



Heating with Wood Series

Cutting Firewood Safely

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With the steady increase in energy costs, many homeowners have turned to fireplaces and wood-burning stoves to help heat their homes. In order to supply wood for their fireplaces and stoves many of these same homeowners have taken to wood lots to cut their own firewood. Cutting firewood can be a very worthwhile and rewarding experience if done properly. If it is done improperly without regard to safe cutting techniques, serious injury, or death can result.

Preparation

The first step in safely cutting firewood is to properly prepare self and equipment for the job. To prepare oneself, utilize the following personal protective equipment:

- A hard hat to protect head from falling limbs or branches.
- A pair of safety goggles or eye glasses with safety lenses to prevent injury from falling wood chips, twigs, and sawdust.
- A good pair of comfortable ear muffs or ear plugs to protect ears from the engine noise when using a gasoline powered chain saw.
- A pair of light weight gloves to protect hands from abrasions, splinters, and cuts.
- A pair of heavy work boots or shoes with high tops and steel toes.
- Clothing which is well-fitted and free of dangling or ragged edges which could become tangled in the saw or drag on branches.

Equipment for cutting firewood falls into two categories—hand tools and power tools. Hand tools consist primarily of saws, axes, wedges, and sledgehammers. The power tool most commonly associated with firewood cutting is the chain saw. However, in recent years, gasoline and hydraulic powered wood splitters are becoming more common.

Preparing equipment for safe operation involves making sure you are thoroughly familiar with its operation and it is in top operating condition. Be aware of any inherent hazards associated with the particular piece of equipment.

Following are some things to look for with specific pieces of equipment:

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<http://osufacts.okstate.edu>

Handsaws: Be sure the saw blade is sharp and in good condition. Check all handles to be certain they are firmly attached to the blade.

Axes: Keep blade sharp. Be certain the handle is in good condition, free of cracks and securely attached to the ax head. **Wedges:** Keep wedges properly sharpened. If the head of the wedge becomes mushroomed, grind it smooth before using again.

Sledges: Keep handle in good condition and firmly attached to the head.

Chain saws: Keep chain sharp and properly sharpened. Follow manufacturers recommendations for service and maintenance. (For more detailed information on safe chain saw operation request a copy of OCES NREM-9430 "Safe Chain Saw Operation" from a county Extension office.)

Wood Splitters: Follow manufacturers recommendations for service and operation.

Felling

Cutting a tree down safely involves consideration of a variety of safety precautions. Before beginning a cut, consider such factors as wind direction, the natural lean and balance of the tree, location of large limbs, and whether the trunk is sound, hollow, or partially rotted. All these factors will affect the direction a tree will fall. The inexperienced cutter should attempt to fell trees only under circumstances which indicate a high degree of certainty as to which way the tree will fall.

Before beginning to cut, clear the ground around the base of the tree of limbs, underbrush, or other obstructions. These precautions provide clear vision, unrestricted movement, and an unhampered escape route when the tree begins to fall. Clear any potentially flammable timber from the area where the saw's exhaust discharge will likely be directed.

Be certain that the intended direction of fall has ample clearance for the tree to fall completely to the ground. If there is not sufficient clearance, the tree is likely to lodge in a standing tree. A hung-up tree is a killer. The only thing more dangerous is a "widow maker" which is a big, dead, or decayed limb that a falling tree knocks off itself or a nearby tree. Such a limb will usually fall straight down, not over with the tree, and more than one has lived up to its name. Such limbs should be removed, if at all possible, before beginning a cut. Also, as part of precutting preparations, clear an escape

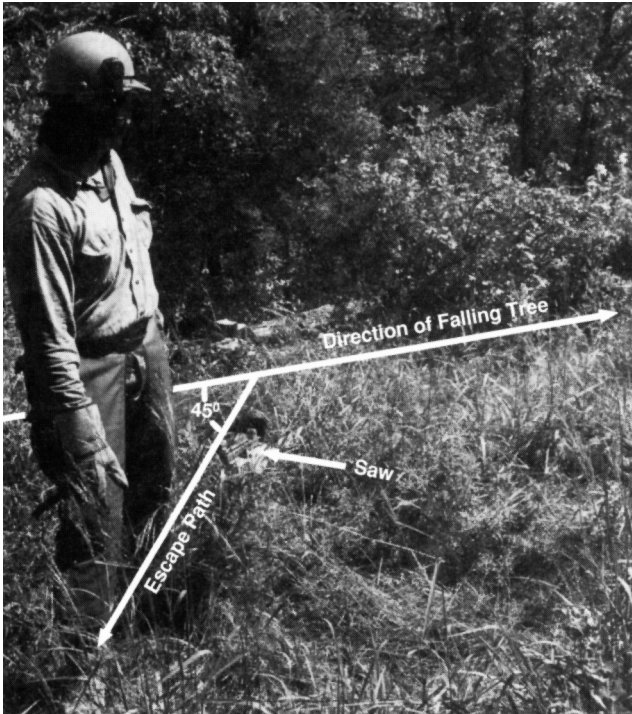


Figure 1. Before felling a tree, be sure an escape route has been planned and cleared.

path in back and to the side depending on the direction the tree is likely to fall (Figure 1).

