e., bear dens
- Yellow cedar is prone to barberchair due to elastic holding wood
- Dead red cedar (grey ghosts) in wet climate have no root systems
- Old growth red cedar tends to have the weight balance near the base of the trunk

Group 3 – Hemlocks and True Firs (Balsam)

- Dead tops indicate a structural weakness
- Cracked, decayed, broken or hung-up limbs
- Split or cracked trunk
- Mistletoe infected trees can develop large and heavy brooms on the limbs
- Second growth sapwood has limited holding strength
- Prone to heart, sap and root rot indicated by fungal fruiting bodies

Group 4 – All Deciduous

- If frozen, prone to shatter
- Prone to sliding off the stump
- Prone to barberchair
- Dead multiple stems, i.e., widow makers, broken tops, cracks, hidden large hanging dead limbs
- Prone to split trunk, i.e., lightning strikes, frost and wind induced cracks
- Stem damage, i.e., butt rot, animal damage, machine and fire damage
- Butt and stem cankers, i.e., aspen, balsam poplar, paper birch, big-leaf maple, and red alder
- Large pieces of bark separated and sloughing from the stem
- Prone to heart rot and root rot
- Sapwood and heart wood is brittle



13 Dangerous Tree Indicators

Falling a dangerous tree (28) requires accurate assessment and planning, and demands the faller's full attention. Plan to fall the dangerous tree as soon as it is safe to fall it into an open area, i.e., do not bypass dangerous trees. Degree of hazard varies with tree size, **species (12)**, and type/location of defect:

- Stem defects resulting in tree failure, i.e., collapse;
- Weakened sapwood resulting in loss of control when falling trees;
- Overhead hazards, i.e., dead or hanging limbs falling on the faller.

① **Hazardous Top:** dead top or multiple-stemmed top with danger indicators of decay (conks, woodpecker cavities) or other structural weakness. The cedar group is less prone to decay in the top but may have hidden cracked seams and embedded bark between multiple tops.

② **Dead Limbs:** limbs of all sizes and species with decay evident, i.e., cracking, or loose hung-up limbs.

③ **Witches Broom:** caused by mistletoe infection, limbs can grow very large and heavy (200+ lbs). Stems of hemlock and balsam can also be affected and become a weak point.

④ **Split Trunk:** cracked trunk from frost, lightning or wind. Visible evidence of advanced decay indicates serious weakness where the tree could fail.

⑤ **Stem Damage:** caused by windfall scarring, fire, machine, and animal damage, as well as heart rot diseases.

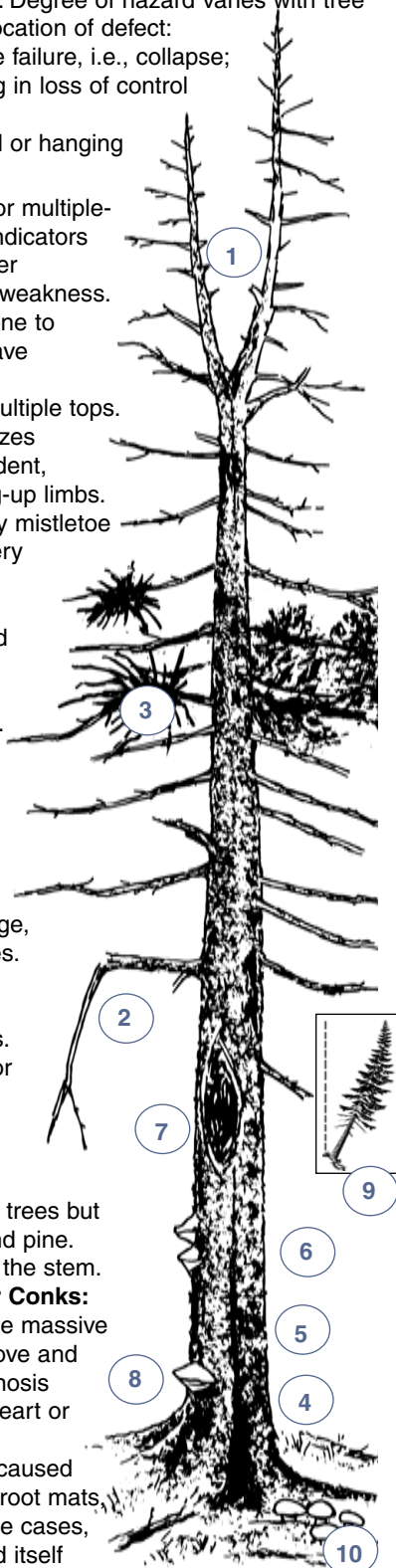
⑥ **Thick Sloughing Bark or Sloughing Sapwood:** usually found on dead trees. Loose bark on Douglas fir or loose sapwood on wind-snapped cedars can dislodge during falling.

