Extension Circular 1124
July 1983

75¢

The Woodland Workbook

Logging

Felling and Bucking Techniques for Woodland Owners

Skills at felling and bucking timber are useful for many woodland owners. The safe and effective use of a chain saw allows you to do precommercial thinnings, salvage operations, commercial harvesting, hardwood removals, and even firewood gathering more efficiently.

While these activities are necessary on many properties, do not undertake them without sufficient skills. This publication cannot provide the full complement of felling and bucking skills, but it does outline principles and procedures to help you begin developing needed skills.

A good approach to skills development is first to understand the basic principles involved. Many are outlined in this publication and selected references—which includes your chain saw owner's manual.

Next, you can develop the skills you need to operate the chain saw effectively by cutting material that is already on the ground—this should help develop bucking skills as well.

Finally, if you can arrange some practice sessions with an experienced timber cutter, you can continue learning valuable techniques while cutting standing timber.

Start with small, straight trees that are sound—not because these trees are safe, but because if problems occur, they might not require big equipment. *Never work alone* with a chain saw. You should have someone nearby who can give you aid immediately if an accident occurs.

Before you begin felling and bucking timber, you should be experienced at chain saw use and maintenance, be physically fit to withstand the exertion, and have the required accessory tools and supplies. The protective clothing and equipment you will need are:

- hardhat (protective helmet)
- eye protection (screens, glasses, goggles)
- hearing protection (ear muffs or plugs)
- safety chaps (protects legs from thigh to ankle)
- gloves
- boots (caulked or hobnail boots are preferred)
- comfortable clothing (snug fitting, cuffless pants)
- first aid kit
- fire extinguisher
- axe (for pounding wedges and cleaning out the undercut)
- saw gas, bar oil, and lubrication for the tip of the bar
- wedges (plastic or aluminum)
- chain file with a handle and holder
- plumb line (a string with a weight at the end to provide a vertical line to determine the lean of the tree)
- peavey or chain (to work with hangups)

Proper felling and bucking can significantly add to or detract from the value you receive for your timber. Getting the most value from timber through bucking practices is covered in other publications (see "Suggested reading"). This publication is oriented to specific manual techniques of felling and bucking and not to maximizing returns through these practices.

However, you must be aware that felling directly influences subsequent skidding or yarding activities. If trees are felled *out-of-lead,* they may be difficult or impossible to get to the road. You should plan your falling patterns in advance of the felling activity (see figure 1).

Evaluating the conditions for felling

There are certain conditions that make it unsafe for nearly any woodland owner to cut timber.

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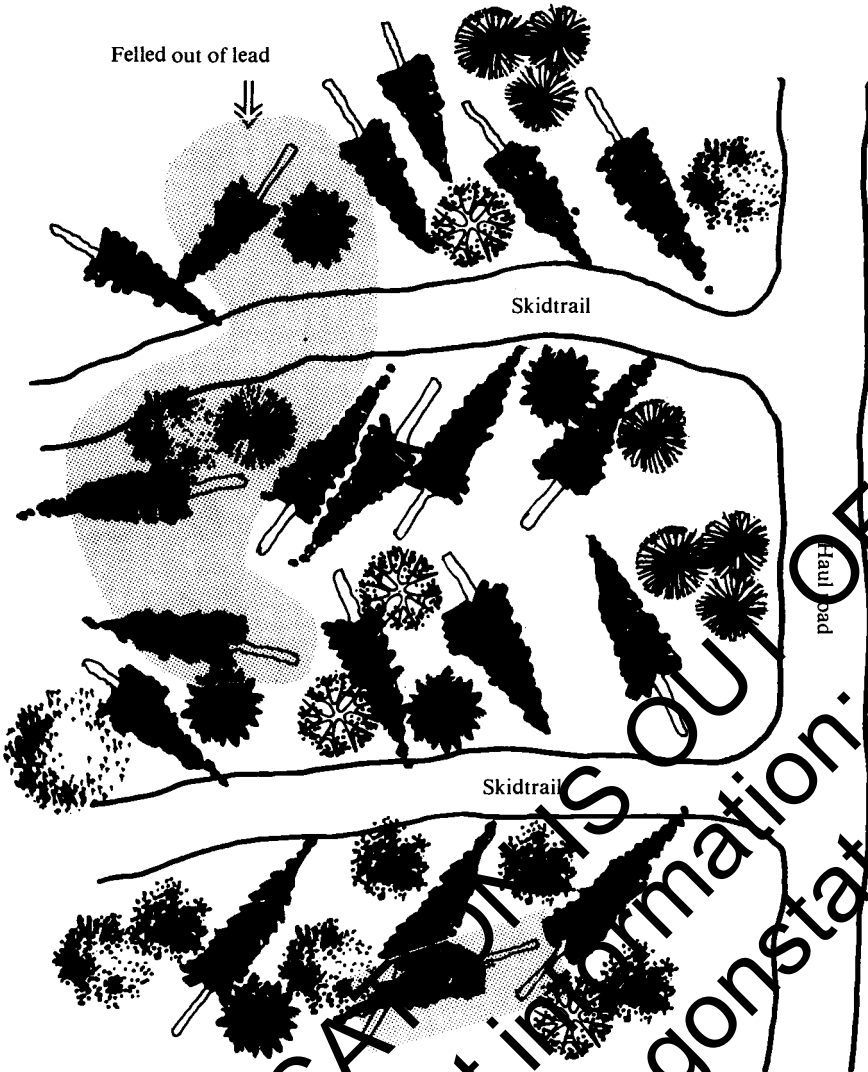


Figure 1.—*A planned felling pattern.*

Some are associated with the tree itself; others are associated with the weather and conditions on the site. You will have to determine the limits of your skills and seek help or stop felling timber when unsafe conditions exist.

Conditions around the tree. Wind, snow, and fog can make it dangerous to cut timber. A slight puff of wind may tip the tree in the wrong direction or cause problems at the stump. When the tops of the trees are moving at all, beginning cutters should not fell timber.

Fog hampers vision up into the tree, making evaluation of the lean difficult and obscuring loose limbs. If the direction-of-fall is not visible, someone may enter a danger area without being seen. Snow and ice may cause limbs to fall unexpectedly, as well as hamper vision.

At every tree to be felled, you should clear an escape path (perhaps two) at a 45° angle from a line projected backwards from the direction-of-fall (see figure 2). Because most felling accidents occur when the cutter remains within 25 feet of the stump, you should clear the escape path(s) at least that distance. The path should be free of brush and other obstacles so that you can drop the saw and walk quickly (or run if necessary) to a position in the clear.

Sometimes there are obstacles at the base of the tree that make a quick escape difficult or that require using the saw in awkward positions. While stumps are normally cut as low to the ground as practical, higher stumps may be needed to work around obstacles or provide a standing position for quick escape.

Beginning cutters should seek professional help if rocks, multiple stems growing from one stump, steep slopes and difficult terrain, or other obstacles hinder a quick escape. Professionals can minimize risks under circumstances that pose life-threatening conditions for beginners.