The next step in cutting a tree down safely after deciding the direction of the fall and clearing the area around the base of the tree, is to make the notch and back cut. The notch, or undercut, is made on the side of tree on which it is expected to fall and at a right angle to the direction of fall (Figure 2). It should be cut to a depth of about one-third the diameter of the tree. Make the lower notch cut first. This will help prevent the saw from binding and being pinched by the wedge of wood while the upper notch cut is being made. Once both cuts have been made, the wedge of wood forming the notch can be knocked out.

After the notch has been cut, the next step is to make the back or felling cut. This cut should be made on the opposite side of the tree from the notch and about two inches above and parallel to the horizontal portion of the notch. The tree should begin to fall when one is several inches from the inner face of the notch. The uncut portion will act as a hinge. This hinge wood is what controls the fall of the tree. If the hinge has the same thickness from end to end, the direction of the fall will be at a right angle to the notch. If the notching and back cuts are not parallel, the tree will fall more in the direction of the thicker end of the hinge. If the hinge is cut through, the tree could fall in any direction and might twist off the stump.

If during the cutting process the saw begins to bind from a closing kerf (cut), this indicates an error in judgement. At first such indication remove the saw. If the saw cannot be removed, do not struggle with it. Shut off the engine and plan a course of action using wedges to remove the saw.

Wedges are the most dependable means of helping to direct a tree fall. It is desirable to use only wooden, aluminum, or plastic wedges as these types will not damage the saw chain should they accidentally contact one another. When using wedges to direct the fall of a tree, it is best to use two rather

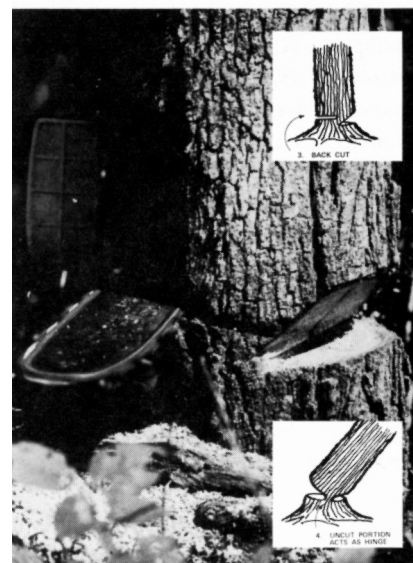


Figure 2. Correct procedure for making the notch and back out.

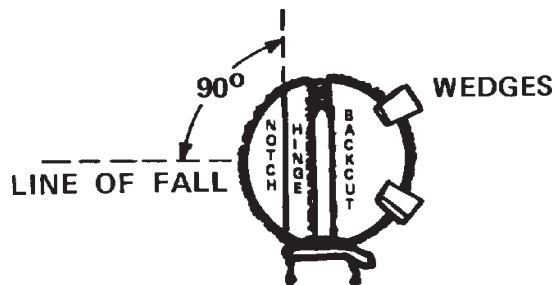


Figure 3. The use of two wedges will allow better control and insure a forward fall of the tree.

than one. The use of two will allow better control and insure a forward fall of the tree (Figure 3).

Use a sledge or mallet with a face broader than the wedge to drive it into place. Strike the wedge squarely with firm but not excessive blows. Careless blows may cause the wedge to pop out and result in the tree swinging backward unexpectedly. Do not use an ax head as a wedge, or as a driver as it is not designed for this purpose and could result in serious injury.

If a tree hangs up in another tree during felling, the best and safest course of action is to use a tractor or winch to pull the tree down. To do this safely, pull the butt of the tree at a 90 degree angle to the direction of the fall. Do not attempt to get it down by cutting the standing tree, or by climbing either tree. Either method is extremely dangerous, and could result in serious injury.

The manipulation of fall control comes with experience. Always approach complex falls with extreme caution. Above all, do not neglect wind effects. Avoid working on very windy days as it is extremely difficult to determine, which way a tree will fall under such conditions.

Limbing

Once a tree is on the ground, the next job is to remove the limbs. The job of limbing a tree is many times a time consuming and tiring task. It is also a time when many accidents occur because of the cluttered work area that is always present. When using a chain saw for limbing, choose a lightweight saw with a short bar. The small size makes holding and maneuvering easier. The lower horsepower allows better control of the saw in kickback situations. Limbing progresses much more rapidly and safely when the saw is sized to the task.