⑦ **Butt and Stem Cankers:** usually found on deciduous trees but can occur on Douglas fir and pine. The infected areas weaken the stem.

⑧ **Fungal Fruiting Bodies or Conks:** found on stems may indicate massive interior rot 1 – 2 metres above and below conk. Excessive resinosis (resin flow) also indicates heart or root diseases.

⑨ **Heavy Tree Lean:** may be caused by damaged roots or lifting root mats, shallow or wet soils. In some cases, the tree may have corrected itself which can be determined by assessing the corrected top.

⑩ **Root Condition:** look for any ground cracks around the base of the tree, signs of decay or fungal conks on the roots.



14 MSI Risk Factors and Control Measures

Bucking

- A poor or awkward position, excessive reaching, and being off-balance while bucking can cause stress to the arms, neck, shoulder and back.



- Be ready for a potential **kickback (7)** and use a solid stance, i.e., maintain a straight back and brace the arm against the leg.
- Keep one leg slightly behind the other, and keep arm on handlebar straight.

Chainsaw Handling/Vibration



- Operating the chainsaw only using the dominant hand.
- Become comfortable using both hands.
- Alternating hands will allow better body positioning.

- Backbaring is cutting with a pushing chain, i.e., using the top of the bar. This can cause severe kickback because of the increased exposure to the **kickback zone (7)** when the saw is being pushed back towards the faller. This also causes stress and fatigue on the arms, wrists, shoulders, neck and back while pushing the saw into the cut against the pushing chain.



- Always use the saw with a pulling chain, i.e., the bottom of the bar. Let the saw do the work; let the saw dogs take the weight of the saw.
- Backbar only when absolutely necessary, i.e., **underbucking (37)(38)**, **trimming whiskers (16)**, **removing thick bark (8)**.

- Working with arms held away from the body can quickly cause fatigue.



- Reposition and work with arms braced or closer to body.

- Carrying a chainsaw that is out of balance causes stress to the wrist, forearm and back.



- If possible, use a bar length that balances the chainsaw weight.

- Yanking or pulling the chainsaw out of a pinched cut causes stress to the shoulders and back, and results in stretched motor mounts or out-of-balance crankshaft causing excessive chainsaw vibration.



- Use a wedge to free the chainsaw, chop it out with an axe or buck it out with your spare chainsaw.

- Bent or twisted wrist posture, forceful gripping, vibration, and cold temperatures will fatigue the hand, wrist and forearm.



- Maintain a neutral wrist posture.
- Use a firm grip without overgripping, i.e., white knuckles.
- Keep hands warm; use heated handlebar.
- Ensure gloves fit properly.
- Dress for conditions and change clothing and gloves when wet.

- Poor filing of the chain causes:

- The chain to grab or cut unevenly (chatter) forcing the faller to grip tighter.
- Fatigue and increased vibration.
- Increased need to push on the chainsaw.



- Ensure a properly filed chain is doing the work, i.e., cutting teeth and rakers are filed consistently without too much hook on teeth.
- Remove gullet and use files that are in good condition.
- Regularly check the bar for trueness and wear.

15 MSI Risk Factors/Control Measures Cont'd

Falling the Tree

- Maintaining awkward postures such as reaching around the tree and twisting the neck to look up, places extra stress on the neck, shoulders and back.



- Get down on one knee.
- Move to maintain a constant body position in relation to the chainsaw.

- Bending forward at the waist and holding chainsaw at arm's length places extreme pressure on the lower back.



- Maintain a straight back and hold chainsaw close to your body.
- Do a back extension stretch throughout the day to counter balance bending forward.

- Falling a dangerous tree takes a long time resulting in:
 - Looking up to extensively monitor the tree.
 - Assuming a poor body position for long periods of time.



- Fall the tree at comfortable height, i.e., **waist height (28)**.
- Use a longer bar to reduce the time and risk at each tree.

Limbing

- Crossing the body with the chainsaw when limbing forces the torso to twist and places stress on the back.



- Limb one side when walking up the tree and the other side on the way back.

- When limbing the tree the back is flexing and bending forward at the waist causing stress to the back.



- Using a bar length that matches your height will minimize bending forward at the waist.

Removing Undercut on Oversized Trees

- Excessive weight can stress the muscles in the lower back when removing undercut in one piece.



- Remove undercut of oversized trees in small sections to reduce the weight.