If you don't have a clear direction-of-fall, leave the tree standing until you can obtain help. Circumstances

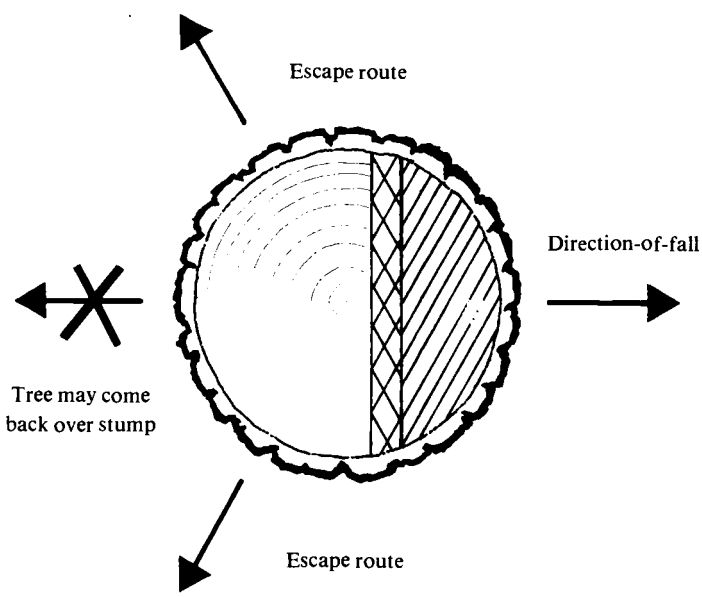


Figure 2.—*Escape paths*

requiring help might include: power lines or buildings in jeopardy, difficult terrain (steep slope with a tree leaning heavily uphill), trees that will cross roads, etc. Professionals can use cutting techniques, wedges, hydraulic rams, or lines to solve these problems.

You should arrange the cutting pattern for a clear-cut operation so that cutters are felling trees into the open area rather than into the timber. When standing timber is brushed by falling trees, limbs or tops may be knocked loose and either fly back toward the cutter, or hang dangerously overhead as *widowmakers.*

In thinning operations, fell trees to openings (remember to consider how they will be extracted during yarding), and give extra care to overhead hazards. Also, try to work up the hill and across the slope to minimize hazards from logs or trees sliding or rolling downslope toward the cutter.

Evaluating the tree itself. Trees that present special hazards to operations are termed *danger trees.* These typically require skills beyond those of a beginner. Snags (trees that have been dead for some time) often present problems—they may be rotten or have heavy, loose bark and limbs overhead, and they may react unpredictably when standard cutting techniques are used.

Heavy leaners may be danger trees. Trees with *pistol butts* are found on slumps and slides and can also occur when a seedling grows up next to an obstacle. This shape may require different cutting techniques.

Some trees, such as cedar or large hardwoods, may have brittle or rotten wood that requires different cutting techniques. Also, any tree that hangs up in another tree is a danger tree for beginners.

You should mark any tree that presents an immediate hazard with red-and-white candy-striped ribbon to warn others—and save it for professional help.

For trees you determine you can handle, the process of evaluation starts by determining the lean. You can find the amount of lean with a plumb line that you can make by hanging any small weight from a string (see figure 3). (A fishing weight on a string makes a good plumb line.)

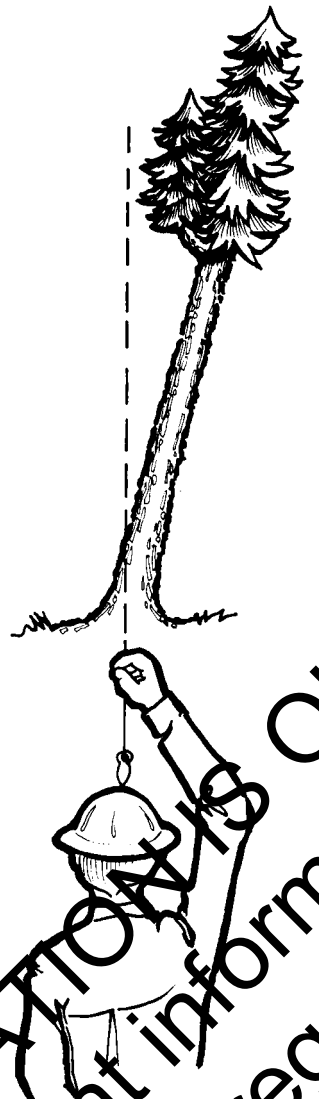


Figure 3.—*Determining the plumb line.*

Determine the direction the tree will fall naturally by looking at the lean from at least two sides of the tree. If the natural lean is in the chosen direction-of-fall, then you can use standard cutting techniques. If the natural lean is away from the direction-of-fall, you will need to use special cutting techniques.

Cutting a tree without evaluating the amount of lean is an invitation to disaster. The lean of each tree is unique; however, it has been observed that trees growing on slopes commonly lean downhill.

Another factor that influences where a tree will fall is the way its limbs grow. The *limb loading* from a large limb growing on one side of the tree can be enough to pull the tree out-of-lead as it falls. Cutting techniques can overcome limb loading as well as lean.

Another problem with limbs is that they may interlock with limbs of an adjacent tree, making it difficult to get the tree started to fall in the desired direction.

While looking upward at the lean and limb loading, look also for loose limbs hanging overhead (loose bark also can be a hazard). Snags and trees with overhead hazards are particularly dangerous because saw vibration or tree movement can bring these objects crashing down on you. When cutting these trees, an extra person should be available to keep an eye on the hazard while the cutter attends to making the proper saw cuts.

Evaluating a tree also requires that you determine if rot is present where the felling cuts are to be made. Controlling a tree during felling requires that you make the cuts in sound wood, or that you know the extent of rotten wood and compensate for it by leaving extra sound wood or by changing the direction-of-fall.

You can expect rot if a tree has been dead for some time or if fungal fruiting bodies (conks) are present. In addition, some tree species (hemlock, true firs, cedar, and some hardwoods) commonly have rot in the lower bole (tree trunk).

Boring the tree (sawing with the tip of the bar directly into the tree) is necessary to determine the location of rot near the area you intend to make felling cuts. With the bar of the saw in a vertical position, make boring cuts on the stump below this area. These cuts will not weaken the tree where the felling cuts are planned, especially if you make them vertically along the line in the direction-of-fall.

Sawdust from rotten wood is quite different from the uniform, white chips produced by sound wood. As an exercise, you could bore into some logs known to contain rotten wood to see the difference in the sawdust. Maintain firm saw control when boring because it is a prime situation for chain saw kickback.

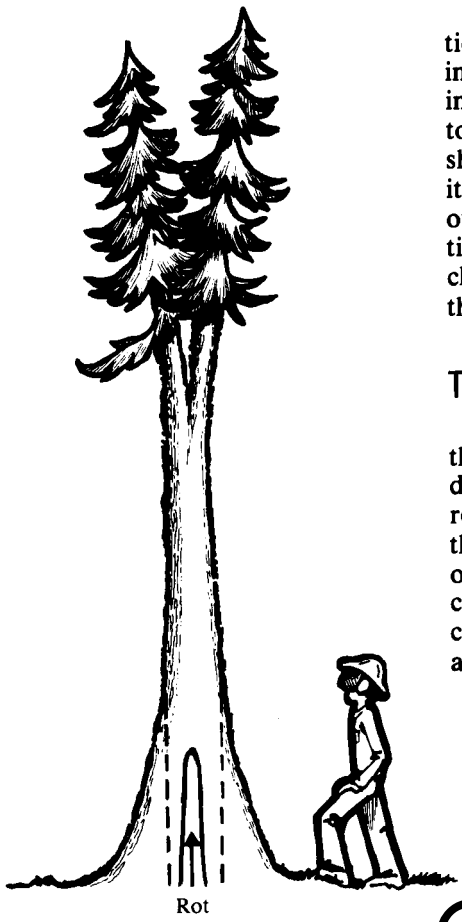


Figure 4.—*Problem trees*

Other factors that you should consider when evaluating the tree are shown in figure 4. Some trees have a characteristic butt swell at the base; you must make felling cuts far enough into the tree to reach the projection of the upper bole downward into the butt swell.

The tree may have other defects that might influence cutting, such as a point of weakness in the tree from snowbreak or rot, or a double trunk from an injury that produced two tops. Also, some types of trees have wood that is brittle rather than the stringy and strong fibers of young fir and pines.