Begin limbing at the base of the trunk. The first limbs cut should be those on top of the trunk. These should be cut as far up to the top side of the trunk as possible before removing those resting on the ground. Make it a practice to saw branches so they fall always from the cut whenever possible. Use extra caution while cutting small diameter limbs, as the slender material may catch in the saw and be whipped toward someone and pull him or her off balance.

While limbing, remove limbs on the opposite side of the trunk whenever possible (Figure 4). The trunk will act as a barrier between the saw and help protect from accidental contact with the chain. Another reason this method is desirable is because it causes the limbs to drop away after they are cut.

This reduces the possibility of being knocked off balance by a falling limb. When it is necessary to work with the saw on the same side of the trunk, keep the saw to the side of body so that it will be less likely to swing into the legs or the body if it cuts through unexpectedly or kicks back.

When it becomes necessary to clear branches, first shut off the saw and put it in a safe place with no fire hazard. Never hold a running saw with one hand and clear limbs with the other.

As work progresses, it may become necessary to cut some of the bottom branches which are resting on the ground to improve working conditions underfoot. Many times it is easiest to undercut these limbs from beneath. Extreme caution should be exercised though when undercutting. Keep a close watch on the cut. At first indication of binding, remove the saw immediately to prevent the possibility of kickback. Keep the engine speed up as a slow moving chain is more likely to lock than one cutting freely.

The likelihood of the tree rolling increases as more branches are removed. Removing heavy branches from the top side of the trunk may cause the tree to shift. Removal of a heavy limb may allow branches below to spring up, turning the tree unexpectedly. Be alert for any movement and be ready to move away quickly if it becomes necessary.



Figure 4. In limbing a fallen tree, keep the saw chain on the opposite side of the log being worked on when possible. This will help prevent accidental contact with the saw chain.

Bucking

Bucking (cutting a log into desired lengths) is generally less hazardous than other sawing tasks. The hazards that may result in accidental injury while cutting up a log are unexpected movement of the log and kickback.

There are a few simple precautions to take to deal with unexpected movement of a log. First of all, always be sure of footing. By staying well balanced at all times, one will be able to react to unexpected log movement easier and with less chance of an accidental injury. Make it a practice to always work on the uphill side of the log. Since a log will naturally roll downhill if it begins to move, working on the uphill side will provide the greatest margin of safety. Raise and chock the log securely whenever possible to help prevent movement. The use of a sawhorse is a good way to do this.

Bucking procedures differ depending on how the log is supported (Figure 5). The tree support conditions are most likely to encounter are a log supported on one end, a log supported on both ends, or a log supported along its entire length.

On a log which is supported on one end, make the first cuts on the freely supported section. To prevent the saw from binding, make these cuts at a slant which will cause the cut to open. On diameters of less than eight inches, cut completely through. Larger diameters should be scored on the underside by sawing upward about one-third of the diameter to prevent splintering. Complete the cut by sawing downward. Any hint of a closing cut indicates a mistake, and the trunk is supported at both ends rather than only one.

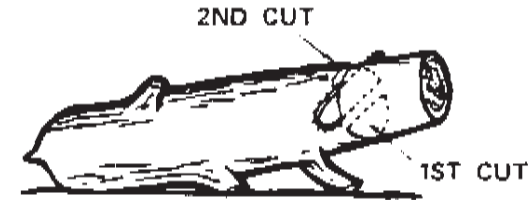
On a log which is supported on both ends make the first cut from the top through about one-third of the diameter of the log. The actual depth will be determined by weakening of the log which will close the cut. At the first indication of a closing cut, stop sawing from the top. The remaining wood is then cut upward from the bottom. The weight of the log and the top cut will cause the log to open and fall away at the completion of the cut. Because most of the cutting in this section is done with the top of the saw blade, be alert for kickback especially at the end of the cut when the log falls apart.

A log that is supported along its entire length should first be cut about two-thirds of the way through from the top. It is then rolled over and cut from the opposite side until free. Use extra care to avoid striking the ground with the saw blade.

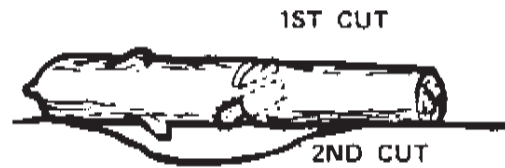
When cutting firewood lengths, a number of methods can be used. One way is to make cuts about three-fourths of the way through for each length of firewood. By not cutting completely through, several lengths will stay together and the log will remain rigid until all major sawing is completed. When all cuts are made from one side, roll the log and complete the cuts.

