

HEALTH AND SAFETY CODE HANDBOOK 6709.11 12/01/1999

22.48 - Chain Saw Operations. Chain saw operations include, but are not limited to, felling, bucking, brushing, limbing, and specialized uses. Individual chain saw operators have the obligation to say "NO" and walk away from any situation they determine to be an unacceptable risk. Complete a JHA for chain saw related work projects and activities (sec. 22.08).

22.48a - Standards. The standards for noise exposure, explosives, PPE, hand and portable powered tools, logging operations, first aid training, and hazard communication are in 29 CFR 1910.95, 1910.109, 1910.132, 1910.151, 1910.242, 1910.266, 1910.1030, and 1910.1200; and 1926.50, 1926.52, 1926.100 - 1926.102, 1926.301, and 1926.302.

22.48b - Qualifications.

1. In addition to having the applicable training and certifications listed in sections 22.07 and 22.48a, all saw operators shall be currently certified by a nationally recognized organization to render first aid and perform cardiopulmonary resuscitation (CPR). Supervisors shall ensure that saw operators receive training or retraining in first aid and CPR before certifications expire. Refer to section 52.3 for direction on the bloodborne pathogens program.

2. Every unit at the Region, Station, Area, and Institute level that utilizes crosscut saws and chain saws shall develop an approved crosscut/chain saw program that includes the following minimum requirements for employees involved in crosscut/chain saw work projects and activities:

- a. Classroom and field training encompassing in part or in total a national training program, such as Wildfire Power Saws S-212 (sec. 22.06).
- b. Demonstration of sawing ability (to a certified operator or certified instructor) in functional areas.
- c. Supervision by a certified instructor or certified operator of saw work by new operators.

3. The Regions, Stations, Area, and Institute shall appoint a crosscut/chain saw Program Coordinator. As a minimum the Program Coordinator shall:

- a. Possess current knowledge of policy and regulations pertaining to crosscut/chain saws and related equipment.

b. Be trained and certified to evaluate and certify or recertify saw instructors.

c. Be certified at the highest level of operator proficiency.

4. Sawyers must maintain national certification cards indicating their proficiency levels as follows:

a. "A" apprentice sawyer. These sawyers have completed the nationally approved classroom and field training for general saw work (such as bucking, limbing, and the first basic steps in felling) or specialized uses (such as construction, maintenance, and fencing). Generally, they are trained at the local unit and must be supervised by a B or C level sawyer during saw work activity, which may include slashing and felling in the least complex situations. This certification expires 3 years after the date of issue. The certifier has full authority to impose restrictions on apprentice sawyers as deemed necessary.

b. "B" intermediate sawyer. This level includes skilled saw operators capable of performing only those tasks as approved by a certifier and documented on the back of the certification card. During saw activities, intermediate sawyers are not allowed to field certify sawyers. Certification is restricted to "C" advanced sawyers and "C" certifiers. This certification expires 3 years from the date of issue. The certifier has full authority to impose restrictions on intermediate sawyers as deemed necessary.

c. "C" advanced sawyer. At this level of proficiency, advanced sawyers are approved to handle complex sawing and felling operations, including fireline construction. They are qualified to conduct classroom and field training at the "A," "B," and "C" level. They are also allowed to field certify "A" and "B" level sawyers. They are not allowed to field certify at the "C" level; this certification is restricted to "C" sawyer certifiers. This certification expires 3 years from the date of issue.

d. "C" sawyer certification. The "C" sawyer certification level includes individuals who are currently "C" advanced sawyers and have been further trained through a formal Regional program to organize and conduct field certification sessions. They have demonstrated communication skills, the ability to transfer and relate concepts to others, and current knowledge of policy and regulations pertaining to saws and related equipment. This certification expires 3 years from the date of issue.