Walking

- Slips, trips and falls lead to many injuries to fallers.



- Establish good access/egress trails.
- Wear properly fitting boots, caulked footwear is recommended.

- Inflexibility in hip flexors and hamstrings may produce a forward lean when walking. Back muscles counteract by producing tension and become susceptible to strain.



- Walk/climb hills with an upright stance rather than a forward lean.
- Thoroughly warm up and stretch the hips.
- Avoid swaying side to side when walking.

- Carrying chainsaw, axe, gas, oil, water and packsack can force awkward movements.



- Balance the weight of tools and equipment on each side of the body
- Create a well-established trail and make two trips if necessary.

Wedging

- Excessive force and repetition when wedging a tree with one wedge.



- Use proper weighted axe and 2 wedges alternately to lift tree.
- Become ambidextrous with axe.

SWP

Procedures for all Falling Cuts

- Wear appropriate **PPE (2)** and **hi-vis (3)**.
 - Stand on high side of tree or log when making cuts.
 - Depending on falling method, undercuts range from 1/4 to 1/3 of tree diameter. Undercuts bigger than 1/3 tree diameter may cause loss of control, and may not provide enough space for wedges in the backcut. Undercuts smaller than 1/4 tree diameter may cause **barberchairs (23)** and/or lack of directional control.
 - Correct inappropriate undercuts. When making backcuts, look up regularly, palm a wedge, maintain adequate holding wood.
- It is good practice for professional fallers to evaluate their workmanship at the stump and make improvements.



SWP

Escape Procedures

- As the tree starts to fall (cut begins to open up, wedges become loose, tree cracks as it begins to move), move away along the escape routes and take cover. Place the chainsaw in a safe position. Never sacrifice your personal safety to save a chainsaw.
- Watch the falling tree for overhead hazards while you move away. Once the tree has landed, wait for the canopy to stabilize. Assess standing timber and surrounding area to ensure that everything has stopped moving before returning to the stump. Back at the stump, ensure there are no additional hazards in the canopy.
- Gather all **wedging tools (8)**, and **backbar (14)** whiskers and stump pull as backbarring shoots debris away from you.

**Escape Routes**

- Allow escape for at least 10 ft (3m) and/or to safe cover, preferably to high side at a 45 degree angle.
- Remove tripping hazards, i.e., loose debris, sticks, "spears" and rocks, etc.
- Several escape routes may be required with dangerous trees.
- Walk route(s) before cutting.

SWP

Opening the Falling Face

- Choose a place to open up that avoids brushing adjacent timber. Look for natural openings and/or **fall dangerous trees (28)** and saplings/immature trees to create the opening. Follow the **falling plan (9)**.
- If you can not avoid brushing find a place with the smallest and healthy trees in the canopy to create the opening.
- If a tree is brushed, fall it immediately if at all possible to avoid the hazard of working underneath overhead broken limbs. Let the canopy settle down before falling a heavily brushed tree.



Before You Fall a Tree, Complete the Tree Assessment Procedure.



Recognize the Hazard

- Overhead hazards
- Ground hazards
- Crown, stem, or root defects of the tree
- Terrain hazards
- Worksite hazards



Evaluate the Situation/Hazard

- Determine the high side of the tree
- Determine the lean of the tree
- Formulate your falling plan, including techniques to fall the tree safely



Control the Hazard

- Determine escape routes
- Brush out escape routes and around tree
- Place tree safely and according to falling plan
- Always follow safe work procedures **SWP**

If you can not follow the plan or have concerns that the work can not be done safely, stop work and discuss concerns with your supervisor/bullbucker.

When doing a site assessment for an entire falling area or for an individual tree always follow this systematic approach.



1. Recognize the Hazard: assess trees from the crown to the base, first from a distance, and then as you approach and walk around each tree if possible.

- ✎ Check for **overhead hazards**, i.e., hung-up trees, snow load.
- ✎ Check for **ground hazards**, i.e., stumps, ground debris.
- ✎ Check for **defects (13)** where trees may fail, i.e., splits, conks.
- ✎ Check base of tree and root system for **soundness**.
- ✎ Check for **area hazards**, i.e., steep slopes, fire kill, wildlife.
- ✎ Check for other **worksite hazards**, i.e., road/harvesting crews.



2. Evaluate the Situation/Hazard: having recognized the hazards associated with the tree, you now formulate a plan how to fall the tree safely by avoiding the identified hazards.