Another way is to sink four or six posts into the ground in a rectangular crib about 3 1/2 feet long and as wide or deep as the cutting bar of the chain saw. Four foot logs are then stacked in the crib and one just go down the stack, cutting several logs at a time.

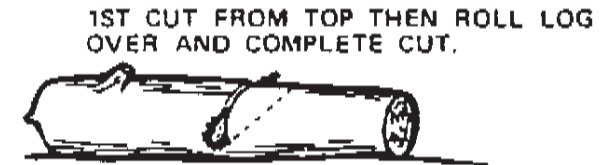
TYPES OF LOG SUPPORT



A. LOG SUPPORTED ONE END



B. LOG SUPPORTED ON BOTH ENDS



C. LOG SUPPORTED ALONG ENTIRE LENGTH

Figure 5. Bucking procedures differ depending on how the log is supported.

Axes and Splitting Wood

The axe is an indispensable tool for limbing fallen trees and splitting large logs. Although it is a simple tool, its safe and efficient use requires careful selection, periodic maintenance, and proper handling.

The right axe should be both personally comfortable and efficient. The standard poll-axe is often a good compromise between the light Hudson Bay axe and the heavy doublebitted axe. When properly sharpened, the poll-axe can be used for limbing and splitting. In addition to the weight of the head, the shape of the handle is important for comfort. Be sure to choose an axe with a handle that fits you.

Since the axe head will probably outlast a couple of handles, be sure to choose an axe with a head secured by visible wedges. Avoid axes with handles molded to the head with plastic as replacing the handle will be very difficult. Also avoid varnished or glossy, paint-finished handles which are dangerously slippery when wet and will cause blisters. The

handle should be of good, straight-grained hardwood; hickory is the best. The grain should run parallel to the length of the handle to prevent warping and breakage.

For efficiency and safety an axe must be kept sharp. The bluntly tapered edge of a new axe is great for splitting but too blunt for limbing. Two axes, each sharpened differently are ideal, but a single axe can be sharpened to a medium taper and serve effectively for both uses.

After the original edge has been formed, periodic resharpening will be required. Place the head in a vise and run an angled file from the heel to the toe over the entire length of the blade. Turn the axe frequently and concentrate on forming an even edge over the entire blade. After the nicks have been removed, use a circular stone to hone with a circular motion at about a 25 degree angle. First use the medium side and then the fine side of the stone. An Arkansas or Moon Stone will perfect and polish the edge, but such stones are quite expensive. Always use plenty of sharpening oil when using a stone as it keeps the stone's surface from clogging with steel particles.

Eventually, the handle of an unused axe will dry out and the head will be dangerously loose. Soaking the axe head overnight in a bucket of water usually solves this problem. Sometimes additional wedging will be necessary. Storing an axe with the head resting on a dirt floor will keep the wood fibers in the handle swollen and the head tight.

To replace an axe handle, rest the heel of the handle on the floor and gently tape the head onto the handle. Next, with the head resting on the floor, strike the handle heel sharply with a mallet until the handle is tight. Take off the shaving that have been forced from the handle with wood rasp. Drive in hardwood wedges along the sides as far as they can go and trim them. Finally, drive in two steel wedges alongside the wooden wedges.

Tools used to split firewood logs include a splitting axe, an eight-pound sledge, a splitting maul and eight-pound wedges. The axes and wedges should be kept reasonably sharp so keep a file and a stone handy.

It takes practice to learn to split wood safely and efficiently. Learning to read the flow of the grain and working with this flow rather than against it will make wood splitting tasks must more enjoyable. Grain patterns differ between tree species; a straight-grained ash will always split easier than an elm with its interlocking and interweaving wood fibers. The grain also varies within a tree and will prove to be most difficult around branches and knobs.

Never split wood directly on the ground as this is a good way to strike a rock or a foot. Place the piece to be split on a chopping block which can be either a larger log or a stump about 20 inches high. Draw an imaginary line across the piece to be split in line with any natural crack or with the center. Drive an axe or maul along that line as many times as it takes to form a split. Flex knees when swinging so that the angle between the log and the axe is 90 degrees. If it does not split, drive a wedge in at the center. Two wedges placed halfway between the center and the edge may be needed with large or stubborn blocks. Wedges carefully placed can also be used to free a buried axe or maul.

When the log has a branch stub or visible knot in it, the split line should be located so that the crack will run through the center of the knot or stub. Hidden knots can sometimes be detected by observing a curve in the otherwise straight grain. A crotch log is difficult to split-either saw the legs apart, or stand the log on its legs and drive a wedge in line with the leg's centers.

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Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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