Felling Trees

Felling trees for the Forest Service requires training and certification. You must receive training and certification before attempting to cut a standing tree. Size up the tree and develop a cutting plan, as explained in the "Using the Forest Service Cutting Process" section earlier in this chapter. Focus on the complexity (lean, tension, compression, defects, or damage) of the tree and not its size. The complexity of small trees is harder to identify, often making them more dangerous to fell than big trees.

This manual focuses on how to use an ax, but a saw can make the job of felling trees easier and safer, especially for novice axmen. This section covers the use of an ax in conjunction with a crosscut saw. While people often use an ax as a standalone tool, it is actually a companion tool to a crosscut saw. When you use a crosscut saw, you should also use the appropriate ax and felling or bucking wedges. The five-step process from the "Using the Forest Service Cutting Process" section earlier in this chapter comes into play here.

"As a scout, you are the guardian of the woods. A scout never damages a tree by hacking it with his knife or axe. It does not take long to fell a tree, but it takes many years to grow one, so a scout cuts down a tree for a good reason only, not just for the sake of using his axe. For every tree felled, two should be planted."

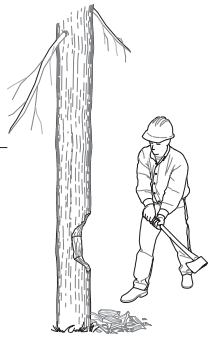
—Lord Baden-Powell

Sizing Up and Analyzing the Tree

Felling a tree begins with thoroughly sizing up and analyzing the tree, and identifying its dangers. There may be hidden dangers, such as rot inside the tree. Keep in mind that not all dangers are in the tree itself. Take into account the topography in the area as well as the wind and weather conditions. Do not attempt to cut trees that have complexities beyond your ability to mitigate. If you have any doubt about your ability to fell a tree safely, walk away or seek the help of a more experienced feller.

To determine the lean of a tree, plumb the tree from the intended lay and 90 degrees off the intended lay. Stand far enough away from the base so that you can see the tree's entire height. A tree can have more than one lean. Many timber fellers use a plumb bob and string to judge lean, but you can also use an ax. Loosely hold the ax by the knob of the handle with the head pointing down. The ax becomes a straightedge that helps you determine the lean of the tree.

The poster "Visual Danger Tree Indicators" <https://www.fs.fed.us/t-d/php/library_card.php?p_num=1167%202M13> (figure 11–36) can help you identify the main hazards a tree may contain. You can order printed copies of the poster by contacting the National Technology and Development Program at 406–329–3900.



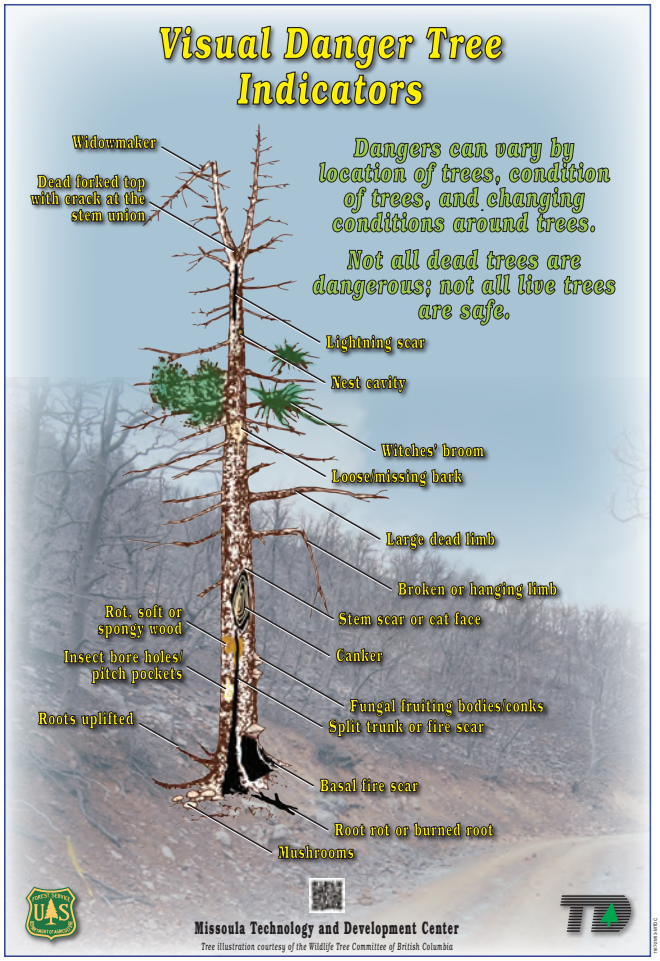


Figure 11–36—The "Visual Danger Tree Indicators" poster.

Every tree has a safe and an unsafe side. Position yourself and plan your cutting activities to take place on the safe side of the tree. Do not put yourself at unnecessary risk, and do not position yourself under the lean of the tree or any overhead hazards that may fall on you.

Once you thoroughly analyze the tree and determine the direction of fall, plan your escape paths. Escape paths should not be located in front of the tree or behind the tree, but diagonally a safe distance away from the tree or to a place of cover (figure 11–37). Before you begin to cut, clear everything from the escape paths that could cause you to trip, fall, or that might otherwise hinder your escape.

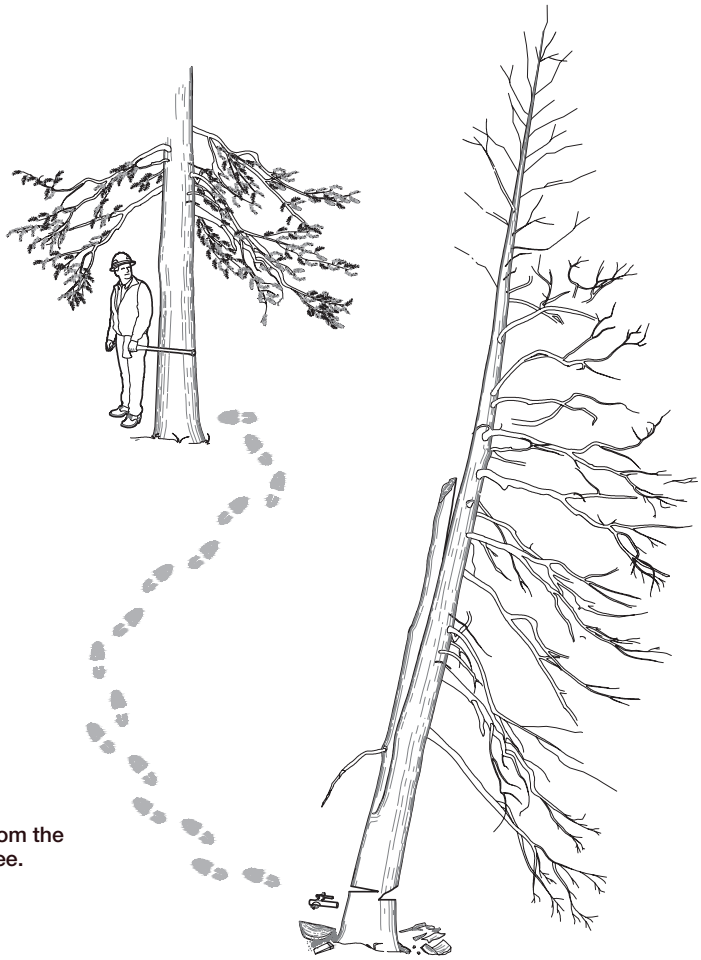


Figure 11–37—An escape path at an angle away from the back of a falling tree, but not directly behind the tree.

With the escape paths cleared, examine the site where you will chop. Ensure that you have good footing and that the area is clear for swinging an ax. Remember, even a small twig can deflect the blow of an ax, causing it to change direction midswing.

Never attempt to fell a tree against its lean when you only use an ax. Be wary of trees with a heavy lean; they are more likely to split lengthwise up the stem during felling. This is known as a "barber chair" (figure 11–38). Barber chairs are extremely dangerous because a portion of the tree may split off and could come back and strike you as you chop. Some tree species are more prone to barber chair. Learn the characteristics of the types of wood you cut. Wood species and their characteristics vary from region to region.

Aside from heavy leaners and the characteristics of certain tree species, an improperly aligned undercut (also known as a "Dutchman") is another common cause for a tree to barber chair (figure 11–39).

Figure 11–38—A tree split lengthwise up the stem during felling, known as a "barber chair."