- ✎ Determine the **high side of the tree** which places the faller above the fall line of the tree. In some cases, this may be the down slope side if tree leans heavy up into the standing timber.
- ✎ Determine the **lean of the tree**; do this assessment always from the high side of the tree. Use your axe as a “plumbline” or physical features such as branch accumulations. When the lean is assessed, you can decide what falling technique to use and what adjustments to make to control the direction of the fall.



3. Control the Hazard: if at any time during the preparations for the falling of the tree you have concerns that the work can not be done safely and according to the **falling plan (9)**, stop work and discuss your concerns with your supervisor/bullbucker.

- ✎ **Determine escape routes:** use cleared path(s) or area(s) to move to a safe cover, i.e., behind a standing tree, natural outcropping, or rock bluff. Move a minimum of 3 m (10 ft) away from the tree and take cover.
- ✎ **Brush out escape routes and around the tree:** always wear **PPE (2)**, i.e., earmuffs, face screen down etc., when brushing out. Remove saplings, ground cover or debris that could fly back and strike you when the tree lands. Cut each piece individually, do not race or slash with the chainsaw.
- ✎ **Tree placement:** place tree according to **falling plan (9)**. Choose a safe place, fall tree into an open or clear area to avoid brushing other trees. Avoid rocks, stumps, windfalls or gullies that may cause the tree to roll or break when it lands, which may create bucking hazards.
- ✎ **Avoid brushing:** Allow timber to fall free of any obstructions and land in a safe area. If the terrain prevents a safe tree placement, modify **falling plan (9)**. Remove obstruction to the free fall of trees, i.e., trees with large limbs or multiple tops, dangerous trees and saplings. Remove brushed dangerous trees before falling other trees. Follow these steps when **opening a falling face (16)**.
- ✎ **Hazardous falling situations:** before making cuts in hazardous situations, ensure the chainsaw is full of fuel so that it does not run dry during a sequence of cuts. If you feel a falling difficulty is too dangerous to overcome, do not make any cuts. Seek qualified assistance or flag the hazard and report it to your supervisor/bullbucker so that an **alternative falling method (33)** can be implemented.

18 Humbolt Undercut

This is the recommended safest cut. As the tree falls, the butt closes squarely against the sloping undercut pushing the tree away with less chance of the tree kicking back off the stump.

Using the sight lines on the chainsaw helps to line up the undercut in the intended falling direction, and to assess the remaining holding wood when completing the backcut.

Scribing is making a shallow cut through the bark of the tree. This assists the faller in creating level backcuts. A scribing line becomes a visual guide as the backcut is constructed.

Caution: scribing on brittle or dangerous trees or heavy leaners that are not sound may cause the tree to **barberchair** (23). Do not scribe too deep. If you are out of alignment you will have to realign properly to wedge the tree.

Undercut: follow **procedures for all falling cuts (16)**, then

① Top Cut: cut straight in 1/3 tree diameter using sight lines.

② Bottom Cut: cut up at an angle; make visual checks to ensure that the bottom cut meets the top cut. Opening of the undercut should be at least 1/2 the length of the top cut.

* Completing the bottom cut first before the top cut allows heavy and large undercuts to drop and fall away from the saw, or insert a **wedge** (8) in the bottom cut to avoid pinching the bar and chain. On large

diameter trees, turn the saw over to complete the bottom cut.

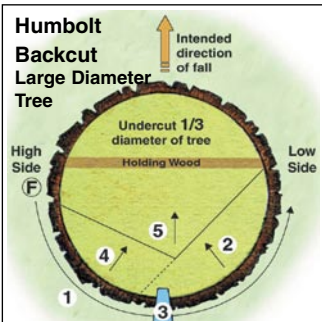
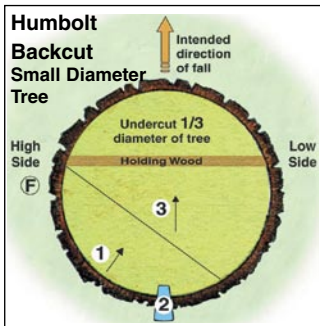
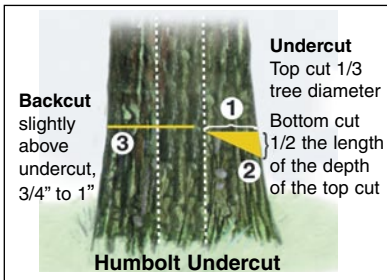
③ **The backcut is at least 3/4" – 1" above the undercut.**

Backcut for Small Diameter Trees

① Sight through undercut to line up backcut. Start backcut. Ensure enough holding wood on the low and high side. Conduct visual check from back side of the tree; never position yourself in front of undercut. Activate chain brake whenever moving away from the saw, i.e., to check holding wood on far side.

