



U. S. Department of the Interior

Tree Felling Operations  
Field Instruction Guide

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# Department of the Interior

## Tree Felling Operations Field Instruction Guide

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### 2. Scope and application.

This instruction establishes safety practices, means, methods and operations for all felling operations. Hazards and working conditions not specifically addressed by this instruction shall be covered in bureau specific requirements.

### **3. Definitions applicable to this instruction.**

"Backcut (felling cut)." The final cut in a felling operation.

"Buck." To cut a felled tree into logs.

"Butt." The bottom of the felled part of a tree.

"Chock." A block, often wedge shaped, which is used to prevent movement; e.g., a log from rolling, a wheel from turning.

"Danger tree." A standing tree that presents a hazard to employees due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem or limbs, and the direction and lean of the tree.

"Debark." To remove bark from trees or logs.

"Designated person." An employee who has the requisite knowledge, training and experience to perform specific duties.

"Domino felling." The partial cutting of multiple trees which are left standing and then pushed over with a pusher tree.

"Fell (fall)." To cut down trees.

"Feller (faller)." An employee who fells trees.

"Felling Supervisor." A person who supervises a felling operation and is capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous or dangerous to the feller or felling team and who has authorization to take prompt corrective measures to eliminate them.

"Guarded." Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable enclosures, covers, casings, shields, troughs, railings, screens, mats, or platforms, or by location, to prevent injury.

"Health care provider." A health care practitioner operating with the scope of his/her license, certificate, registration or legally authorized practice.

"Limbing." To cut branches off felled trees.

"Lodged tree (hung tree)." A tree leaning against another tree or object which prevents it from falling to the ground.

"Log." A segment sawed or split from a felled tree, such as, but not limited to, a section, bolt, or tree length.

"Machine." A piece of stationary or mobile equipment having a self-contained power plant that is operated off-road and used for the movement of material. Machines include, but are not limited to, tractors, skidders, front-end loaders, scrapers, graders, bulldozers, and mechanical felling devices, such as tree shears and feller-bunchers. Machines do not include airplanes or aircraft (e.g., helicopters).

"Root wad." The ball of a tree root and dirt that is pulled from the ground when a tree is uprooted.

"Serviceable condition." A state or ability of a tool, machine, vehicle or other device to operate as it was intended by the manufacturer to operate.

"Slope (grade)." The increase or decrease in altitude over a horizontal distance expressed as a percentage. For example, a change of altitude of 20 feet (6 m) over a horizontal distance of 100 feet (30 m) is expressed as a 20 percent slope.

"Snag." Any standing dead tree or portion thereof.

"Spring pole." A tree, segment of a tree, limb, or sapling which is under stress or tension due to the pressure or weight of another object.

"Undercut (facecut or notch)." A cut in a tree to assist the direction of the tree fall.

#### **4. Personal protective equipment.**

- 4.1 Bureaus shall provide, at no cost to the employee, and assure that personal protective equipment is inspected and maintained in serviceable condition.
- 4.2 Bureaus shall assure that personal protective equipment, and if authorized to include any personal protective equipment provided by an employee, is inspected before initial use during each work shift. Defects or damage shall be repaired or the unserviceable personal protective equipment shall be replaced before work is commenced.
- 4.3 Bureaus shall provide, at no cost to the employee, hand protection which provides adequate protection from puncture wounds, cuts and lacerations.
- 4.4 Bureaus shall provide, at no cost to the employee, and assure that each employee who operates a chain saw wears leg protection constructed with cut-resistant material, such as ballistic nylon. The leg protection shall cover the full length of the thigh to the top of the boot on each leg to protect against contact with a moving chain saw. **Exception:** This requirement does not apply when an employee is working as a climber if the bureau can demonstrate that a greater hazard is posed by wearing leg protection in the particular situation, or when an employee is working from a vehicular mounted elevating and rotating work platform meeting the requirements of [29 CFR 1910.68](#).
- 4.5 Bureaus shall assure that each employee wears foot protection, such as heavy-duty boots that cover and provide support to the ankle. Sharp, calk-soled boots or other slip-

resistant type boots may be worn where the bureau demonstrates that they are necessary for the employee's job, the terrain, the timber type, and the weather conditions, provided that foot protection otherwise required by this paragraph is met.

- 4.6 Bureaus shall provide, at no cost to the employee, and assure that each employee who works in an area where there is potential for head injury from falling or flying objects wears head protection meeting the requirements of [Subpart I of Part 1910](#).
- 4.7 Eye protection meeting the requirements of [Subpart I of Part 1910](#) where there is potential for eye injury due to falling or flying objects; and
- 4.8 Face protection meeting the requirements of [Subpart I of Part 1910](#) where there is potential for facial injury such as, but not limited to, operating a chipper. Logging-type mesh screens **may** be worn by employees performing chain-saw operations.  
**Note to paragraph:** The employee does not have to wear a separate eye protection device where face protection covering both the eyes and face is worn.