Making use of the information. After evaluating the conditions around the tree and the tree itself, you can use the information to make the appropriate felling cuts. More importantly, the evaluation tells you if help is needed and what hazards to expect.

Experience at this kind of evaluation allows professional cutters to incorporate a large amount of information by looking over the tree to be felled. Beginning cutters should use a mental checklist of the items described above for each tree; overlooking a key piece of information could bring trouble. A summary checklist is presented at the end of this publication.

The face cut or undercut

The face cut or undercut provides the opening in the tree stem in the direction-of-fall. Enough wood is removed in the undercut to commit the tree to movement in the direction-of-fall. Three types of undercuts are commonly used depending on the circumstances (see figure 5a, b, and c).

The *conventional undercut* is probably the most familiar and the easiest for beginners to use.

The *Humboldt undercut* takes the wedge of wood out of the stump as opposed to the butt log.

The *step undercut* is most commonly used for very large trees—more than 48 inches in diameter.

Gunning the tree. Once you determine the direction-of-fall, make the first cut—a horizontal one, one-fifth to one-third of the tree's diameter (figure 5d). This cut is at right angles to the direction-of-fall.

Saws are usually built so that the cutter can *sight down the handle*, as if using a gun sight, to aim the tree in the direction-of-fall during the first cut. Saws with curved handles have a set of marks to use as sights to help assure that the cut is perpendicular to the direction-of-fall.

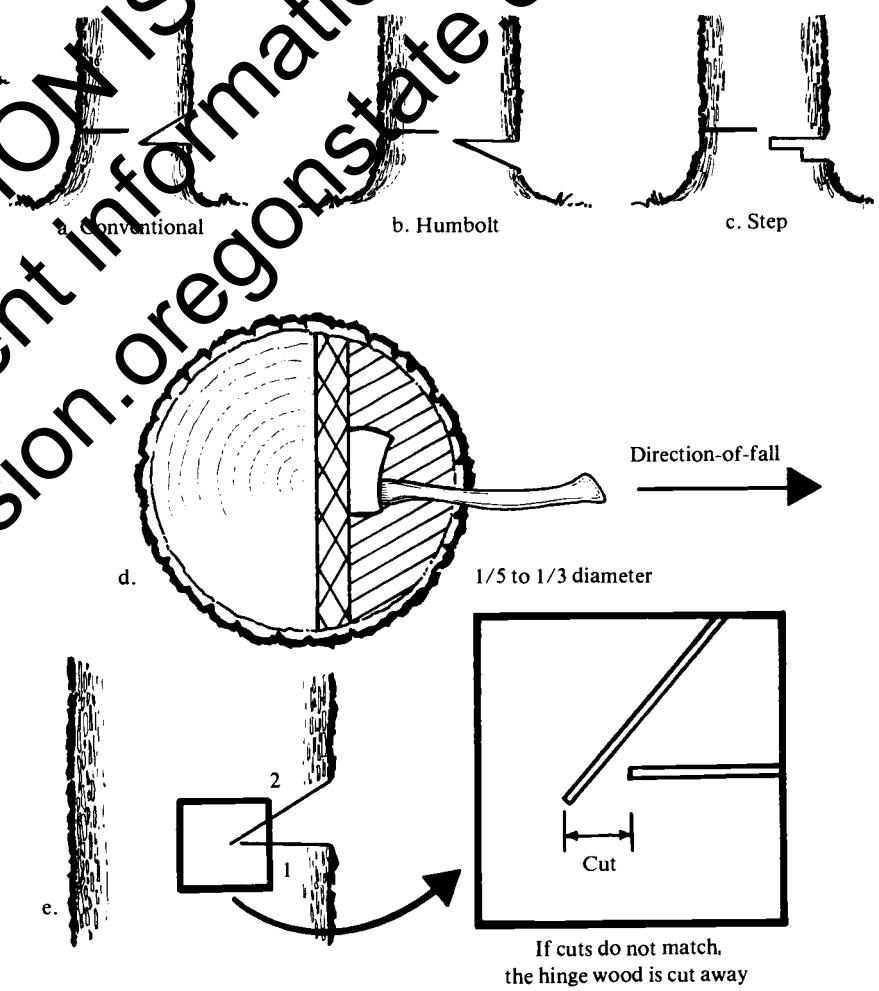


Figure 5.—*(a, b, and c) Types of undercuts; (d) the first cut using an axe to check direction-of-fall; and (e) matching the cuts.*

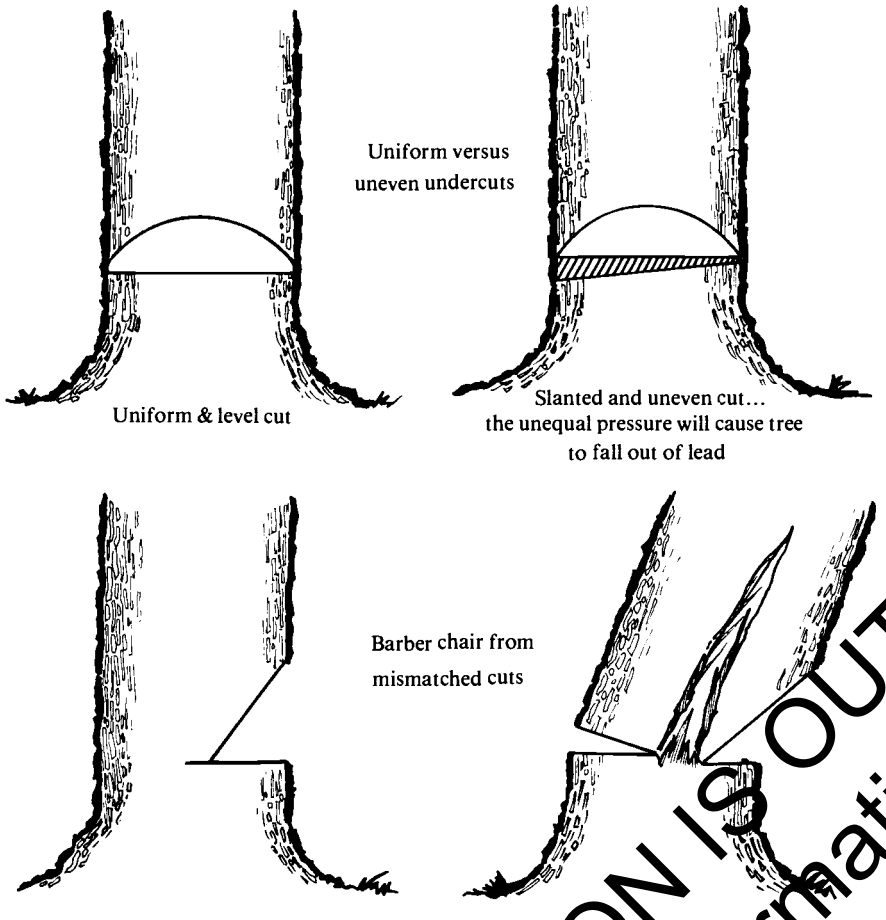


Figure 6.—*Missed cuts on the undercut.*

For a conventional undercut, align the next cut so that a wedge of wood is removed by meeting exactly the deepest point of the first horizontal cut. The vertical opening of the face cut in the direction-of-fall should be about one-fifth of the tree's diameter.

Matching the cuts. It is essential that the upper and lower cuts for the undercut match (figure 5e). As the tree goes over in the direction-of-fall, the undercut will close uniformly where these cuts meet.

If the cuts do not match, the force of the falling tree will be redirected as the face closes irregularly. The tree may not fall in the desired direction or it may *barber chair* (split up the middle as it falls). Figure 6 shows how the force of the falling tree is redirected when the undercut does not close uniformly.

Beginning cutters should have another person at the tree to help match these cuts and alert the cutter to make corrections. Once the cuts match you may still need to chop the wedge of wood out of the undercut.