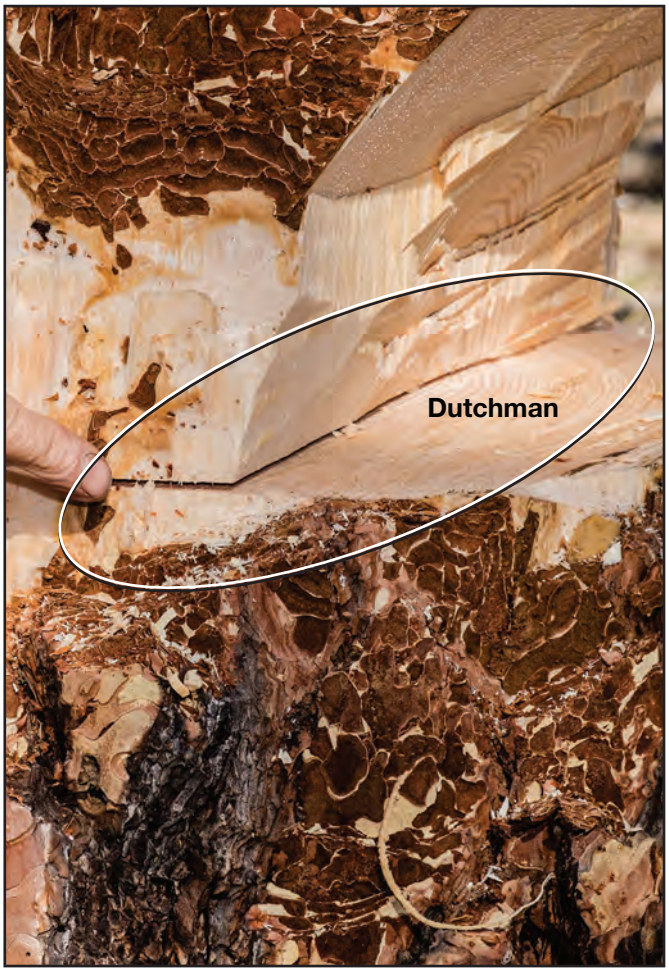


Figure 11–39—An undercut with a "Dutchman."

The intersection of the horizontal and the sloping cuts must line up exactly (figure 11–40). If the cuts do not line up, the tree could barber chair as it begins to fall. If you create a Dutchman in your undercut, correct it with an ax or saw before starting the back cut. The following section, "Making the Initial Cuts," provides information about undercuts and back cuts.

Felling a tree in a direction away from its lean or compensating for its lean typically involves the use of wedges placed in the saw kerf or back cut. The inability to use standard wedging techniques when felling with only an ax makes it very difficult, even for experienced fellers, to manipulate a tree away from its natural direction of fall. There are techniques to accomplish this, such as the use of cables to provide directional tension and some complicated wedging or leveraging systems, but these techniques are best left to highly skilled and specially trained fellers.

If there is another tree in the intended direction of fall that could cause your tree to hang up, you may need to fell that tree first. Trees that hang up can be extremely dangerous. They require special training to remove safely.

Because felling trees is one of the most dangerous tasks in the Forest Service, the information given here serves as a baseline for fellers to understand the general principles of cutting down trees. With every swing of an ax or pull of a saw, you change the dynamics and the forces of a standing tree until your actions bring the tree to the ground. If you do not fully understand the forces at play, do not cut the tree. The same applies to bucking downed logs, which can often be more hazardous than felling standing trees.

Green trees are generally safer than dead trees to work around and fell, but all trees can pose hidden dangers. The nature of green wood allows you to manipulate it more easily. Dead wood can be stiff and brittle. Be especially wary of dead and defective trees, trees that are broken, and trees that show signs of rot, insects, or nesting cavities. Check to ensure the tree is sound by thumping it with the poll of the ax. Check from several different positions around the base of the tree. If the tree sounds hollow, it may be rotten. Keep in mind that not every green tree is safe and not every dead tree is immediately dangerous.

Figure 11–40—An undercut where the sloping and horizontal cuts line up perfectly.

A tree must have solid wood for the hinge. The hinge controls the fall. Once you break or sever the hinge (figure 11–41), the tree is no longer attached to the stump and you are no longer in control. Before the hinge breaks, your goal is to commit the tree to the direction in which you intend it to fall. Ideally, the hinge breaks when the undercut closes. A shallow-angle undercut closes sooner than a wider-angle undercut (here we are talking about the angle of the undercut and not its depth). Rotten wood makes a weak or nonexistent hinge. A tree should have a minimum of 30 percent solid wood to cut. Do not cut it if it does not have 30 percent solid wood. An increment bore is ideal for determining the solidity of the wood, but most axmen don't carry one into the woods. Many experienced axmen sound a tree using the poll end of a single-bit ax. If the tree sounds hollow, they do not cut the tree.

Storm- or fire-damaged trees pose unique and often hidden dangers. Every log may have multiple binds with varying degrees of tension and compression that pose challenges for both bucking and felling activities.

Figure 11–41—Two stumps showing a hinge. The stump to the right was cut with a crosscut saw and ax combination. The stump below was cut with an ax alone.

Making the Initial Cuts

The initial cut in the tree is the undercut (figure 11–42). Make your cut so that the tree falls in the direction you intend. If you only use an ax to fell, your typical undercut is about one-half of the tree's diameter. Your cuts should be at a 45-degree angle and should form a large, horizontal "V" (also known as a "bird's mouth"). If you use a crosscut saw to fell, your typical undercut is about one quarter of the tree's diameter. When you use an ax and a crosscut saw, make the 45-degree sloping cut using the ax and a flat, horizontal cut with the crosscut saw.

Once you make the undercut, you can use a double-bit ax to judge the direction of fall. Place the ax head in the cut and sight down the handle (figure 11–43). The handle points in the direction of fall. A single-bit ax usually does not work for this type of sighting because the handle is typically curved.

Figure 11–42—Making a 45-degree sloping cut with an ax. Note the horizontal crosscut saw cut.

Figure 11–43—Sighting down an ax handle to determine the direction of fall.

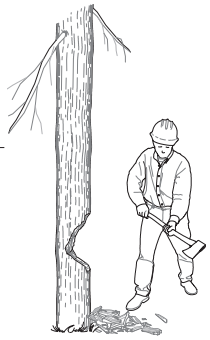
Perform the back cut on the opposite side of the tree (figure 11–44). It is very important not to cut all the way through the tree. Leave a strip of wood to serve as a hinge. As noted earlier, the hinge controls the direction of fall. The thickness of the hinge varies, depending on the size of the tree. Big trees require more hinge and smaller trees require less hinge. The tree can fall in any direction if you cut through the hinge.

Felling With a Crosscut Saw and Ax

Felling a tree with a crosscut saw and ax allows you to adjust your cuts easily and increases safety. Using a crosscut saw and ax also allows you to use conventional wedging techniques to assist with felling. If the tree has a dedicated lean, wedging may not be necessary to commit a tree to a direction of fall. However, a wedge placed lightly in the kerf (figure 11–45) will fall out once the tree starts to move. This serves as a visual indicator that the tree is beginning to fall.

Figure 11–44—Performing a back cut on a tree using a crosscut saw.

Figure 11–45—Placing a wedge lightly in the kerf of the tree will help alert you when the tree begins to fall.



Felling techniques when using an ax and crosscut saw together are essentially the same as when using an ax alone. Use the crosscut saw to make a horizontal undercut about one quarter the diameter of the tree and use the ax to make a sloping cut that meets up with the horizontal cut.

Use the crosscut saw to make the back cut 2 inches above the undercut. This helps prevent the tree from sliding back across the stump as it falls. Use wedges to prevent the tree from sitting down on top of the saw while cutting. Again, be sure to leave a hinge in place to help guide the tree to the ground.

Make your cuts at a comfortable height for you. Cutting too high on the stump leaves less wood in the log, but cutting too low may make it more difficult to chop and saw.

Using an ax and crosscut saw to fell a tree provides unique insight into the felling process that may elude chain saw users. The chain saw cuts fast. While a sawyer using a chain saw can power through wood fibers that would cause a crosscut saw to bind, a sawyer using an ax and crosscut saw may need to apply more finesse. When using an ax and crosscut saw, the sawyer spends more time identifying the tension and compression of a tree before cutting. Taking the time to evaluate a tree's dynamics makes the process of cutting down a tree safer.