## 5. First-aid kits.

- 5.1 As a standard part of an Emergency Medical System, felling supervisor s shall assure first-aid kits at provided at each work site, or within a reasonable proximity, where trees are being cut (e.g., felling, buckling, limbing), and on each employee transport vehicle. The number of first-aid kits and the content of each kit shall reflect the degree of isolation, the number of employees, and the hazards reasonably anticipated at the work site.
- 5.2 Felling supervisors also may have the number and content of first-aid kits reviewed and approved annually by a health care provider.
- 5.3 Felling supervisors shall maintain the contents of each first-aid kit in a serviceable condition.

## 6. Work areas.

- 6.1 Felling operations shall include more than one person on-site or in vicinity. Felling operations shall not be conducted alone.
- 6.2 Fellers shall be spaced and the duties of each feller shall be organized so the actions of one feller will not create a hazard for any other feller or employee.
- 6.3 Work areas shall be assigned so that trees cannot fall into an adjacent occupied work area. The distance between adjacent occupied work areas shall be at least two tree lengths of the trees being felled. The distance between adjacent occupied work areas shall reflect the degree of slope, the density of the growth, the height of the trees, the soil structure and other hazards reasonably anticipated at that work site. A distance of greater than two tree lengths shall be maintained between adjacent occupied work areas on any slope where rolling or sliding of trees or logs is reasonably foreseeable,

unless a standard of practice already exists that is at least as protective as this measure describes.

- 6.4 Each employee performing a felling operation at a felling work site shall work in a position or location that is within visual or audible contact with another employee.
- 6.5 Felling supervisor shall account for each employee at the end of each work shift.
- 6.6 Positive communications shall be made with home unit/dispatch center/incident command post prior to felling operations. This practice is to ensure communications are established in case of an emergency.

## **7. Communication with Feller (Signaling and signal equipment).**

- 7.1 Means of communication with the feller shall be identified prior to chainsaw operations. Options include: hand signals or audible contact, such as but not limited to, whistles, horns, or radios. Factors to consider are tool noise, distance, restricted visibility, or other factors that may prevent a clear understanding of normal voice communications between employees.
- 7.2 Engine noise, such as from a chain saw, is not an acceptable means of signaling. Other locally and regionally recognized signals may be used.

## **8. Overhead electric lines.**

- 8.1 Felling operations near overhead electric lines shall be done in accordance with the requirements of [29 CFR 1910.333\(c\)\(3\)](#).
- 8.2 Felling supervisor shall notify the power company immediately if a felled tree makes contact with any power line. Each employee shall remain clear of the area until the power company advises that there are no electrical hazards.

## **9. Flammable and combustible liquids.**

- 9.1 Flammable and combustible liquids shall be stored, handled, transported, and used in accordance with the National Wildfire Coordinating Group's publication "*Interagency Transportation Guide for Gasoline, Mixed Gas, Drip-Torch Fuel, and Diesel*" (located at <http://www.nwcg.gov/pms/pubs/442/pms442.pdf>) if involved in Wildland firefighting activities or if working and handling flammable and combustible liquids in other than wildland firefighting operations, the requirements set forth in [Subpart H of Part 1910](#) shall be used.
- 9.2 Flammable and combustible liquids shall not be transported in the driver compartment or in any passenger-occupied area of a machine or vehicle.
- 9.3 Each machine, vehicle and portable powered tool shall be shut off during fueling. Diesel-powered machines and vehicles may be fueled while they are at idle, provided

that continued operation is intended and that the felling unit follows safe fueling and operating procedures.

## **10. Explosives and blasting agents, if applicable.**

- 10.1 Explosives and blasting agents shall be stored, handled, transported, and used in accordance with the requirements of [Subpart H of part 1910](#).
- 10.2 Only a designated person shall handle or use explosives and blasting agents.
- 10.3 Explosives and blasting agents shall not be transported in the driver compartment or in any passenger-occupied area of a machine or vehicle.