② Palm wedge. Ensure adequate space between chain and wedge.

③ Finish the backcut using the sight lines as a guide to keep holding wood intact. When tree starts to fall, follow **escape procedures (16)**.



Backcut for Large Diameter Trees

① Sight through undercut to line up backcut, then scribe around the tree.

② Start backcut. Ensure enough holding wood on low and high side. Conduct the visual check from the back side of the tree; never position yourself in front of the undercut.

③ Palm wedge. Ensure adequate space between chain and wedge.

④ Continue backcut.

⑤ Finish the backcut using sight lines as guide to keep holding wood intact. When the tree starts to fall, follow **escape procedures (16)**.

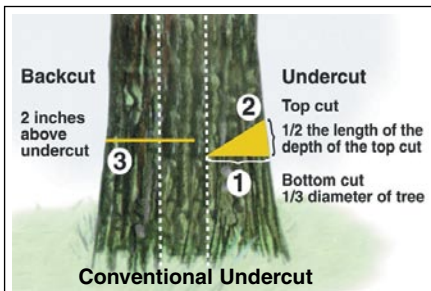
18 Humbolt Undercut

19 Conventional – Swanson – Pie Undercuts

Conventional Undercut

Top and bottom cut angles are reversed from **Humbolt undercut (18)**.

The backcut is at least 2" above the undercut, this reduces the chance of tree kicking back off the stump.



Undercut

Follow **procedures for all falling cuts (16)**, then

① Undercut – Bottom cut: cut straight in to 1/3 tree diameter using sightlines.

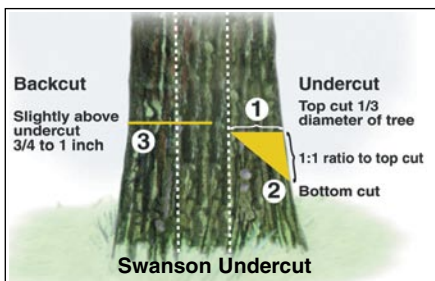
② Undercut – Top cut: cut down at an angle making visual checks to ensure the top cut meets the bottom cut. The undercut opening should be at least 1/2 the length of the depth of the bottom cut. Correct **incomplete falling cuts (23)**.

Backcut

③ The backcut is at least 2 inches above the undercut, creating a higher step or hinge, so that the butt of the tree does not slide back. Use backcut procedures as in **Humbolt backcut (18)**.

Swanson Undercut

Large, steep bottom cut causes butt to strike ground first; removes whipping action; holds wood on steep slopes.



Undercut

Follow **procedures for all falling cuts (16)**, then

① Undercut – Top cut: cut straight in to 1/3 tree diameter using sightlines.

② Undercut – Bottom cut: opening should be a 1:1 ratio to top cut. Cut up at an angle making visual checks to ensure the bottom cut meets the top cut. Correct **incomplete falling cuts (23)**.

Backcut

③ The backcut is at least 3/4" - 1" above the undercut.

Pie Undercut (also called "Bird's Mouth" or "Split-the-Difference")
Wider opening; used in frozen wood, all deciduous trees, and heavy leaners which have brittle wood fibers; reduces risk of barberchair.

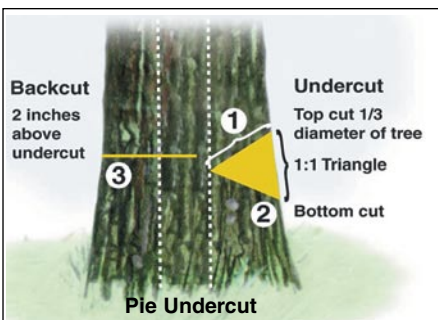
Undercut

Follow **procedures for all falling cuts (16)**, then

① Undercut – Top cut: cut down at an angle to 1/3 tree diameter.

② Undercut – Bottom cut: cut up at an angle making visual checks to ensure the bottom cut meets the top cut.

Opening, top cut and bottom cut should all be the same length. Correct **incomplete falling cuts (23)**.



Backcut

③ The backcut is at least 2 inches above the undercut.

19 Conventional – Swanson – Pie Undercuts

20 Directional Control

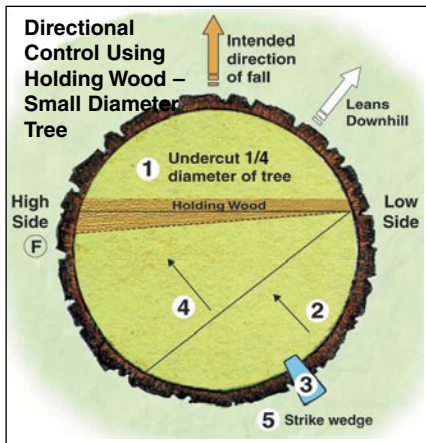
Directional Control and Holding Wood

Holding wood controls the fall of the tree. Changing the angle of the holding wood ensures that trees fall in the intended direction. The species, diameter, condition of the stem, lean and growth patterns will determine the amount of holding wood required.