The University of Montana's School of Extended and Lifelong Learning provides the online interactive training course "The Crosscut Sawyer" <http://www.campusce.net/umextended/course/course.aspx?c=335> for people who want to learn more about using crosscut saws. This course helps Forest Service employees and volunteers to prepare for a crosscut saw training and certification course.

As a Tree Begins to Fall

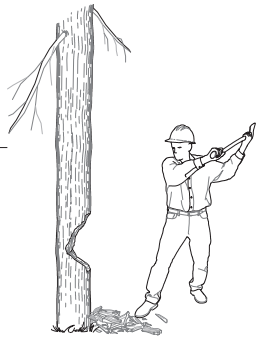
As you chop or saw, look up frequently to watch for signs of movement or for hidden hazards that you may have overlooked. You will notice movement in the treetop first when the tree is close to falling. Step away from the base of the tree into your escape path, look up for falling debris, and watch the tree as it commits to its direction of fall. Be aware of hazards that may result from the tree you cut striking other trees on the way down, or when the tree hits the ground. While some people may, the author would never turn his back on a falling tree. Remember that most injuries and fatalities that occur during the felling process happen within 10 feet of the stump.

"Cutting" by Claire Leighton. —*Collection of the Illinois State Museum. Courtesy of the Fine Arts Program, Public Buildings Service, U.S. General Services Administration. Commissioned through the New Deal Art Projects*

Crosscut Saw Variations

Be aware of crosscut saw variations. As with axes, not all crosscut saws are intended for the same types of work. There are felling and bucking saws (figure 11–46), as well as different tooth patterns for cutting different types of wood. Generally, felling saws are more flexible and have a concave back while bucking saws are heavier, stiffer, and have a straight back. Felling saws typically have one hole in each end to accommodate the handle. Bucking saws typically have two holes in each end for the handle. The two holes in each end of the saw provide a pivot point to make it easier for a sawyer to cut in different positions and to apply cutting force to different points on the log.

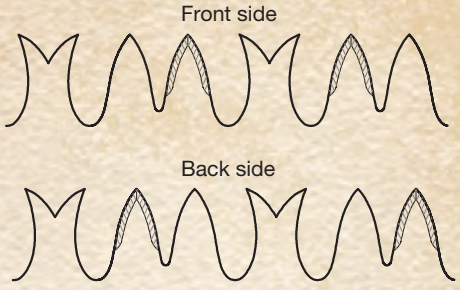
Figure 11–46—A felling saw (top) and a bucking saw (bottom).



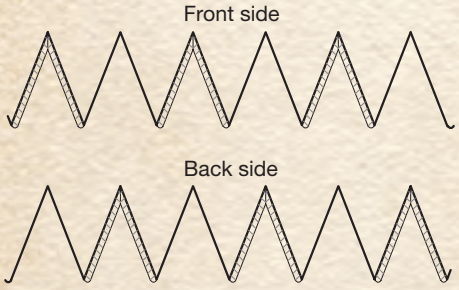
Crosscut Saw Variations (continued)

Generally, saws with four cutting teeth per raker are better for cutting softer wood while saws with two cutting teeth per raker are better for cutting hard or frozen wood (figure 11–47).

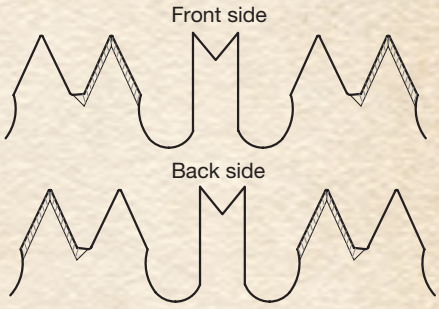
Figure 11–47—Crosscut saw tooth patterns.



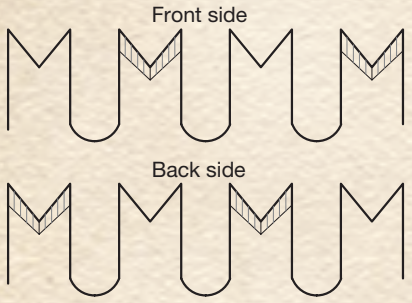
Champion Tooth



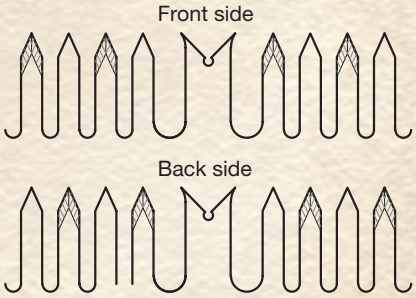
Plain Tooth



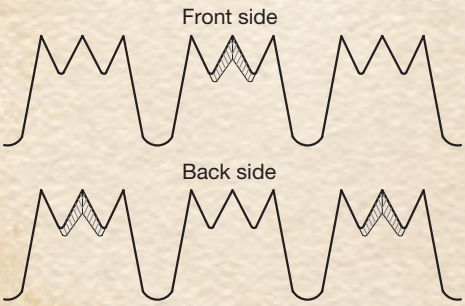
Tuttle Tooth



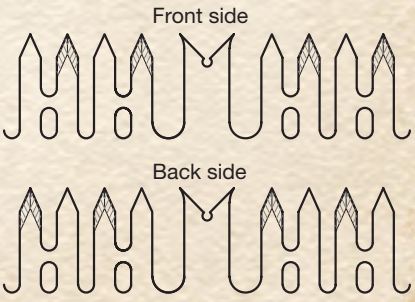
M Tooth



Lance Tooth



Great American Tooth



Perforated Lance Tooth

Crosscut Saw Variations (continued)

Good crosscut saw handles can be more difficult to find than a good crosscut saw. Most sawyers prefer the western handle pattern, which provides added protection for hands and knuckles. Be aware that some handles are designed for bucking and others for felling (figure 11–48). Bucking handles traditionally have a longer wooden shaft, while felling handles have a shorter wooden shaft. The shorter shaft on felling handles is a safety measure. Typically, you pull the saw parallel to your body while bucking and pull the saw horizontally toward your body while felling. The short shaft of a felling handle prevents the handle from catching on clothes or suspenders while cutting and allows you to keep the power of your stroke in line with the saw. The longer shaft of the bucking handle allows you to adjust your hand position to apply force on different parts of the log.

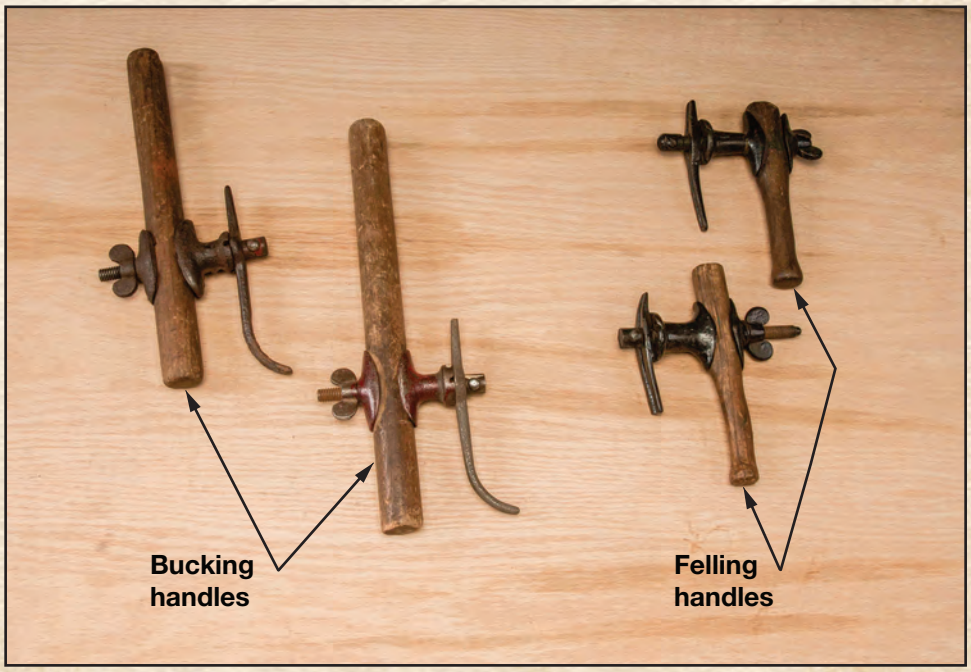


Figure 11–48—Crosscut saw felling and bucking handles.