## **11. Hand and portable powered tools.**

- 11.1 Felling supervisors shall assure that each hand and portable powered tool, including any tool provided by an employee or supervised contractor is maintained in serviceable condition.
- 11.2 Felling supervisors shall assure that each tool, including any tool provided by an employee or supervised contractor is inspected before initial use during each work shift. At a minimum, the inspection shall include the following:
  - 11.2.1 Handles and guards, to assure that they are sound, tight-fitting, properly shaped, free of splinters and sharp edges, and in place;
  - 11.2.2 Controls, to assure proper function;
  - 11.2.3 Chain-saw chains, to assure proper adjustment;
  - 11.2.4 Chain-saw mufflers, to assure that they are operational and in place;
  - 11.2.5 Chain brakes and nose shielding devices, to assure that they are in place and function properly;
  - 11.2.6 Heads of shock, impact-driven and driving tools, to assure that there is no mushrooming;
  - 11.2.7 Cutting edges, to assure that they are sharp and properly shaped; and
  - 11.2.8 All other safety devices, to assure that they are in place and function properly.
- 11.3 Felling supervisors shall assure that each tool is used only for purposes for which it has been designed.
- 11.4 When the head of any shock, impact-driven or driving tool begins to chip, it shall be repaired or removed from service.
- 11.5 The cutting edge of each tool shall be sharpened in accordance with manufacturer's specifications whenever it becomes dull during the work shift.
- 11.6 Each tool shall be stored in the provided location when not being used at a work site.
- 11.7 Racks, boxes, holsters or other means shall be used for the transportation of tools so that a hazard is not created for any vehicle operator or passenger.

## **12. Chain saws.**

- 12.1 Each chain saw placed into service shall be equipped with a chain brake and shall otherwise meet the requirements of the ANSI B175.1-1991 "Safety Requirements for Gasoline-Powered Chain Saws." Each chain saw placed into service shall be equipped with a protective device that minimizes chain-saw kickback. No chain-saw kickback device shall be removed or otherwise disabled.
- 12.2 Each gasoline-powered chain saw shall be equipped with a continuous pressure throttle control system which will stop the chain when pressure on the throttle is released.
- 12.3 The chain saw shall be operated and adjusted in accordance with the manufacturer's instructions.
- 12.4 The chain saw shall be fueled at least 10 feet (3 m) from any open flame or other source of ignition.
- 12.5 The chain saw shall be started at least 10 feet (3 m) from the fueling area.
- 12.6 The chain saw shall be started on the ground or where otherwise firmly supported. Drop starting a chain saw is prohibited.
- 12.7 The chain saw shall be started with the chain brake engaged.
- 12.8 The chain saw shall be held with the thumbs and fingers of both hands encircling the handles during operation unless the bureaus demonstrates that a greater hazard is posed by keeping both hands on the chain saw in that particular situation.
- 12.9 The chain-saw operator shall be certain of footing before starting to cut. The chain saw shall not be used in a position or at a distance that could cause the operator to become off-balance, to have insecure footing, or to relinquish a firm grip on the saw.
- 12.10 Prior to felling any tree, the chain-saw operator shall clear away brush or other potential obstacles which might interfere with cutting the tree or using the retreat path.
- 12.11 The chain saw shall not be used to cut directly overhead.
- 12.12 The chain saw should be carried in a manner that will prevent operator contact with the cutting chain and muffler.
- 12.13 The chain saw should be shut off or the throttle released before the feller starts his retreat.
- 12.14 The chain saw should be shut down or the chain brake engaged when a saw is carried.

## **13. Machines, if applicable.**

- 13.1 Felling supervisors shall assure that each machine, including any machine provided by an employee or supervised contractor is maintained in serviceable condition.
- 13.2 Felling supervisors shall assure that each machine, including any machine provided by an employee or supervised contractor is inspected before initial use during each

work shift. Defects or damage shall be repaired or the unserviceable machine shall be replaced before work is commenced.

- 13.3 Felling supervisors shall assure that operating and maintenance instructions are available on the machine or in the area where the machine is being operated. Each machine operator and maintenance employee shall comply with the operating and maintenance instructions.