Using an axe to clean it out will help provide a uniform closing line. With the wedge of wood removed, place the axe in the undercut and use it as a sighting device to recheck the direction-of-fall (figure 5d). If the face cut or undercut is not aligned with the direction-of-fall, there is no certainty that the tree will go in that direction. Make corrections in the undercut before beginning the back cut.

The back cut

The back cut is a horizontal cut made about two inches higher than the horizontal cut of the undercut. The back cut does not continue into the tree to match the undercut. A *hinge* of uncut wood is left to control the speed and direction-of-fall. The raised back cut leaves two inches of height on the stump and helps prevent the tree from coming back toward the cutter as it goes over (see figure 7).

Making the back cut. Before you make the back cut stop the saw and give a warning for the direction-of-fall: *down the hill, up the hill, across the hill,* as the case may be. Listen for a reply.

On straight, small trees make a single horizontal cut to the hinge. The width of the hinge should be enough to control the tree—usually 1 to 2 inches (figure 7).

Insert a falling wedge as soon as it is practical. The wedge will prevent the tree from sitting back on the saw (you can use a wedge as insurance for misjudging tree lean).

Make the back cut moderately fast so that the tree does not pull wood away from the stump or butt log. Also, once you have started, make the back cut before wind or gravity acts unpredictably on the tree.

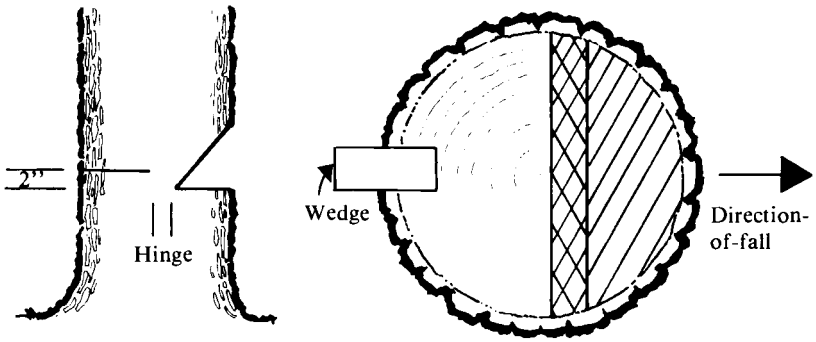
Take care to avoid cutting off the corners when making the back cut. Just as matching the undercut is critical, overcutting the back cut can change the direction-of-fall (see figure 8). A helper at the tree can watch the far side of the saw to make sure the back cut is progressing satisfactorily.

Series of cuts

On trees larger than the length of the saw bar, you can make a series of cuts for the back cut (see figure 9). These cuts preserve the strength in the tree until you make the final cut up to the hinge. You should insert a falling wedge as you make cut three.

Getting away from the tree

As you make the final back cuts, glance frequently up the tree for overhead hazards. When the tree starts to go over, remove the saw



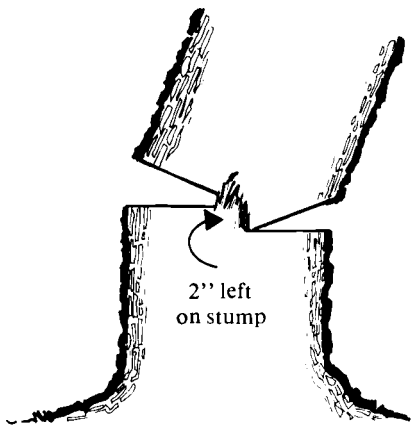


Figure 7.—*The back cut*

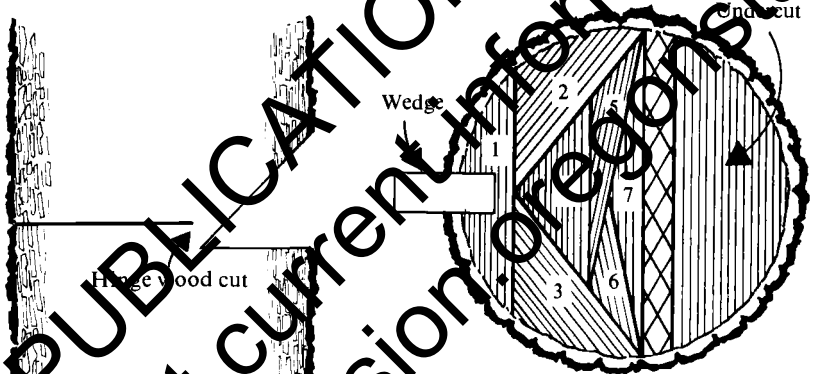


Figure 9.—*A series of seven cuts in the back cut is necessary for large trees.*

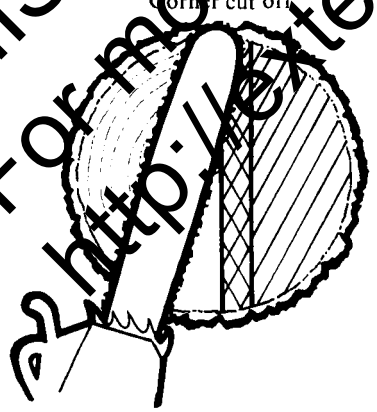


Figure 8.—*Missed cuts on the back cut.*

from the cut and proceed quickly along your escape path.

You can drop the saw (with the motor running) and retrieve it later when things settle down. You only have a few seconds to get *in the clear,* away from the tree. Get far enough away so that limbs knocked loose from adjacent trees won't fall on you. The time spent earlier clearing out one or more escape paths can be crucial if the tree does not fall according to your plan.

Problem trees

There are a number of problem trees that you can handle once you acquire basic skills. Just as a reminder, a careful evaluation should be your first step. If you need help, don't compound the problem by starting to cut the tree. Mark danger trees and leave them for professionals.

Multiple stems. Some trees have multiple stems growing from one stump. Usually, you must treat each stem as a single tree. Difficulties arise from the awkward cutting positions and the problem in determining a direction-of-fall.

Start with the outermost stems and fell them in the direction the stem is leaning. Watch out for overhead hazards as each stem is cut. You may need several escape paths to get in the clear.

Occasionally conifers will have double stems originating from a single stump. These trees are called *schoolmarms.* If the split occurs higher than you can reach with a saw, there is probably sufficient wood to hold the two stems together while you fell the tree as a single tree.

The direction-of-fall should be perpendicular to the horizontal long axis of the two stems (see figure 10). However, regardless of the height of the fork, cautiously examine the trunk for a well-defined vertical seam or scar indicating a separation of the two stems. In such cases, use the technique below to fell the stems separately.

If you can reach the split with a saw, you can fell the stems individually. Select the direction-of-fall and make the undercut. Then make the back cut leaving the appropriate hinge. You can make the back-cut with boring cuts.