When using an ax and crosscut saw, it is best to use your ax to clear away the bark from the area you intend to cut (figure 11–49). The bark of a tree holds dirt, which can quickly dull a crosscut saw. Clearing the bark helps keep the saw sharp and cutting well. A sharp, well-tuned crosscut saw is easy to use. Sharpening a crosscut saw is time consuming; it is an art unto itself.

The publication "Saws That Sing: A Guide to Using Crosscut Saws" (0423–2822P–MTDC) <http://www.fs.fed.us/t-d/php/library_card.php?p_num=0423%202822P> provides detailed information about using crosscut saws.

The publication "Chain Saw and Crosscut Saw Training Course, Student's Guidebook" (0667–2805–MTDC) <https://www.fs.fed.us/t-d/php/library_card.php?p_num=0667%202805> provides detailed information about Forest Service chain saw and crosscut saw training.

Simply reviewing instructional materials about felling, bucking, and the use of saws is insufficient. Proper training requires classroom instruction and field exercises led by certified trainers.

Wedges

Wedges are useful for felling trees and for bucking logs when using a saw. Sawyers typically use an ax to drive the wedges. There are different types of wedges for different purposes. Wedges can make felling and bucking easier and safer. Do not underestimate the importance of this simple, basic tool.

Most wedges today are made of hard plastic (figure 11–50). Some plastic wedges contain a steel insert in the end cap. The steel provides better durability while the plastic body absorbs the shock, preventing damage to the poll of the ax. It is against Forest Service policy to use wooden wedges because they have a tendency to split. Wooden wedges also tend to be

Figure 11–49—Clearing bark from an area on a tree before using a crosscut saw.

thicker and do not easily fit in a kerf. The Forest Service allows the use of steel wedges (figure 11–51), but the wedges must be in good condition. Be aware that a steel wedge can damage an ax or saw, whereas a plastic wedge will not.

Figure 11–50—Plastic felling wedges.

Figure 11–51—A steel wedge (top) and a wooden wedge (bottom).

Some companies make aluminum wedges (figure 11–52) that are acceptable because the softer metal does not damage an ax or saw. Never use a broken or damaged wedge, especially if the back edge is mushroomed (figure 11–53). Mushroomed pieces can break off and cause injury. Wedges come with smooth, textured, or ridged surfaces (figure 11–54). Wedges with smooth surfaces are easier to drive, while wedges with textured or ridged surfaces provide friction that helps to hold the wedges in place.

Figure 11–52—Aluminum wedges.

Figure 11–53—Mushroomed and damaged felling wedges.

Figure 11–54—A wedge with a ridged surface.

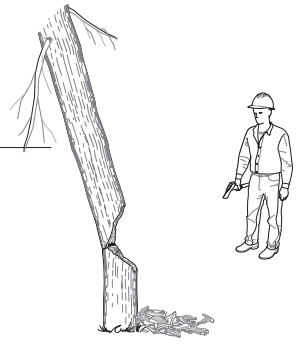
Wedges come in different lengths. Make sure to use a wedge that is appropriate for the size of the wood you cut. You may not be able to drive a long wedge deep enough into a small tree to provide the lifting power you need, and you may run up against the back of your saw.

Felling and Bucking Wedges

Felling wedges are tapered on one side and flat on the other side, giving them lifting power. Bucking wedges have a double taper, meaning they taper on both sides. They are better for keeping the kerf open when cutting a downed log in two. The forces on bucking wedges spread out equally between the two sides as you drive the wedge in, preventing the saw blade from binding or pinching.

Felling Wedges

Felling wedges generally have a gentle taper. If they taper too much, they create resistance when you drive them into the kerf. Felling wedges are either single taper, double taper, or triple taper on one side only. Single-taper wedges are easier to drive because they have a lower profile. Double- and triple-taper wedges can provide better lifting capacity. Double- and triple-taper wedges are similar to single-taper wedges, but their tapers increase around the middle of the wedge. Be careful not to confuse the taper of felling and bucking wedges. Felling wedges are always flat on one side to provide lifting power when felling trees, whereas bucking wedges taper on both sides to keep a kerf open while cutting a downed log into segments. You place the flat side of the felling wedge on the bottom of the kerf with the tapered side facing up to lift the tree.



Using a Felling Wedge With a Crosscut Saw

Wedges lift a tree so the tree falls into the undercut. They also prevent the tree from sitting back on the crosscut saw and pinching the blade. When you set the wedge lightly into the back cut, it drops out when the tree starts to move (see figure 11–45). When felling a tree, the sawyer should watch the top of the tree and the back cut for any indication that the tree is moving or about to fall.

Properly placing wedges can have a major effect on the direction a tree falls, but understanding the gravitational dynamics involved requires special training. Do not attempt to fell a tree against its natural lean without proper training.

Bucking Wedges

Use bucking wedges to keep the kerf of a log open while you cut the log (figure 11–55). An 8-inch, double-taper wedge is a good general purpose wedge for most bucking situations. An open kerf is important for preventing a crosscut saw from being pinched, stuck, or possibly bent. Bucking wedges may be made of softer material than felling wedges because bucking wedges do not endure the extreme forces and compression that felling wedges do. Many people use felling wedges for both felling and bucking.

Using a Bucking Wedge with a Crosscut Saw

Drive the bucking wedge into the kerf as soon as the saw allows it. Reset the wedge as necessary to keep the kerf open and the saw running freely.

Figure 11–55—Using a wedge to hold a kerf open on a log.

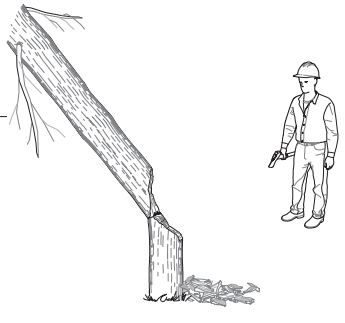
Holding Wedges

A holding or hanging wedge is another type of specialized wedge used for bucking. People also refer to these types of wedges as tie wedges. Drive these smaller, thinner wedges across the kerf of the log you are bucking. The wedge holds the log in place and keeps it from shifting or twisting as you cut it. These wedges have an eyehole near the top where you could link two wedges together with a lanyard. Sawyers typically use these wedges in pairs and drive them into the log across the kerf at the 10 o'clock and 2 o'clock positions.

It is difficult to find holding wedges today. Newly manufactured holding wedges are made of aluminum and may be too thick to penetrate deeply across the kerf of a dry log. You can sand or grind the sides of holding wedges to create a thinner profile for wedges that are too thick.

Vintage holding wedges (figure 11–56) have the proper thickness for driving across the kerf of a log that you are bucking, but they are made of steel and the tops of the wedges roll or mushroom after repeated use. Rolled or mushroomed ax polls or wedges can be dangerous. Do not use them.

Figure 11–56—Newly manufactured aluminum holding wedges (foreground) tend to be thicker than vintage holding wedges (background).



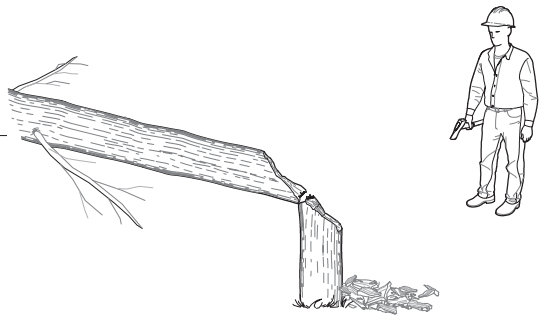
When bucking, a sawyer drives holding wedges (connected by a lanyard) horizontally across the kerf. The sawyer uses the poll end of a single-bit ax to drive the wedges. The sawyer then sinks the ax in the section of log that will not move after the log is cut and places the lanyard connecting the wedges over the back of the lodged ax head (figure 11–57). As the sawyer continues to cut and the end of the log drops away, the wedges remain on the lodged ax head (figure 11–58). This prevents the wedges from dropping and possibly damaging the saw.

Figure 11–57—Driving wedges into a log (left). Note the lanyard placed over the back of the ax head (below).

Splitting wedges (figure 11–59) are thick, heavy, metal wedges for splitting wood. The "Splitting Wood" section later in this chapter provides information about splitting wedges.

Figure 11–58—With the lanyard connecting the wedges over the back of the lodged ax head, the wedges remain fixed on the log after the cut end of the log drops away.