22.48c - Personal Protective Equipment. Maintain PPE in a clean and fully functional condition. The following PPE is required for chain saw operations:

1. Forest Service-approved hardhat.
2. Eye protection.
3. Hearing protection (85 dB and above).
4. Appropriate gloves (cut-resistant gloves for chain filing).
5. Long-sleeved shirt.
6. Chain saw chaps. The chain saw chaps shall meet the requirements of Forest Service Specification 6170-4; it is recommended that they overlap boots a minimum of 2 inches (51 mm).
7. Heavy-duty, cut-resistant or leather, waterproof or water-repellent, 8-inch high (204 mm) laced boots with nonskid soles (hard toes are optional). For further direction refer to FSM 6716.03, Personal Protective Equipment (Condition of Hire) Policy.
8. Fire shelter (wildfire and prescribed burn assignments).
9. Required chain saw features:
 - a. Throttle interlock.
 - b. Falling and bucking spikes (or dogs) for falling and bucking operations (full set of two). Note: There are exceptions for specialized non-felling uses.
 - c. Anti-vibration system.
 - d. Chain brake, fully functional.
 - e. Proper saw for the job, fully operational. A full wraparound handle bar for felling operations is recommended. The full wraparound handlebar allows the operator to use the bottom of the bar from either side of the tree; the saw then cuts, pulling the chain and the spikes into the tree. When using the top of the bar, the saw has the potential to kick out of the cut, which causes the operator to put extra effort into holding the saw. This creates fatigue and takes attention away from other safety concerns associated with tree felling. Three-quarter handlebars are allowed for bucking and limbing only.

f. ***Proper bar length for the specific work project or activity.***

g. Bow bars with top and bottom chain guards and stingers.

h. Chain, filed and maintained.

10. General equipment.

a. First aid kit (refer to the Glossary).

b. Fire extinguisher.

c. Chain saw wrench.

d. Chain file with handle and guard.

e. Approved safety container for fuel.

f. Chain and bar oil container, clearly marked.

g. Proper wedges for the specific work project or activity (wooden wedges are not permitted).

h. Single-bit axe or maul, 3 to 5 pounds (1 to 2 kg).

22.48d - Procedures. Chain saw and crosscut saw operations are skill related and must be "hands-on-taught" and learned. To teach new employees and maintain operator proficiency, provide cutting areas for training to meet national saw training requirements.

1. Supervisors shall monitor proficiency of sawyers to recognize the need for recertification in less than 3 years in cases where employees have not used a chain saw enough to retain a safe skill level.

2. Instructors have complete authority to limit the scope of the certification and can impose restrictions such as specific project, specific function, size limitations, and species.

3. Standard procedures include:

a. Ensure that personnel are alert and physically capable before allowing them to operate a saw.

b. Ensure that tailgate safety and health sessions address saw safety before beginning work projects or activities. Refer to section 52.4 for ergonomic concerns.

c. Include in the JHA: Spacing, leap frogging, and communications.

(1) Space employees and organize their duties so that the actions of one do not create hazards for others.

(2) When a danger tree is identified, it must be physically marked and no work can be conducted within the safety zone (2-1/2 tree lengths of the danger tree).

d. Follow the manufacturer's safety, operation, and maintenance recommendations for the specific chain saw to be used on work project or activity.

e. Ensure that trainee sawyers are under the supervision of a certified sawyer until they have demonstrated the ability to handle the saw independently and proficiently.

Refer to sections 12.2 and 12.5 for further direction on equipment requirements for vehicles and for transporting saws. Refer to sections 41, 43, and 44 for direction on requirements for handtools, power-operated tools, and heavy equipment.

22.48e - Safety Practices. Follow these basic safety and health practices:

1. No felling at night.

2. Situational Awareness and Size Up. Analyze the felling job by considering:

a. Location of people, structures, powerlines, other obstacles.

b. Roads and travel in the cutting area.

c. Topography and steepness of ground.

d. Nearby hazards such as trees, low-hanging and dead limbs, rocks, and brush.

e. *Primary and secondary escape routes, safety zones, and alternates.*

- f. ***Wind direction and velocity such as steady versus gusting and/or changing directions.***
- g. Tree species, both live and dead.
- h. Diameter and height of trees.
- i. ***Soundness of tree: split, lightning struck, broken-off top, rot, deterioration or physical damage to the root system, trunk, stem, limbs, or bark.***
- j. Lean direction.
- k. Limb distribution.
- l. ***Widowmakers.***
- m. ***Spiked top and/or schoolmarm.***
- n. ***Burning top.***
- o. Moisture in the form of rain, snow, or ice.

3. Primary and Secondary Escape Routes, Safety Zones, and Alternates.
Escape routes are predetermined paths along which the sawyer proceeds once the tree is committed to the fall or to the bucking cut. Sawyers must select and prepare the work area by clearing a primary escape path and an alternate path before starting the cut.