If the seam between stems is weak, the stems may separate as you make the back cut. Otherwise, stand up and saw downward toward the back cut between the stems. Be prepared to move quickly to the

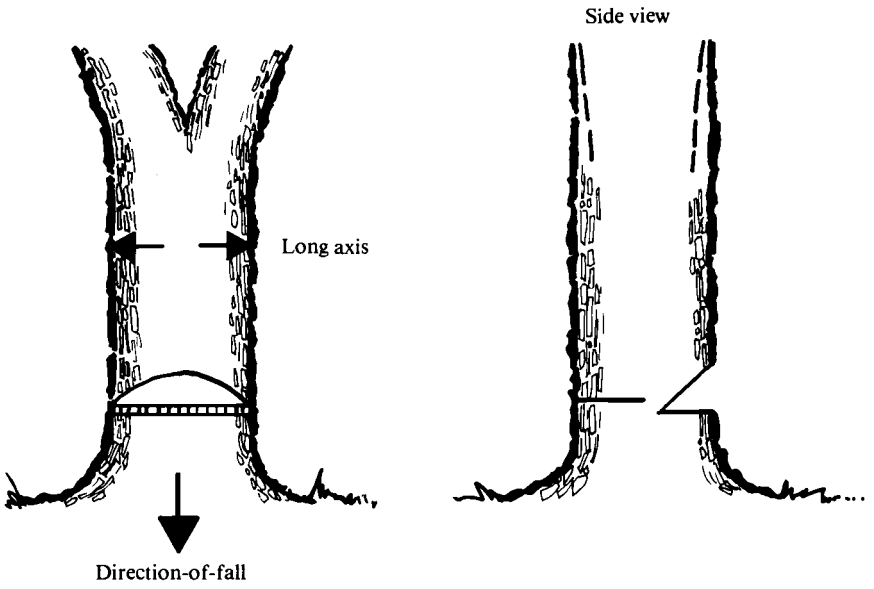


Figure 10.—*A tree with two stems (schoolmarm).*

clear. You can fell the remaining stem with the lean, or you can make corrections to pull the tree against the lean (see figure 11).

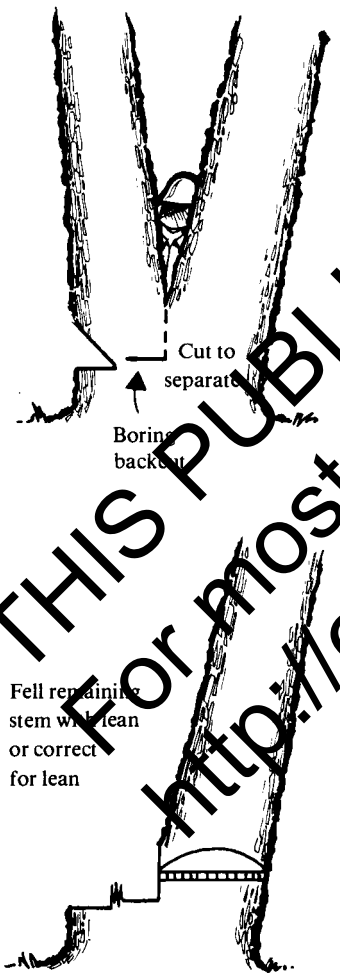


Figure 11.—*Felling two stems separately.*

Leaning trees. These present problems even for experienced cutters. Beginners should not attempt to fall trees that lean heavily.

Trees with moderate lean can be felled once basic skills are developed —a chain may be wrapped around the tree above the cuts to help prevent a barber chair situation.

Felling with the lean. You can fell trees most easily in the direction they lean. Start with a standard undercut —up to one-third the diameter of the stem. Take care to match the cuts. You can use three types of back cuts (see figure 12):

1. On small trees less than 12 inches d.b.h., you can use a standard back cut if you make the cut quickly. A substantial amount of hinge wood will break away quickly. Be ready to move to the clear. (See figure 12a.)
2. On larger trees with more lean, bore out the center of the back cut from the back cut side to reduce the potential for producing a barber chair (see figure 12b). Then make a quick back cut, using the remaining wood on either side of the center cut to act as hinge wood.
3. On large leaners make two side cuts and leave a center portion of wood to hold the tree. A quick back cut will cut part of the remaining wood while a substantial amount of wood will break away as the tree goes over. (See figure 12c.)

Correcting for moderate lean. Moderate lean may be overcome in felling with the use of *holding wood:* an extra amount of wood left on the hinge wood to "hold" the tree against the lean during falling (see figure 13).

Holding wood modifies the shape of the hinge so that more is left *opposite* the direction of lean; however, you must not cut through the hinge wood because a hinge is still necessary to control the rate of fall.

Felling against the lean. You can fell trees with a small amount of lean against the lean with wedges.

You will need a shallow undercut (1/5 the diameter of the tree) in the direction-of-fall (see figure 14) and a longer lever arm (distance from back of tree to the hinge wood) for the action of the wedges. Use the wedges to lift the tree upright, and then continue felling and wedging until the tree goes in the desired direction.

You will need sufficient wedges to alternate pounding them as you release pressure on one set and then the other.

On small trees, insert a wedge as soon as possible when you make the back cut. On larger trees start the back cut first so you can insert wedges before making the shallow undercut.

Progress slowly with the back cut, and alternate pounding the wedges in tight to lift the tree. You can place wedges on top of each other to get additional lift. Then continue backcutting until wedging straightens the tree.

You still need a hinge to control the tree, but as the wedging continues, you may need a narrower one. The amount of pressure on the wedges is a guide to whether more back cutting is needed. When back cutting is to the point where an adequate hinge is left, you can wedge the tree over.

Besides the actual amount of lean, other factors such as limb loading, the presence of rot, the tree's shape, and wind determine how the tree will fall. Wedges provide about 1 inch of lift if used properly.

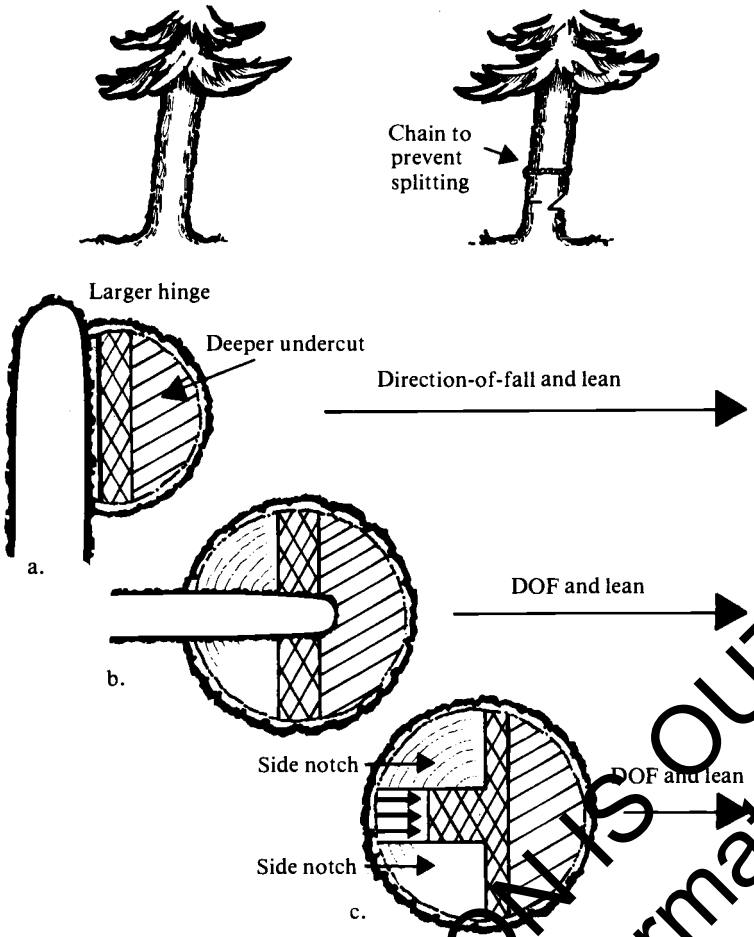


Figure 12.—*Felling with the lean using a chain, (a) a standard back cut, (b) a back cut with the center bored out, and (c) a side-notched back cut.*

Beginners should consider the maximum amount of lean that wedges can correct to be: 4 feet on a 50-foot tree; 7 feet on a 100-foot tree; and 10 feet on a 150-foot tree. This rough guideline applies to trees between 12 and 24 inches d.b.h.

Felling trees with more lean is possible up to a point with wedges, but this usually requires experts. They can use hydraulic rams or jacks, or they can use lines attached to the tree to pull it upright and then fell it in the proper direction. Considerable judgment gained from years of cutting experience is needed to fell some difficult trees against the lean.