SWP

For Small Diameter Trees

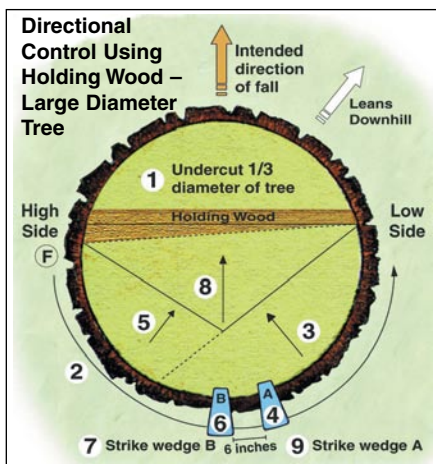
- 1 Construct undercut 1/4 tree diameter using sightlines.
- 2 Sight through undercut to line up backcut. Start backcut. Ensure there is enough holding wood on low side. Set chain brake. Conduct visual check from backside of tree. Never position yourself in front of the undercut.
- 3 Palm wedge off centre towards the weighted side of the tree to assist in lifting the tree in the intended direction of fall.
- 4 Finish the backcut using the sight lines as a guide to keep the holding wood intact.
- 5 Strike wedge. Follow [wedging procedure \(21\)](#) until tree begins to fall.
- 6 When tree starts to fall, follow [escape procedures \(16\)](#).



SWP

For Large Diameter Trees

- 1 Construct undercut 1/3 tree diameter using sight lines.
- 2 Sight through undercut to line up backcut, then [scribe \(18\)](#) around by cutting through bark.
- 3 Start backcut. Check to ensure there is enough holding wood on the low side. Set chain brake. Conduct visual check from backside of tree. Never position yourself in front of the undercut.
- 4 Place palm wedge A slightly off centre towards the weighted side of the tree to assist in lifting the tree in the intended direction of the fall.
- 5 Continue backcut.
- 6 Set wedge B about 6" away from wedge A. This assists wedge A and leaves room in case it is necessary to double up on the wedges.
- 7 Strike wedge B, then wedge A.
- 8 Finish the backcut using the sight lines as a guide to keep the holding wood intact.
- 9 Strike wedge A and B alternately. Follow [wedging procedure \(21\)](#) until tree begins to fall.
- 10 When tree starts to fall, follow [escape procedures \(16\)](#).



21 Wedging Procedures

SWP

Wedging a Small Diameter Tree

Use when bar length is longer than tree diameter.

① Construct undercut 1/4 tree diameter to allow more control and room in backcut for saw and wedges in order to lift the tree.

② Sight through undercut to line up backcut. Start backcut.

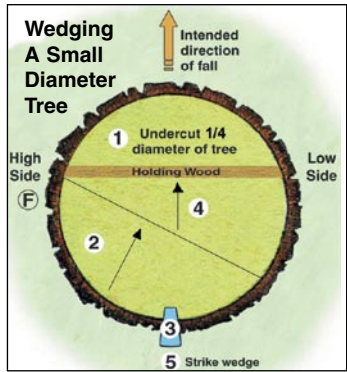
③ Palm and set wedge when room. Ensure wedge sits in sapwood, not just in bark. Ensure there is enough holding wood on low and high side. Conduct a visual check from backside of tree.

④ Finish backcut using sight lines to keep holding wood intact. Turn saw off and lift earmuffs to hear overhead hazards and tree movement.

⑤ Strike wedge; lift face screen; look up and pause, checking for tree top movement and loose or hung-up debris; lower face screen; strike wedge and repeat until tree starts to fall.

⑥ When the tree starts to fall, follow **escape procedures (16)**.

Alternative Procedure: falling against the lean **(32)**.



SWP Wedging a Large Diameter Tree

Use when bar length is shorter than tree diameter.

① Construct undercut 1/4 – 1/3 tree diameter.

② Sight through undercut to line up backcut, then **scribe (18)** around by cutting through bark.

③ Start backcut; check to ensure there is enough holding wood on the low side. Conduct a visual check from backside of tree.

④ Palm wedge A. Ensure wedge sits in sapwood, not just in bark.

⑤ Continue backcut.