- a. ***In tree felling operations, the quadrant opposite the planned fall of the tree is one of the most dangerous. Choose an escape path that extends diagonally away from the expected felling line and always have an alternate retreat path to a safety zone.***
- b. ***Walk out and thoroughly check the intended lay or bed of the tree. Look for dead tree tops, missing tree tops, widowmakers, snags, and ground debris that may cause kickbacks, rolling, or result in another tree or limb becoming a hazard.***
- c. ***Plan the route from the stump to the safety zone, generally not less than 20 feet (6 m) away; the farther the distance the better (ex. 01).***

d. If possible, stand behind another tree, preferably quartering back from the planned direction of fall. Wait and watch for at least 30 seconds after the tree hits the ground for the whiplash branches and other broken tree parts. The shielding tree should be sound and of sufficient size to give protection.

22.48f - Saw Handling Techniques. General saw handling techniques include:

1. Carrying Saw:

- a. Carry the saw in a way to prevent contact with the chain, muffler, or bucking spikes.
- b. Point the bar forward when going downhill with the saw at your side.
- c. Point the bar backward when going uphill with the saw at your side.
- d. When carrying a saw on your shoulder, take extra care due to the sharpness of the chain and "dogs" (refer to the Glossary). Wear a long-sleeved shirt, gloves, and a shoulder pad. Cover the bar and chain. Use of a manufactured bar and chain guard is recommended.
 - (1) Set the saw at idle speed and activate the chain brake when carrying a saw for short distances.
 - (2) Shut off the saw when carrying it for a distance greater than from tree to tree or in hazardous conditions, such as slippery surfaces or heavy underbrush, and, in all cases, when carrying it more than 50 feet (15 m).

2. Starting/Operating Saw. The methods to safely start and operate a saw can vary with the model and size. The following basic precautions generally apply regardless of the saw model:

- a. **Maintain a secure grip on the saw at all times.**
- b. Always start the saw with the chain brake engaged.
- c. Start the saw on the ground or where otherwise firmly supported.
- d. Do not "drop start" a chain saw.

- e. In general, throttle up to full speed before letting the chain contact the wood.
 - f. In general, do not throttle down before the cut has been completed.
 - g. Avoid cutting with the power head positioned between the waist and shoulders, which is considered a danger zone.
 - h. ***Do not cut with the power head positioned above shoulder height.***
3. Fueling Saw. Select an area with bare ground for storing fuel and oil.
- a. Allow the saw to cool at least 5 minutes before refueling.
 - (1) Fill the tank on bare ground or other noncombustible surface.
 - (2) Immediately clean up spilled fuel.
 - b. Refuel outdoors and at least 20 feet (6 m) from an open flame or other sources of ignition.
 - c. Start the saw at least 10 feet (3 m) from the fueling area.

22.48g - Felling, Bucking, and Limbing Techniques. Use the following techniques to help ensure safety:

1. Observers and Spotters.
 - a. The project supervisor and the sawyer shall determine jointly if spotters are needed during tree felling operations.
 - b. ***No employee shall approach a faller closer than 2-1/2 tree lengths of trees being felled until the faller has acknowledged that it is safe to do so, unless it is demonstrated that a team of employees is necessary to manually fell a particular tree.***
2. Obscured Vision. ***Felling trees or snags is prohibited if the tops and surrounding area (the distance of 2-1/2 times the height of the tree to be felled in a viewing radius of 360°) are obscured by darkness, fog, smoke, or other condition.*** Do not allow felling, wedging, or hand pushing standing or leaning trees or snags when inadequate light impairs visual inspection of the hazard and the immediate work area.

3. Weather. Never start or continue to work during high winds, electrical storms, or in other hazardous weather.

4. Escape Paths. **Before felling or bucking any tree or snag, always provide for escape in emergencies. Establish firm footing.**

a. Determine the lean of the tree using equipment, such as a straight handled hatchet, axe, or plumb bob, and recheck the primary and secondary escape routes and alternates.

b. **As tree lift begins, check the direction the tree is falling. Proceed along the predetermined escape path to your safety zone. Keep alert for falling debris and kickback.**

5. Roadways, Trails, and Firelines. Ensure that adequate traffic control measures, such as signs, vehicles, or personnel, are taken when felling or bucking across or alongside any traveled route. Maintain 2-1/2 tree lengths of distance between faller and all of the above.