Figure 11–59—Splitting wedges.



Moving the Wood

A little preplanning can make moving a log after chopping or sawing safer and easier. You may need to first cut other logs and brush, or move obstacles that would prevent you from moving the log you plan to cut.

Spring Poles

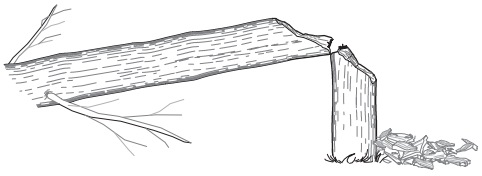
Be careful around spring poles (figure 11–60)—bent branches or small saplings held in place by a downed log. They can be under considerable tension and may release with tremendous force. Cut any spring poles before cutting the log that holds them in place. A series of small cuts on the underside (compressed side) of the spring pole releases the tension and reduces or eliminates its ability to spring up.

Figure 11–60—A spring pole.

If the log is partially or totally elevated off the ground, determine where it will fall after you cut it. Make sure that it will not dislodge or strike other material that could injure you. Correctly identify any areas of tension or compression and the types of binds you may encounter.

If you need to move the log after you cut it, place smaller logs or poles beneath the log (figure 11–61) and use them to roll or skid the log out of the way.

Figure 11–61—Using poles to roll or skid a cut log out of the way.



Log carriers (figures 11–62 and 11–63) provide a convenient way for two people to move and place a log if the log is not too large or heavy. A log carrier has two swinging, hooked tongs suspended from a stout pole. The two people secure the tongs to the log to lift and move it. More people can use two or more log carriers to move larger logs.

The log carrier is a useful tool, but people must provide the muscle to lift the log. Understanding and using mechanical advantage to increase leverage enables people to move heavier pieces of wood while reducing back strain and potential injury.

Figure 11–62—A log carrier designed for two people.

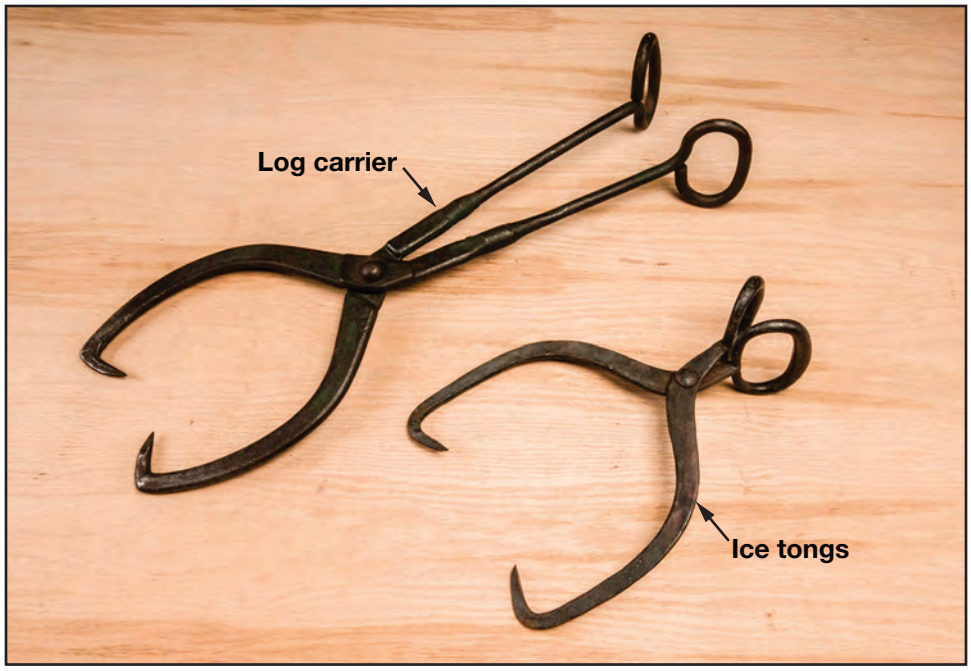


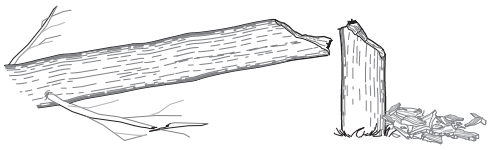
Figure 11–63—Tools used for carrying logs. Note that the "log carrier" on the right is actually a set of ice tongs.

A lever is the most common type of mechanical advantage for moving cut logs. A stout pole may provide enough leverage (figure 11–64), or you can use a cant hook (figure 11–65) or peavey.

A cant hook has a straight handle with a metal end cap and a swinging, hooked arm. The end cap typically has short dogs (teeth) to hold the log while the swinging, hooked arm grips the log. The long handle provides leverage. A peavey is similar to a cant hook, but it has a spike instead of an end cap (figure 11–66).

Figure 11–64—Using a lever to move a log.

Figure 11–65—Using a cant hook to move a log.



Cant hooks and peaveys typically have hardwood handles that range from 30 to 66 inches, though some have smaller handles for moving logs in close quarters, such as a sawmill.

Lightweight pickaroons or hookaroons (figure 11–67), commonly found in a sawmill or log yard, are useful for rolling or moving logs. The tools look almost identical and serve the same purpose, but pickaroons tend to have a straighter tang, similar to a pick, and hookaroons have a small hook or nub at the end of the tang.

Rigging and specialized equipment provide other methods for moving logs. The publication "Rigging for Trail Work: Principles, Techniques, and Lessons from the Backcountry" provides information about some of these methods. "Handtools for Trail Work: 2005 Edition" (0523–2810P–MTDC) <http://www.fs.fed.us/t-d/php/library_card.php?p_num=0523%2028 10P> provides excellent information about handtools Forest Service employees use for trail maintenance and construction.

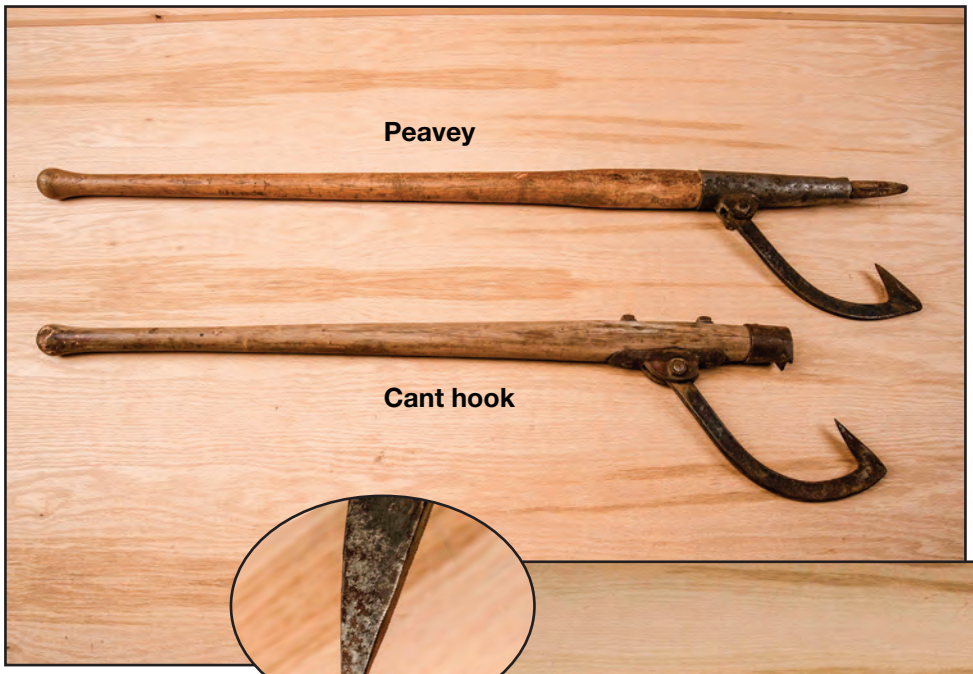


Figure 11–66—A peavey and cant hook. Note the spike on the peavey and the dogs (teeth) on the cant hook.