Problems with hangups. Even experienced cutters create hangups occasionally. Hangups occur because the cut tree falls into standing trees. *Never cut the tree in which the first tree is hung up.* Often it may be only the limbs of adjacent trees that are holding the tree up—this is especially common in thinnings.

When a tree hangs up, the first step is to evaluate the situation from a safe location. Often the hangup will suddenly and unexpectedly break away limbs on its own!

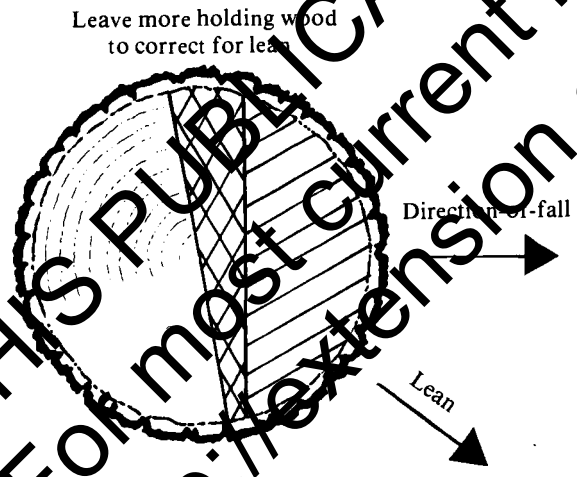


Figure 13.—*Correcting for moderate lean with holding wood.*

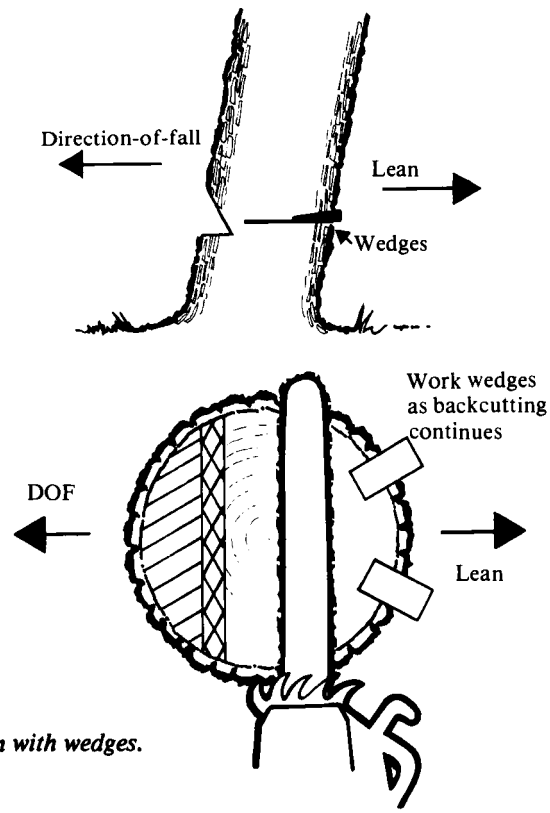


Figure 14.—*Felling against the lean with wedges.*

Three techniques are commonly used to get the tree to the ground (see figure 15). These are most effective on small trees (less than 18 inches in diameter). If these are not successful, mark the hangup with red-and-white candy-striped ribbon. Then use lines from a machine to pull it down or seek an experienced cutter's services.

1. *Cutting the tree off the stump.* Sometimes you can clear the hangup if you cut away the lower portion of the stump and cut the tree off the stump. Cut away the portion of the stump below the undercut and then cut the remaining holding wood. If the impact doesn't clear the hangup, you can use a peavey or similar tool (a hardwood stick and chain) to roll the tree to break off limbs. Stand where the trunk won't fall on you and watch what the hangup is doing in the tree.
2. *Cutting away the butt.* Making a cut part way up the butt of the tree may clear the hangup. First, make a shallow V-shaped cut on the top of the tree (see "Bucking"), then make a cut from the bottom. It may require two or more of these sequences to get the tree clear. Between each of these sequences, try to roll the tree clear if possible (described in number 1).
3. *Felling another tree into the hangup.* There are times when an adjacent tree may be felled into the hangup to clear it. The tree should hit the hangup with sufficient force to break either the tree or the obstacle. If the original hangup causes another tree to be hung up, use lines from machines or get an experienced cutter. Do not compound a safety problem by building a teepee of hung trees. Mark the hangups and get help.

Bucking

Bucking involves cutting the tree into lengths specified by mill requirements. Besides the techniques described in this publication, you must be concerned with making square cuts, measuring the lengths correctly (including adding the required trim), cutting out defects, and maximizing log value.

Before explaining bucking techniques, a better understanding of chain saw kickback is needed.

Kickback. This is the sudden, uncontrolled movement of the saw toward the operator. The cutting power of the saw is transferred into a sharp movement of the saw backwards. For a variety of reasons the saw chain fails to cut the wood and the saw's horsepower propels the saw rearward. The causes of kickback include:

- a poorly maintained chain (depth gauges are too high);
- a pinched saw bar and chain;
- the nose of the bar encountering an obstacle (a limb, another log, etc.) at an angle that makes cutting difficult; and
- cutting from green wood into dead wood.

The power of even small chain saws is more than a person can handle if kickback occurs unexpectedly.

Figure 16 shows the critical angles on the nose of the bar that make

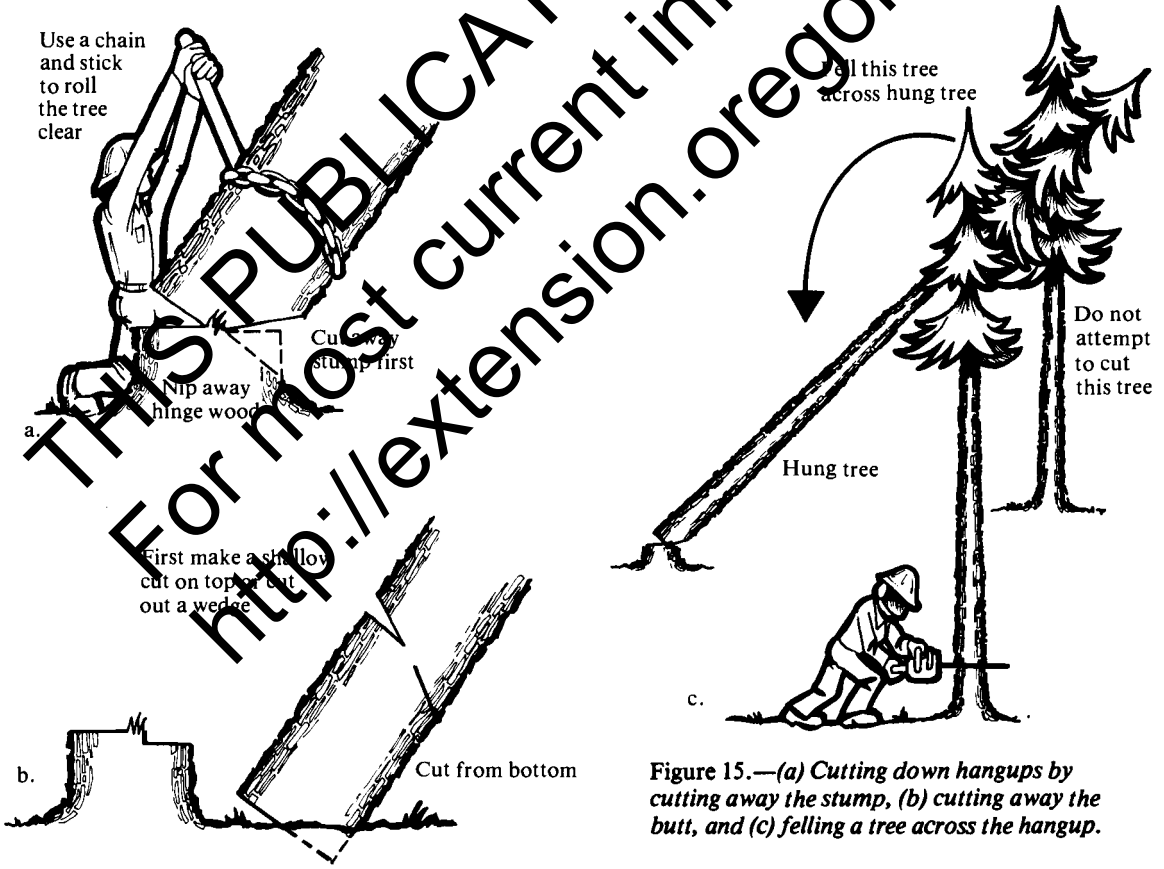


Figure 15.—*(a) Cutting down hangups by cutting away the stump, (b) cutting away the butt, and (c) felling a tree across the hangup.*