6. Powerlines. If a tree to be cut is near a powerline, have the electrical utility authorities de-energize the line. Keep personnel clear until electrical utility authorities advise it is safe to proceed (sec. 36.13).

7. Other Workers. **Make sure the felling never endangers nearby workers. Space employees and organize the duties of each employee so that the actions of one employee do not create a hazard for any other employee.**

a. **Do not allow workers not in the felling crew to get closer than 2-1/2 tree lengths of the trees being felled.**

b. **Have workers and felling crews working on the same contour, rather than some working above others on steep hillsides.**

c. Always watch the top of the tree throughout the felling operation.

d. Before starting a back cut, shut the saw off and shout a warning to nearby crews.

e. Before completing a cut, stop cutting, idle the saw, and shout warnings twice (or use a mechanical signal device, whistles, or horns) to warn nearby crews that a tree is about to fall.

(1) Make sure everyone is clear.

(2) Complete the cut in the prescribed manner.

8. Felling. Follow these basic steps when felling:

- a. Fell problem trees or snags first.
- b. Undercut all trees exceeding 5 inches (127 mm) diameter at breast height (dbh) before making a backcut.
- c. Inspect your tree for a dead top, loose bark, limbs, and other debris leaning or hanging into it. Using a hatchet or axe, sound completely around the trunk of any large trees to check for rot (refer to the Glossary).
- d. ***Watch out for other trees and tops that may fall in an undetermined direction when hit by a falling tree.***
- e. Undercut and backcut all trees at a safe standing height.
- f. Never trust holding wood in partly rotted trees.
- g. Do not make any side cuts or corner cuts in hollow trees or trees with heartrot unless an adequate hinge can be maintained.
- h. Make the proper face/undercut with the opening large enough to control the tree nearly to the ground.
 - (1) Make the downhill or off cut first.
 - i. ***Begin the backcut by inserting wedges into the kerf as soon as practical*** (refer to the Glossary).
 - (1) ***Continue cutting until the desired amount of wood holds the tree.***
 - (2) ***Ensure that sloping/horizontal cuts do not cross one another.***
 - j. Never leave a tree partially cut. Always finish the felling job before leaving for break, lunch, or at the end of the day or shift, with the exception that where hazards are unusually significant, leave trees standing, ribbon the area with hazard tree or danger area tape, or a suitable substitute, and notify your immediate supervisor.
 - k. ***Never climb a lodged tree. Notify nearby workers and your immediate supervisor of the hazard.***

(1) Whenever possible, pull the lodged tree down by tractor, winch, or other mechanical means.

(2) Consider all options--including marking the hazard and walking away from it.

l. Before returning to work on the felled tree, check all snags and adjacent trees for broken limbs, log chunks, loose bark, and overhead hazards.

9. Bucking, Brushing, and Limbing. Follow these basic steps:

- a. Never buck a tree that is considered unusually dangerous.
- b. Consider bucking hazards, including overhead hazards.
- c. Anticipate the log's reaction when it is severed.
- d. Select the bucking cut location very carefully.
- e. Beware of other logs, branches, or rocks immediately behind the area where you are bucking, brushing, or limbing for possible kickback potential or rocking of the chain.

(1) Remember that touching any object with the tip of the chain and bar can cause a kickback.

(2) Know where the tip of the bar is at all times.

- f. Remove limbs and brush before bucking.
- g. When topping, brushing, or limbing, be cautious about any tree held off the ground by its branches.
- h. To prevent rolling, do not cut limbs or branches that support the tree off the ground.
- i. Walk on top of large downed logs while limbing (if possible) to prevent a log from rolling onto the operator.
- j. Be aware of side, top, bottom, and internal bind due to natural unevenness of the ground and objects, such as stumps, windfalls, and rocks. Initiate bucking slowly. Observe kerf closely to determine the bind.

- k. Cut a sapling or branch that is bound down only when it is necessary for safety. Make a series of small cuts on the decompressed side of the sapling or branch to release the bind.
- l. Use wedges to prevent pinching bar.
- m. Completely saw off log chunks.
- n. ***When trees on sloping ground are bucked, use blocking devices that prevent bucked sections from rolling or sliding. Always work from the uphill side.***
- o. Buck windfalls only after examining each tree to be cut for strains, breaks, binds, and the chance of root wads falling, rolling, or setting upright when the weight of the tree is removed. Be aware of trees that are underneath the one you are bucking as they may be under pressure and could move in any direction when the overhead weight is cut or removed.