## **14. Machine operation, if applicable.**

- 14.1 The machine shall be started and operated only by a designated person.
- 14.2 Stationary felling machines and their components shall be anchored or otherwise stabilized to prevent movement during operation.
- 14.3 The rated capacity of any machine shall not be exceeded.
- 14.4 To maintain stability, the machine must be operated within the limitations imposed by the manufacturer as described in the operating and maintenance instructions for that machine on any slope which is greater than the maximum slope recommended by the manufacturer.
- 14.5 Before starting or moving any machine, the operator shall determine that no employee is in the path of the machine.
- 14.6 The machine shall be operated only from the operator's station or as otherwise recommended by the manufacturer.
- 14.7 The machine shall be operated at such a distance from employees and other machines such that operation will not create a hazard for an employee.
- 14.8 No employee other than the operator shall ride on any mobile machine unless seating, seat belts and other protection equivalent to that provided for the operator are provided.
- 14.9 Before the operator leaves the operator's station of a machine, it shall be secured as follows:
  - 14.9.1 The parking brake or brake locks shall be applied;
  - 14.9.2 The transmission shall be placed in the manufacturer's specified park position; and
  - 14.9.3 Each moving element shall as, but not limited to blades, buckets, saws and shears, shall be lowered to the ground or otherwise secured.
  - 14.9.4 If a hydraulic or pneumatic storage device can move the moving elements such as, but not limited to, blades, buckets, saws and shears, after the machine is shut down, the pressure or stored energy from the element shall be discharged as specified by the manufacturer.
- 14.10 The rated capacity of any vehicle transporting a machine shall not be exceeded.
- 14.11 The machine shall be loaded, secured and unloaded so that it will not create a hazard for any employee.

## **15. Guarding.**

- 15.1 Each machine shall be equipped with guarding to protect employees from exposed moving elements, such as but not limited to, shafts, pulleys, belts on conveyors, and gears, in accordance with the requirements of [Subpart O of part 1910](#).
- 15.2 Each machine used for debarking, limbing and chipping, if such activities will take place during a felling operation, shall be equipped with guarding to protect employees from flying wood chunks, logs, chips, bark, limbs and other material in accordance with the requirements of [Subpart O of part 1910](#).
- 15.3 The guarding on each machine shall be in place at all times the machine is in operation.

## **16. Vehicles.**

- 16.1 Felling supervisors shall assure that each vehicle used to perform any felling operation is maintained in serviceable condition.
- 16.2 Felling supervisors shall assure that each vehicle used to perform any felling operation is inspected before initial use during each workshift. Defects or damage shall be repaired or the unserviceable vehicle shall be replaced before work is commenced.
- 16.3 Felling supervisors shall assure that operating and maintenance instructions are available in each vehicle. Each vehicle operator and maintenance employee shall comply with the operating and maintenance instructions.
- 16.4 Felling supervisors shall assure that each vehicle operator has a valid operator's license for the class of vehicle being operated.
- 16.5 Mounting steps and handholds shall be provided for each vehicle wherever it is necessary to prevent an employee from being injured when entering or leaving the vehicle.
- 16.6 The seats of each vehicle shall be securely fastened.
- 16.7 This section shall also apply to each vehicle used to transport any employee off public roads or to perform any felling operation, including any vehicle provided by an employee.

## **17. Manual felling.**

- 17.1 Before felling is started, the feller shall plan and clear a retreat path. The retreat path shall extend diagonally away from the expected felling line unless the bureau demonstrates that such a retreat path poses a greater hazard than an alternate path. Depending on the situation, once the tree has committed to its fall the feller shall immediately move away from the tree to a safe location where one can retreat safely.

- 17.2 Before each tree is felled, conditions such as, but not limited to, snow and ice accumulation, the wind, the lean of tree, dead limbs, and the location of other trees, shall be evaluated by the feller and precautions taken to mitigate risk to the feller.
- 17.3 Each tree shall be checked for accumulations of snow and ice. Accumulations of snow and ice that may create a hazard shall be removed before felling is commenced in the area or the area shall be avoided.
- 17.4 When a spring pole or other tree under stress is cut, no employee other than the feller and swamper shall be closer than two tree lengths when the stress is released. Hazard trees (e.g., hung trees, spring poles, leaners, etc.) may pose additional risk, and therefore, feller supervisors and fellers should have adequate work space to ensure trees (those being cut and hazard trees in the direct tree cut vicinity) do not impact others in or near the tree felling site.
- 17.5 An undercut/facecut shall be made in each tree being felled unless the bureau can demonstrate that felling the particular tree without an undercut/facecut will not create a hazard for an employee. The undercut/facecut shall be of a size so the tree will not split and will fall in the intended direction.
- 17.6 A backcut shall be made in each tree being felled. The backcut shall leave sufficient hinge wood to hold the tree to the stump during most of its fall so that the hinge is able to guide the tree's fall in the intended direction. Fellers may use discretion to manipulate direction of falling to include instances where holding/hinge wood is cut/impacted.
- 17.7 The backcut shall be above the level of the horizontal facecut in order to provide an adequate platform to prevent kickback. Exception: The backcut may be at or below the horizontal facecut in tree pulling operations. Recognized directional felling techniques that prevent kickback shall be used
- 17.8 Domino felling of trees is prohibited.  
*Note to paragraph:* The definition of domino felling does not include the felling of a single danger tree by felling another single tree into it.