cutting difficult. If the nose of the bar hits an obstacle on the lower portion of the rounded nose, the saw will kick up and back into the operator. If the top of the rounded nose hits an obstacle, the saw will kick down and back.

Nearly half of the 125,000 chain saw accidents last year were caused by kickback. Many of them might have been prevented by more knowledgeable saw users. The best prevention measure is proper use of the saw that avoids kickback:

- Maintain control of the saw with good footing and a solid, two-handed grip.
- Know where the tip of the bar is at all times.
- Anticipate kickback situations—like when you are making a boring cut. Bore at an angle upward or downward rather than straight into the log.
- Maintain the saw's chain brake if it has one; however, do not depend on its chain-stopping feature alone: use proper working positions with a firm grip on the saw. File the chain according to the manual's directions. (Improved bar designs and antikickback chain are worth investigating.)

Cut the compression wood first! Any bucking situation deserves the same careful evaluation as does felling. Your first step is determining the direction the bucked segments will move after cutting.

The way the log will move depends on how gravity and tension wood interact. Compression wood and tension wood are shown in figure 17. Compression wood is on the inside of a curved or bent piece of wood; the forces are pushing the wood fibers together. Tension wood is on the outside of the curve; forces are pulling at the wood fibers.

The rule in bucking is, *Cut the compression wood first.* Cut the tension wood last, and the cut piece will move in the direction of tension unless overcome by gravity.

Several examples of small logs where two cuts will suffice are shown in figure 18. The first cut is only deep enough to cut some of the compression wood without pinching the saw. The second cut releases the tension wood.

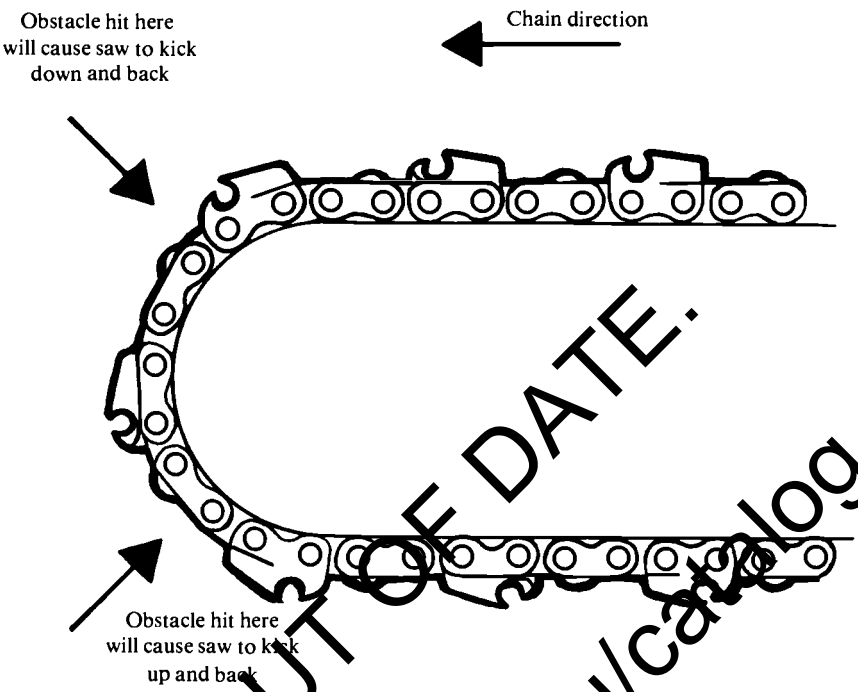


Figure 16.—*Critical angles on the tip of the saw bar.*

Because it is not always possible to evaluate correctly where the compression and tension wood are located, you should have an axe and wedges available to open up a pinched cut or chop out a dull saw. The terms *top bind* and *bottom bind* also indicate the location of the compression wood.

The concept of cutting compression wood first is illustrated in a series of cuts in figure 19. In large timber, a number of cuts are made to reduce the amount of wood left for applying the principle. In each of these examples, the final cut is cutting tension wood. A portion of the wood frequently breaks away as the tension wood is cut.

The same principles apply to trees lying in a *horizontal bind,* except that you must cut from a safe position (see figure 20). Also, you must make the final cuts from the uphill side of logs on a slope where rolling might occur.

Other bucking situations. Several other situations are commonly encountered during bucking. Logs supported throughout their length on a slope may have end pressure (see figure 21.). The upper log may