22.48h - Crosscut Saws. Crosscut saw operation has historically been part of Forest Service work projects and activities. The qualifications stated in section 22.48b shall also apply for crosscut operators.

1. Personal Protective Equipment. The following PPE is required for crosscut saw operations:

- a. First aid kit (refer to the Glossary).
- b. Forest Service-approved hardhat.
- c. Eye protection.
- d. Heavy-duty, cut-resistant or leather, waterproof or water-repellent, 8 inch high (204 mm) laced boots with nonskid soles (hard toes are optional). For further direction, refer to FSM 6716.03, Personal Protective Equipment (Condition of Hire) Policy.
- e. Appropriate gloves.
- f. Chain saw chaps (optional). If chain saw chaps are worn, they shall meet the requirements of Forest Service Specification 6170-4.

2. Safety Practices.

- a. Storage. For storage of crosscut saws, provide an area specifically designed for easy access. Store crosscut saws straight, sheathed if possible, with teeth guarded.
- b. Ground Transport. For ground transport of crosscut saws, comply with the following:
 - (1) Vehicle. Guard teeth (sheath or box) and secure them from movement. Do not carry a crosscut saw in the passenger compartment of a vehicle.
 - (2) Livestock. When transporting a crosscut saw on a pack animal, take extra care. Adequately guard and secure the saw.
 - (a) Select the most gentle animal to carry the saw and place that animal at the front of the pack string.
 - (b) Ensure that short saws are carried sheathed, guarded, or in a scabbard, and are positioned in a manner so that the action of removing the saw is away from the animal's head.
 - (c) Ensure that long saws are sheathed. Bend a saw into a horseshoe shape over an adequate sized load. Secure the saw to the center of the pack saddle with teeth facing the rear of the animal (ex. 01).

22.48h - Exhibit 01

- (d) Ensure screws are tightened in the handle of the saw.
- (e) Monitor the pack animal to ensure the saw and load remain secured in place.
- c. Air Transport. For air transport of cross cut saws, comply with the following:
 - (1) Fixed Wing Aircraft.
 - (a) Properly sheathe the saw.
 - (b) Secure the saw from movement in a separate compartment, cargo bay behind net, or on the floor with tie-down straps.
 - (2) Rotor Wing Aircraft.
 - (a) Properly sheathe the saw.

- (b) Secure the saw to the floor or in a net compartment.
 - (c) In an external cargo sling net, keep the saw straight and secured to a larger object.
 - (d) In an external basket, keep the saw properly secured with appropriate tie straps.
- d. Personal Transport. For personal transport of crosscut saws, comply with the following:

- (1) Guard and balance the saw on your shoulder.
- (2) Remove the rear handle.
- (3) Rest the saw over your shoulder with the teeth facing away from your neck.
- (4) Carry the saw on the downhill side.
- (5) Walk last in line if you are the person carrying the saw.

e. Use of Crosscut Saws. In using crosscut saws, comply with the following:

- (1) Always inspect the saw before use.
- (2) Use only saws that are properly set and sharpened.
- (3) Wear cut-resistant gloves when handling a saw. Carefully sheathe and unsheathe the saw with the teeth facing away from your body (ex. 02).

22.48h - Exhibit 02

- (4) Pick up the saw with teeth away from your body. Rotate the teeth toward your body before handing the saw to another employee.
- (5) When attaching handles, keep the teeth away from your body and secure a firm grip on the saw.
- (6) Assess the work site (sec. 22.48e).

(7) Establish primary and secondary escape routes, safety zones, and alternates.

(8) Prior to cutting, remove vegetation. Ensure firm, stable footing.

(9) When using a two-employee crosscut saw for bucking, ensure that any employee placed downhill is in a safe position. If it is not certain that the downhill partner would be in a safe position, always single buck.

(10) When using a two-employee crosscut saw for falling, always predetermine who will remove the saw.

(11) When beginning to cut, ensure hands are in proper position. Do not push the saw.

(12) Do not reach across a moving saw.

(13) Maintain control and safe body position while sawing.

(14) Keep in communication with your partner at all times about holding wood, binds, limbs, and knots that might affect safety.

(15) When situations are deemed unsafe, use alternate methods or cancel the task.