## **18. Limbing and bucking.**

- 18.1 Limbing and bucking on any slope where rolling or sliding of trees or logs is reasonably foreseeable shall be done on the uphill side of each tree or log.
- 18.2 Before bucking or limbing wind-thrown trees, precautions shall be taken to prevent the root wad, butt or logs from striking an employee. These precautions include, but are not limited to, chocking or moving the tree to a stable position.

## **19. Training.**

Bureaus that conduct felling operations shall assure that training for each employee required to perform such duties, including supervisors, is provided at no cost to the employee.

## **20. Training frequency.**

- 20.1 Training shall be provided as follows:
  - 20.1.1 Prior to initial assignment for each new employee;
  - 20.1.2 Whenever the employee is assigned new work tasks, tools, equipment, machines or vehicles; and
  - 20.1.3 Whenever an employee demonstrates unsafe job performance.

## **21. Training content.**

- 21.1 Bureaus shall establish training requirements as appropriate, but at a minimum, training shall consist of the following elements:
  - 21.1.1 Safe performance of assigned work tasks;
  - 21.1.2 Safe use, operation and maintenance of tools, machines and vehicles the employee uses or operates, including emphasis on understanding and following the manufacturer's operating and maintenance instructions, warnings and precautions;
  - 21.1.3 Recognition of safety and health hazards/risks associated with the employee's specific work tasks, including the use of measures and work practices to prevent or control those hazards/risks;
  - 21.1.4 Training of an employee due to unsafe job performance, or assignment of new work tasks, tools, equipment, machines, or vehicles; may be limited to elements in this instruction or which are relevant to the circumstances giving rise to the need for training.

## **22. Portability of training.**

- 22.1 Unless otherwise specified in bureau specific policy, each employee who has received training in the particular elements specified in this section shall not be required to be retrained in those elements or retrained in those elements prior to initial assignment.
- 22.2 Felling supervisors are responsible for ensuring that each current and new employee can properly and safely perform the work tasks and operate the tools, equipment, machines, and vehicles used in their job.

- 22.3 Each new employee and each employee who is required to be trained, as specified by this instruction, shall work under the close supervision of a designated person until the employee demonstrates to a bureau designee the ability to safely perform their new duties independently.

### **23. First-aid/CPR training.**

- 23.1 Felling supervisors shall assure that each employee, including supervisors, receives or has received first-aid and CPR training per respective Bureau requirements.
- 23.2 Felling supervisors shall assure that each employee's first-aid and CPR training and/or certificate of training remain current.
- 23.3 All training shall be conducted by a designated person.
- 23.4 Felling supervisors shall assure that all training required by this section is presented in a manner that the employee is able to understand. The felling supervisors shall assure that all training materials used are appropriate in content and vocabulary to the educational level, literacy, and language skills of the employees being trained.

### **24. Certification of training.**

- 24.1 Bureaus shall assure certification of training by preparing a record. The written certification record shall contain the name or other identity of the employee trained, the date(s) of the training, and the signature of the person who conducted the training or the signature of the bureaus. If the felling supervisors relies on training conducted prior to the employee's hiring or completed prior to the effective date of this section, the certification record shall indicate the date the bureau determined the prior training was adequate. If bureau specific policy dictates an alternate method of certification that is at least as effective as described, that method shall take precedence.
- 24.2 The most recent training certification shall be maintained.

### **25. Safety and health meetings.**

Felling supervisors shall hold safety and health meetings and conduct on-site tailgate safety sessions as necessary. Safety and health meetings may be conducted individually, in crew meetings, in larger groups, or as part of other staff meetings.

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## Appendix A -- First-aid Supplies

First aid supplies for wildland firefighting operations are available through the CACHE system. Kits can be found at <http://www.nwccg.gov/pms/pubs/catalog/kits.pdf>. Consideration should be given to the number of people working in the area and the work being performed prior to determining the type of kit to be procured. The contents of the first-aid kit should be adequate for the work site(s). When larger operations or multiple operations are being conducted at the same location, additional first-aid kits should be provided. Quantities of supplies should include:

- Gauze pads (at least 4 x 4 inches).
- Two large gauze pads (at least 8 x 10 inches).
- Box adhesive bandages (band-aids).
- One package gauze roller bandage at least 2 inches wide.
- Two triangular bandages.
- Wound cleaning agent such as sealed moistened towelettes.
- Scissors.
- At least one blanket.
- Tweezers.
- Adhesive tape.
- Latex gloves.
- Resuscitation equipment such as resuscitation bag, airway, or pocket mask.
- Two elastic wraps.
- Splint.
- Directions for requesting emergency assistance.