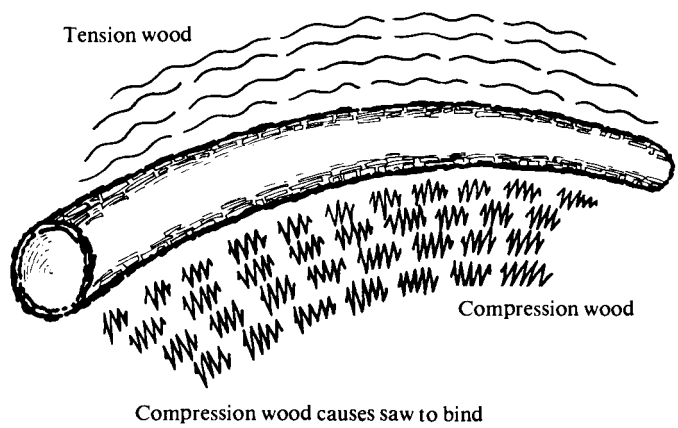


Figure 17.—*Compression and tension wood*

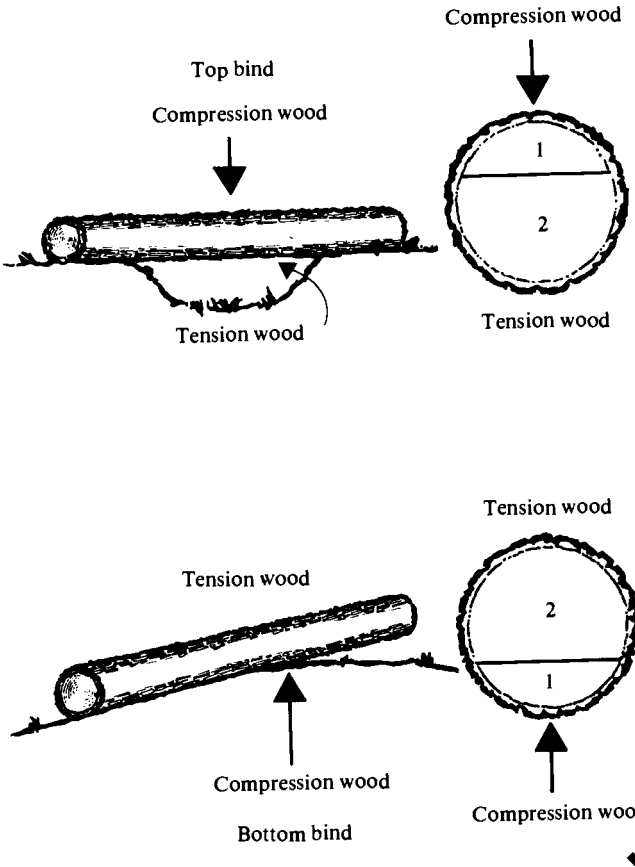


Figure 18.—*Determining top bind and bottom bind for bucking small logs.*

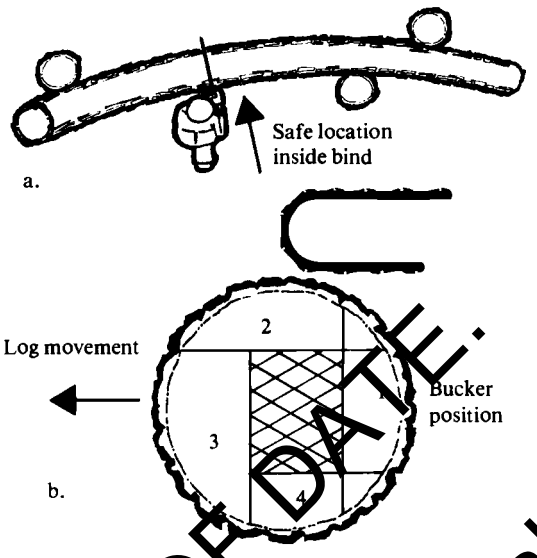


Figure 20.—*(a) The top view of a tree lying in horizontal bind, and (b) the series of cuts necessary to reach the tension wood.*

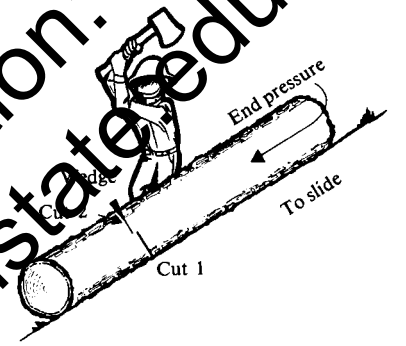


Figure 21.—*Bucking with end pressure.*

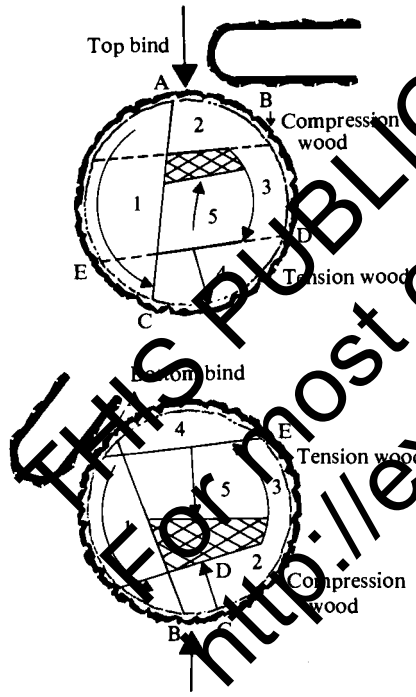


Figure 19.—*Multiple cuts in large material.*

slide downhill when you make the cuts.

Bucking these logs requires two cuts—make the first cut offset and uphill on the lower half of the log, and make the second cut downhill on the upper half of the log. A wedge can help keep the upper cut open. If the logs do not separate, mark them as a warning to those doing the skidding or yarding.

Windfalls are bucking problems, not only because they are hard to evaluate, but because the rootwad may act unpredictably as it is cut away. Underground, bent roots apply pressure to upright the rootwad. In the process, it may roll onto the bucker, or the log may react unpredictably. Awkward positions for bucking may also present special problems.

Another problem exists when limbs supporting the log cannot be removed prior to bucking. Unfortunately, no simple solutions fit all situations. The best advice is to spend time analyzing the likely movement of the log.

Limbing

Removing limbs from trees appears relatively simple; however, the significant number of accidents that occur during the limbing activity refute this simplicity. Limbs under pressure need to be evaluated for the location of compression and tension wood (see figure 22).

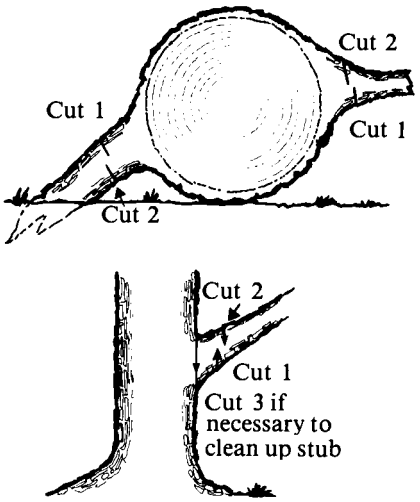


Figure 22.—*Cut limbs by cutting compression wood first as shown (top) on a log with limbs, and (bottom) on a standing tree.*

Limbing often requires working in awkward positions. Unsure footing makes moving from one limbing position to another especially dangerous. The safest way to proceed is to move to the next position while the saw bar is on the far side of the log from the cutter. Injuries often occur to the legs when they are unprotected by safety chaps.

Predicting how the limbs will move after cutting is still another problem. You will gain experience through cautious trial and error.

Summary checklist

Considering the number of ideas that fallers and bucklers must remember and use in their work, a checklist is a necessity. Eventually the checklist becomes a set of mental habits, but beginning cutters need explicit reminders (consider making a pocket card checklist for your use).

1. *Prepare to do the job safely.*
   - Personal protective gear?
   - Tools and supplies?
   - Saw and chain maintained?
2. *Evaluate the conditions for cutting.*
   - Weather?
   - Escape routes and cutting positions; is kickback possible?
   - Do you have a falling pattern to follow?
3. *Evaluate the tree and determine the direction-of-fall.*
   - Did you plumb the tree, determine lean, and limb loading?
   - Is rot present?
   - Is this a danger tree to be left for a more experienced cutter?
4. *Make the undercut.*
   - Are the cuts level? Do the cuts match up? Is the face cleaned out?
   - Does the undercut face the direction-of-fall?
   - Is it the proper depth?
5. *Make the back cut.*
   - Shout out a warning and listen for replies.
   - Put in wedges as needed.
   - Make the back cut 2 inches higher than the undercut.
   - Don't cut off the holding wood.
   - Leave a hinge to control the fall.
6. *Move to safety and watch for overhead hazards.*
   - Do you need help to clear a hangup?
   - Are broken limbs left hanging as hazards in adjacent trees?
7. *Evaluate the limbs before limbing.*
8. *Determine if the bucking cut can be made safely.*
   - Determine compression wood, tension wood, and the way the bucked pieces will move.
   - Buck from the uphill side.
9. *Never work alone!*

Felling and bucking timber is inherently dangerous. Only the proper use of safety equipment and cutting techniques can make the process safer. This publication identifies procedures the beginning cutter needs to think about during the learning process. Practice and guidance from an experienced cutter can provide additional skills.

Suggested reading

Your chain saw owner's manual.

and

- Conway, Steve, *Timber Cutting Practices*, 2nd edition (San Francisco: Miller-Freeman Publications, 1978).

Dent, D. Douglas, *Professional Timber Falling: A Procedural Approach* (Portland, Ore.: Ryder Printing, 1974).

Faller's and Bucker's Handbook, Worker's Compensation Board of British Columbia (Vancouver, 1973).

Sarna, R. P., *Chain Saw Manual* (Danville, Ill.: The Interstate, 1979).

This publication *was prepared by John J. Garland, Extension timber harvesting specialist, Oregon State University. It is one of a series of publications being developed as an Extension* Woodland Workbook. *Your county Extension forestry agent has additional information.*

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