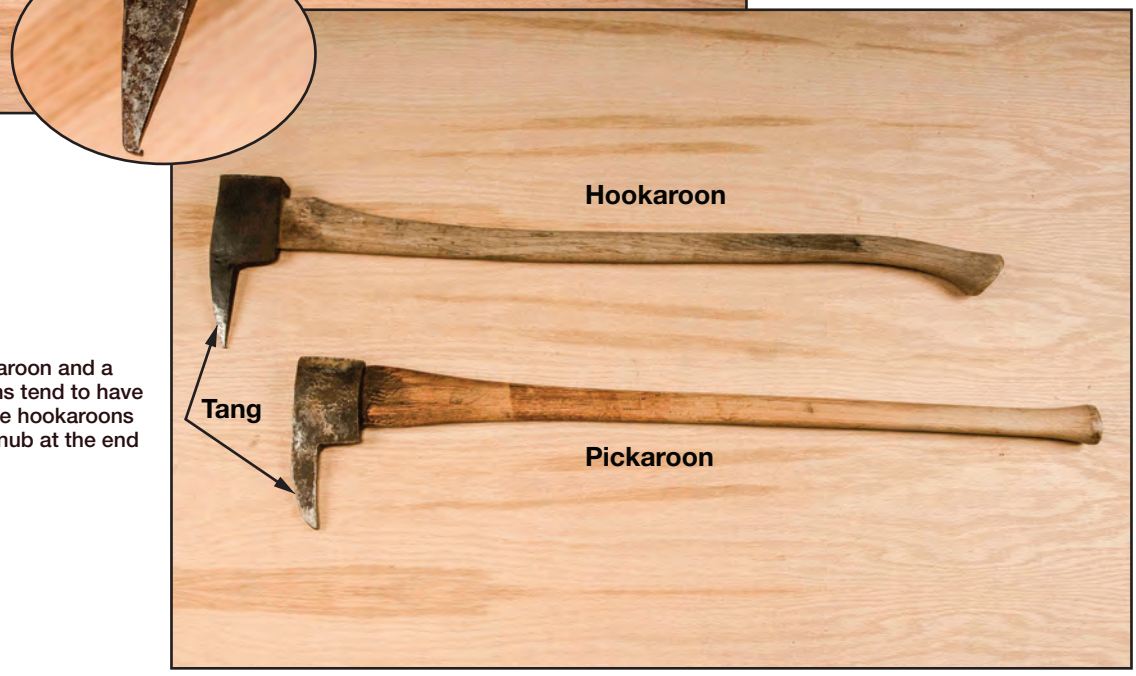


Figure 11–67—A pickaroon and a hookaroon. Pickaroons tend to have a straighter tang, while hookaroons have a small hook or nub at the end of the tang (inset).

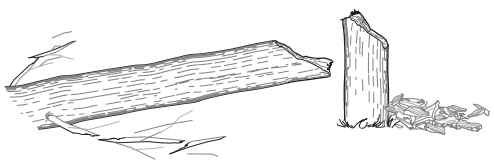
Splitting Wood

Chopping wood is the function of an ax. Splitting wood is the function of a maul and wedge (figure 11–68). You can split wood with an ax, but if you have large rounds or knotty wood, a maul and wedge are the proper tools to use.

Whichever tools you use, pay close attention to the grain of the round you split. Splitting, as the name implies, is when the split follows the grain. Chopping is done perpendicular to the grain. Some woods have curly or twisting grain, making them difficult to split. Other woods have straight grain, making them easy to split. If possible, avoid knots by splitting around them.

The ax you use for felling or bucking may not be the best ax for splitting. The ideal ax for splitting is a large, heavy, single-bit ax with a long handle. A hardened poll, such as the poll on a rafting-pattern ax (see figure 5–3), is the best choice for driving a splitting wedge. Remember, most axes do not have a hardened poll, and driving a steel wedge can damage the poll.

Figure 11–68—A maul and splitting wedges.



The Soft Sides of a Double-bit Ax

Do not use the side of a double-bit ax to drive wedges (figure 11–69). The sides of a double-bit ax are softer than the cutting edges and you could damage the ax or break the handle.

Figure 11–69—Driving wedges with a double-bit ax can damage the sides of the ax head.

When splitting wood, the cutting edge of an ax head should be sharp, and the sides should be thicker. This enables the ax to have greater splitting action once the cutting edge penetrates the wood. The longer handle enables you to generate more speed as you swing the ax.

For field use, the author uses a 4½-pound ax head on a 27-inch handle for chopping and a 5¾-pound head on a 44-inch handle for splitting rounds of firewood (figure 11–70). The long handle on the splitting ax makes the ax difficult to control for felling or bucking, but makes it ideal for splitting rounds of firewood.

A true splitting ax is different from a chopping ax. The splitting ax is heavier and often wider, causing greater wood separation through wedging action. Some manufacturers make modern splitting ax blades with small wings that spread the wood out during the strike and cause greater displacement (figure 11–71). Splitting axes, particularly ones with longer handles, do not make efficient chopping axes. The extra weight and longer handle often make them unwieldy, especially for horizontal strokes.

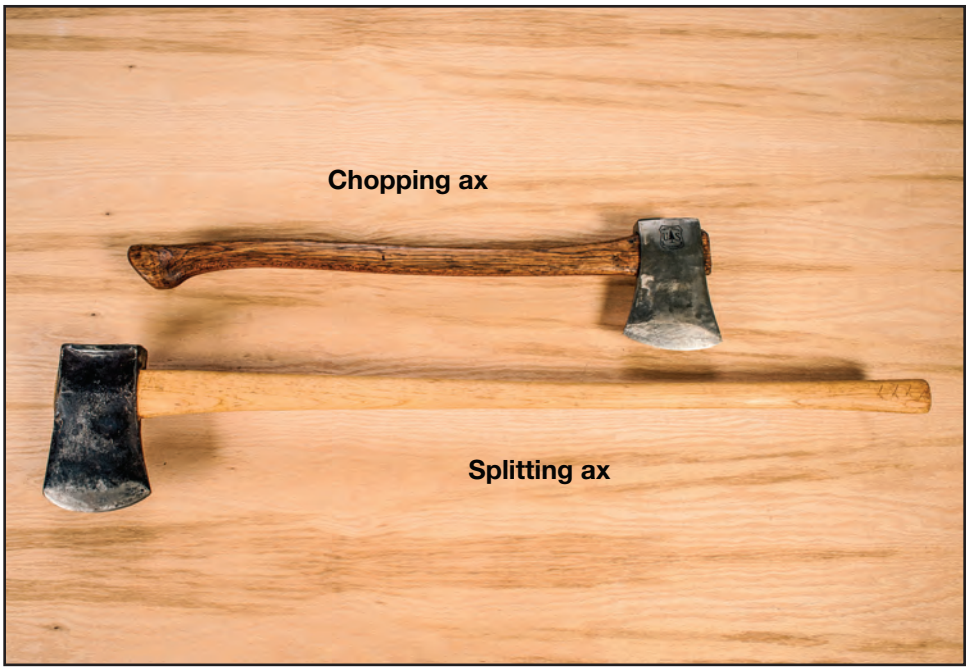


Figure 11–70—A 4½-pound Arvika 5-Star ax head on a 27-inch handle (top) and a 5¾-pound American Axe and Tool Company ax head on a 44-inch handle (bottom).

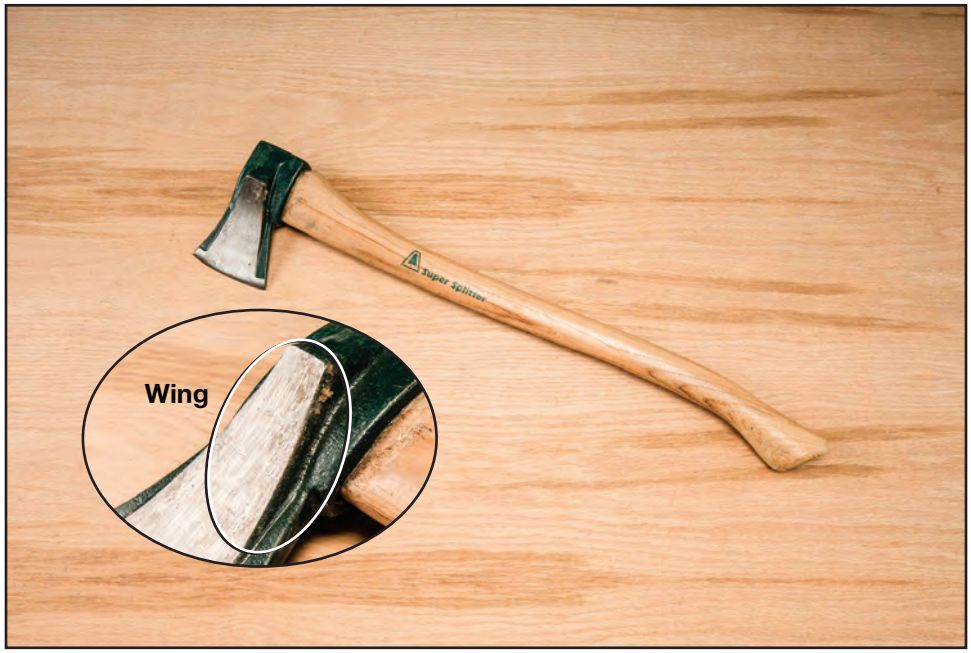
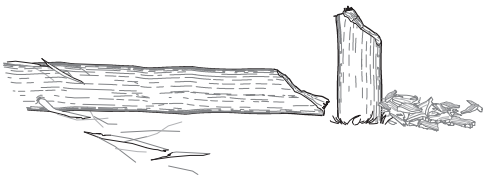


Figure 11–71—A modern splitting ax with wings that help spread and split the log. The inset shows a closeup of one wing.