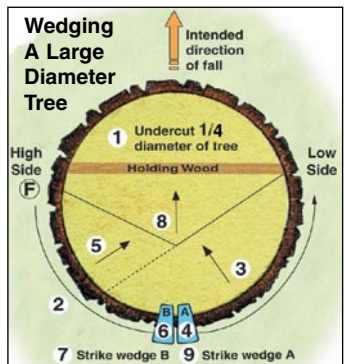
⑥ Set second wedge B.

⑦ Strike wedge B; lift face screen; look up and pause, checking for tree top movement and loose or hung-up debris; lower face screen.

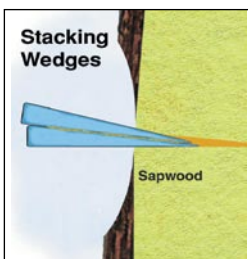
⑧ Finish backcut using sight lines to keep holding wood intact. Turn saw off and lift earmuffs to hear overhead hazards and tree movement.

⑨ Strike wedge A; lift face screen, look up and pause for vibrations to impact tree top; lower face screen and strike wedge B. Repeat the sequence, strike alternate wedges until tree starts to fall.

⑩ When the tree starts to fall, follow **escape procedures (16)**.



If single wedges do not make the tree fall, get two additional single-tapered **wedges (8)** of the same size and stack them on top of one another (double-tapered wedges can kick out of cut). Place flat sides together with sawdust in between, to minimize risk



of wedges flying back when struck. Drive wedges in until the other wedges can be pulled out. Use this process to avoid chopping out your wedges. Double up the free wedges and alternately strike top and bottom wedges. Alternately, strike the sets of double wedges. If the tree still does not fall, seek qualified assistance; consider **re-falling (32)** or **blasting (33)**.

22 Inadequate Falling Cuts

Inadequate falling cuts include the following:

- Backcut below undercut
- Excessive undercut
- Undercut not cleaned out (23)
- No undercut in trees greater than 6" (15 cm) diameter at breast height (dbh).
- Inadequate undercut
- Sloping cuts
- Cut off holding wood

Professional fallers construct undercuts which are complete and cleaned out, ensure that adequate holding wood is maintained, and that the backcut is higher than the undercut.



Sloping Cuts

Undercut and/or backcut are angled down in the same direction, or criss-crossed in undercut and backcut sloped at opposite angles.



Hazards

A side-sloping stump may force the falling tree to slip off the stump causing a loss of directional control. Faller may misjudge amount of holding wood resulting in a loss of directional control.

This is an unacceptable practice which is also an indicator of poor workmanship resulting in loss of directional control of the tree.

A professional faller takes the time to construct correct, level and angled cuts according to undercut procedures.



Backcut Below Undercut

This is an unacceptable practice because the faller can be struck by a tree sliding back off the stump; it is also difficult to determine the adequate amount of remaining holding wood.



Hazards

Tree may slide back off the stump as it starts to fall with

a loss of directional control. Wedging also becomes difficult as it must lift the weight of the tree above the undercut. Always ensure that backcuts line up above undercuts at the appropriate height, according to safe work procedures.

Cutting Off Holding Wood

Leave enough holding wood to maintain control of the tree that it does not break, slip or twist off the stump and fall in an unplanned direction. A professional faller takes the time to check regularly that adequate holding wood is left intact.



Domino Falling

Domino falling is defined as placing undercuts and backcuts in a series of trees, then using a tree to push these trees in the intended direction. **This practice is prohibited.**



Hazards

- Wind causing tree(s) to fall
- leaving one or more cut-up trees standing
- not enough force on the cut-up trees to push the trees in the intended direction of the fall.

This is an unacceptable practice because the faller can be struck by a cut-up tree(s), cut-up trees without wedges are left standing which creates a potential hazard for the faller and other workers, and the faller has to turn his back on the cut-up trees.



A professional faller ensures that all trees are felled in a controlled safe manner. The **falling area (10)** must be properly planned and laid out to allow enough room to work safely, and skidtrails located to take advantage of the general timber lean. Use appropriate **axe and wedges (8)** to fall trees.



22 Inadequate Falling Cuts

23 Correcting Incomplete Falling Cuts

Cuts Do Not Meet

This situation is created when the second cut does not meet the first cut. If the faller had continued cutting until the two cuts met, the resulting undercut would become too deep changing the direction of fall. This also leaves inadequate room to place **wedges (8)** in the backcut, and may cause unstable trees to collapse on the undercut.