If you split a round of wood with flat ends, place it on level ground, on another round, or on a chopping block. Take advantage of any splits or checks (natural cracks) in the wood; these provide easy points for splitting the round into pieces (figure 11–72). When splitting, flick or twist your wrist slightly as the ax strikes to help split the wood (figure 11–73). Keep in mind that flicking your wrist causes side torque on the handle that could potentially break it, especially if the handle is already damaged.

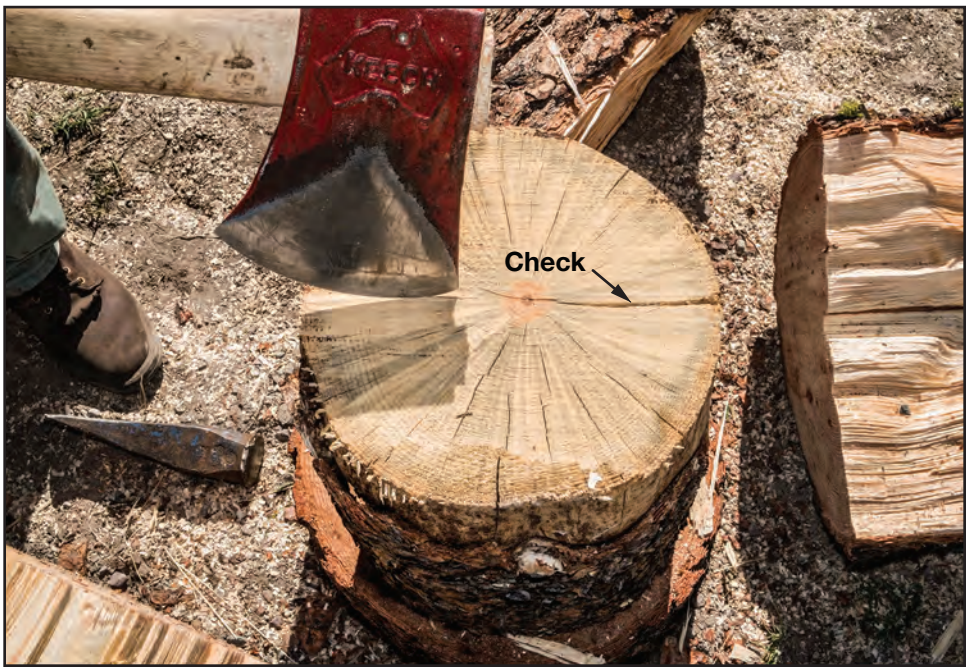


Figure 11–72—Use splits or checks in the wood when splitting a round of wood with an ax.

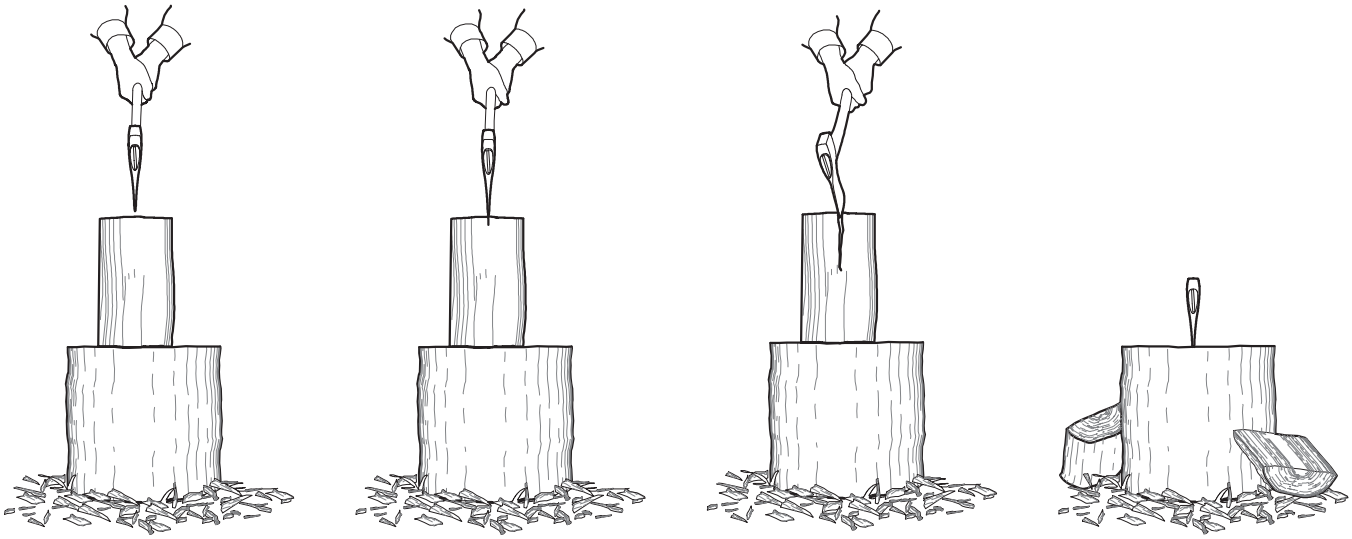


Figure 11–73—Flicking or twisting the wrist slightly as the ax strikes helps to split the wood.

If the ax sticks in the round of wood, be careful not to apply too much continuous force trying to free it. Applying too much continuous force may result in a broken ax handle.

To free an ax that is stuck, first bump or push the handle down and then up, repeating the processs until the ax starts to move, as shown in figure 11–74.