Hazards

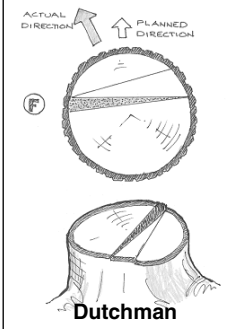
Loss of directional control of tree.

SWP

- Stop cutting, knock out undercut with axe head, and check that undercut is clean.



Correct the undercut (yellow line) or it will push the tree away from the planned fall direction as suggested in the stump sketch.



Dutchman

This leading cause of loss of directional control of a tree is created in the undercut when the cuts do not meet to form a proper 'V', i.e., the bottom cut meets the top cut too soon creating a flat spot which can continue across the full diameter of the stump.



Hazards

Tree falls in unintended direction, holding wood on high side may break off prematurely, tree can split, there is potential for barberchair or stem failure, makes **wedging (8)** more difficult.

SWP

- Ensure undercut is cleaned out or corrected before starting backcut, i.e., cut out dutchman, cuts must meet.

Do not use a dutchman intentionally.

Barberchair

It is created when the trunk of the tree splits vertically because of pressure that has been exerted on the holding wood. As the tree splits and falls, the butt end can kick back or pivot sideways at the breakage point.

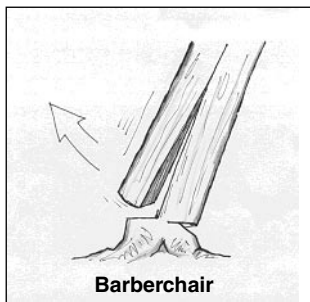


Hazards

Loss of control of tree, kickback, faller is struck or crushed by tree. Hardwoods or deciduous trees, red and yellow cedars, balsam, hemlock, spruce, second growth timber and frozen trees have the most potential to barberchair.

SWP

- Construct proper falling cuts, i.e., deep and wide enough; clean undercut to avoid dutchman; do not leave too much holding wood; complete backcut until the tree is committed to fall.
- Be aware of **heavy lean (25)** or pressure on trees, split seams, cracks or other deformities in the butt section.
- Set wedges as soon as possible to prevent tree from sitting back; avoid falling in unfavorable conditions.
- Do not fall trees across obstacles, i.e., rock outcroppings or short **stubby trees (32)**.



24 Steep Slope, Upslope and Riparian Falling

Falling on Steep Slopes

Accurately assess the situation and plan where and how to safely fall the tree, and position it for safe bucking; avoid sliding hazards. Consider **Swanson undercuts (19)** for better tree placement.

- SWP**
- Establish tree lean and soundness, i.e., trees with heavy leans up hill may increase the falling difficulty.
 - It is difficult to maneuver on steep terrain, so take extra time to plan and clear **escape routes (16)**. Always work on the high side of the tree when falling on steep terrain.
 - Ensure good footing before starting any cuts. On swell-butted trees, notch the root to create a foothold and ensure solid footing.
 - Never work directly above other fallers or workers if there is **ANY** possibility of a runaway tree, logs or debris being dislodged and rolling downhill. A roadway between you and other work activities will not always stop rolling rocks, logs or runaway trees.



Using Rope and Harness

It is recommended in some steep slope areas that fallers be assisted by rope and harness to overcome the specific falling difficulty. Use only a certified rope and safety harness. However, the practice of being solely supported from a rope and harness while falling timber is prohibited. Fallers must



have a safe place to stand and be able to retreat to a safe position by moving along the escape route under their own power.

SWP Falling Trees Up Slope

In some situations, it may be necessary to fall trees up slope. This becomes critical on slopes over 45%.

- ① Limit the direction of fall to a maximum upslope angle of 15° off level.
- ② Plan and clear **escape routes (16)**. Ensure the escape route takes you far enough from the tree to be clear of the limbs if the tree slides back.
- ③ Construct undercut (Swanson is recommended) and place the **backcut at least 2" above undercut** to create an anti-kickback step.
- ④ Watch for debris flying back when the tree falls.
- ⑤ When the tree starts to fall, follow **escape procedures (16)**.
- ⑥ If you can not fall the timber safely or at less than a 15° angle upslope, stop work and report to supervisor/bullbucker.

Falling Around Riparian Areas

Discuss contentious issues during the **Initial Safety Meeting (9)**, i.e., marking of boundaries, options for the faller to substitute reserved trees if they are an obstruction to the falling process, assessment of dangerous trees along block boundary. Note that Ministry of Forests & Range guidelines permit fallers to remove dangerous trees from wildlife tree patches and riparian areas that would otherwise impact worker safety. Ensure that map is current and that designated wildlife trees are safe from damage with large enough reserves.