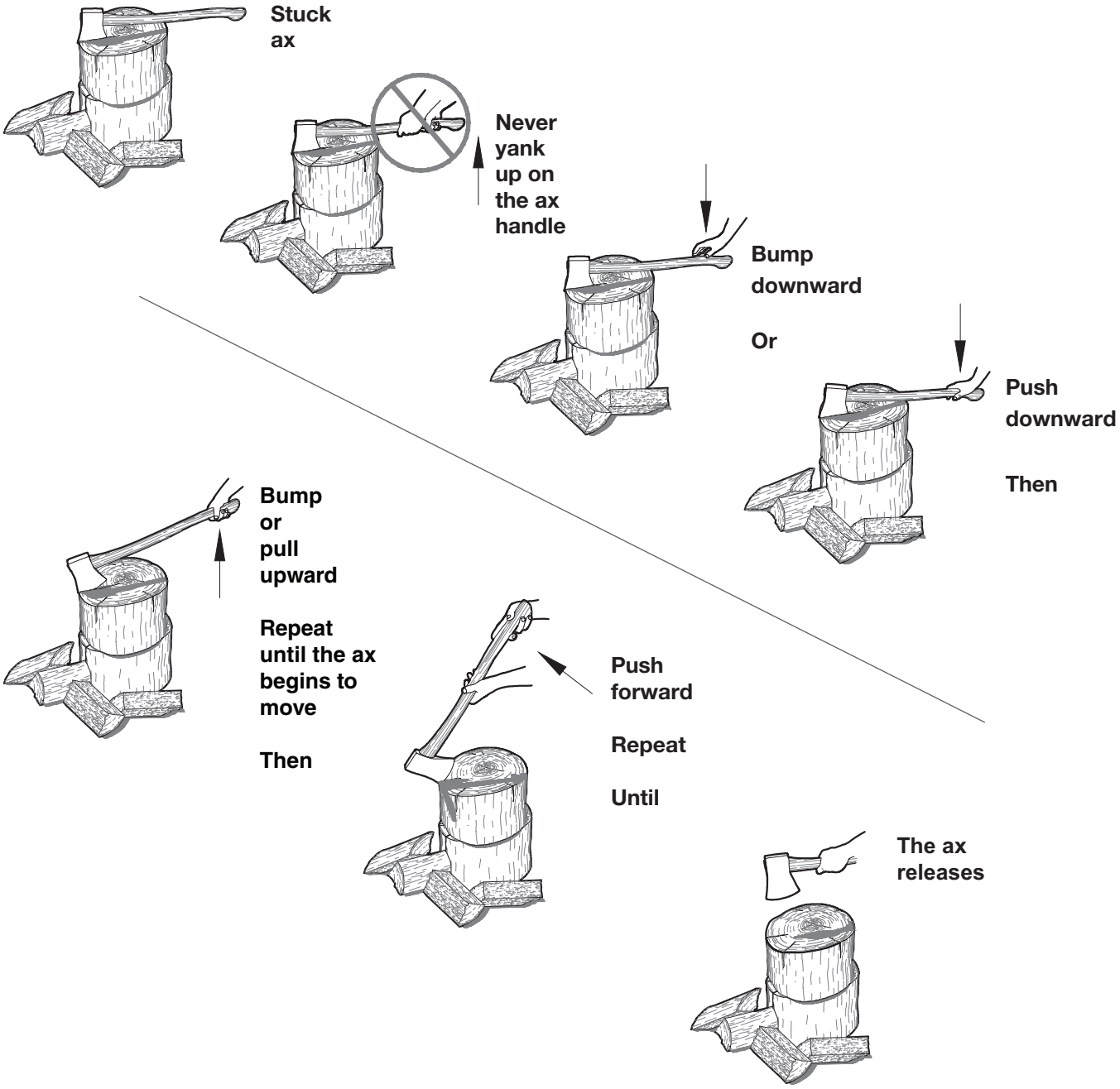
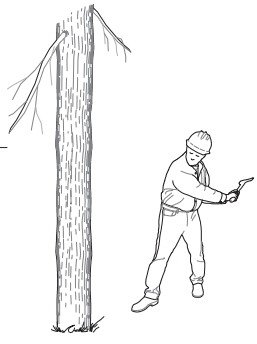


Figure 11–74—Freeing a lodged ax by first bumping or pushing the handle down and then up, repeating the process until the ax begins to loosen from the wood.



If you cannot easily remove an ax from a round of wood, use another ax or a maul and wedge to split the round and free the ax (figure 11–75).

If the round you cut does not have flat ends, it will not stand upright. In this case, instead of using a flat chopping block, find a forked section of log and secure the round into the fork (figure 11–76). If you are unable to find a forked section of log, try notching a log to give the round a stable place to rest. Because the round will not be upright, you will likely have to split it from the side. Strike as close to the top of the round as possible, using any natural cracks in the wood that you see and avoiding any knots. If you do not position your strike well, splitting from the side poses an added risk of a glancing or scooping blow. Knotty wood or wood with an uneven, curly grain can make the situation even more dangerous. If you split from the side, chop so that the wood splits away from you and not toward you. If you chop with the

Figure 11–75—Using a wedge and maul to split a round and free a bound ax. An ax is more likely to bind when striking the center of a round. Striking the edge of a round not only decreases the likelihood that the ax will bind, but also splits the round more easily.

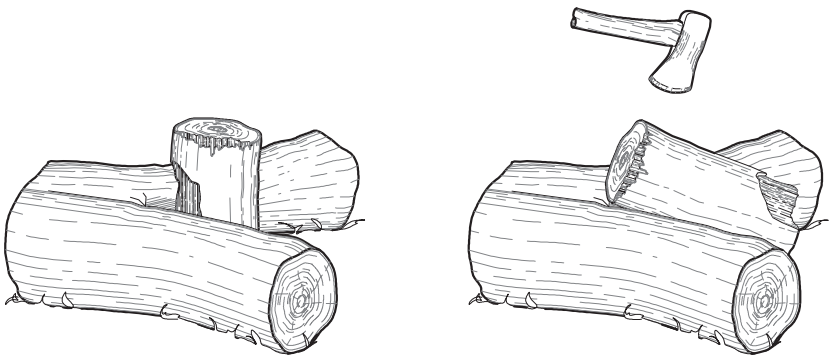


Figure 11–76—Using a forked section of log to secure a round that does not have flat ends.

wood splitting toward you, the head of the ax also is coming toward you. If you can stabilize the round with your foot, you are chopping in the wrong direction (figure 11–77). **Plan your cuts for safety.**

A maul is more wedge-shaped and heavier than an ax. You may be able to split many rounds without using a wedge, but for large rounds and rounds with twisted grains or many knots, using a splitting maul and steel wedge is the easiest and safest option. Ensure that the poll of the maul is made of tempered or hardened steel and always wear safety glasses.

Place the wedge about one-quarter to one-third of the way across the top of the round, closer to the edge than the center. Take advantage of any natural splits in the wood and avoid knots. Drive the wedge about three-quarters of its length into the round. Ideally, the round will split down and across its diameter. If the round splits, you can use the maul and a wedge to strike the side of the round opposite the first wedge to finish the cut (figure 11–78). If the round does not split sufficiently, you can use the maul to knock the wedge free and start the process again.

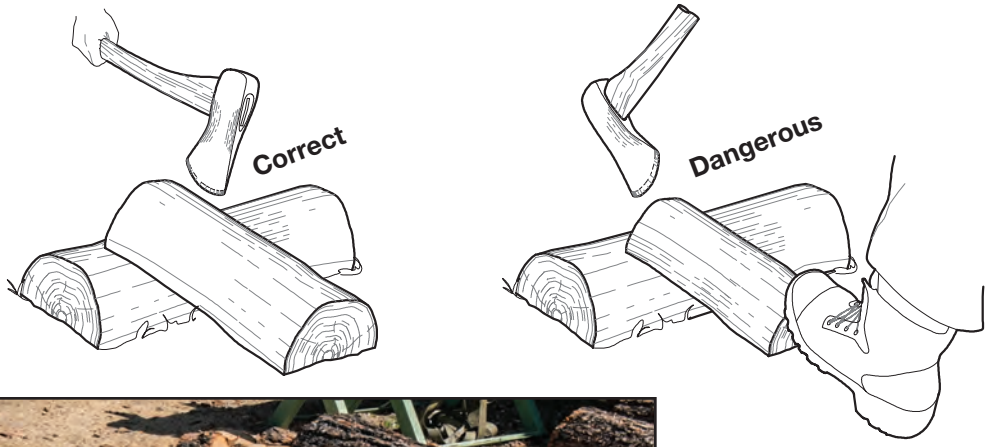
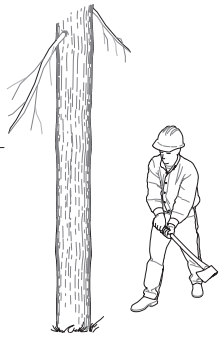


Figure 11–77—An alternative method for chopping a round that does not have flat ends.

Figure 11–78—Striking a wedge with a maul after driving a wedge into the opposite side of the round.



Never drive an ax by striking its poll with another ax or maul. The poll is not hardened and striking it can damage an ax. The poll could mushroom over (see figure 8–19) and consequently alter the shape of the eye. Striking a wedge with a mushroomed poll could cause pieces of the poll to break off and injure you.

Splitting is not just for firewood. You may have a need or an occasion to split a long length of wood into a rail. To do this, you need several wedges and a maul, or a sledge hammer and ax.

Start by taking advantage of natural cracks in the log. Use a sledge hammer or maul to drive a wedge into the end or top of the log to develop a split (figure 11–79). As the split develops, drive another wedge into the split and remove the first wedge (figure 11–80). Traditionally, an axman would use a wooden wedge ("glut") to "chase" the split down the length of the log. You can use either a steel spliting wedge or a glut for this task.

Figure 11–79—Using a sledge hammer and wedge to split a rail from a log.

Figure 11–80—As the split in figure 11–79 develops, drive another wedge into the split.

Repeat the process, alternating the wedges down the length of the log until the log splits (figure 11–81). As the split develops, it may move to a different grain. Use an ax to cut across the grain and get the split back in line with your intended cut. You can also perform this method by alternating two axes down the length of the log instead of using wedges. Using an ax requires more finesse and skill to maneuver the cuts accurately while not striking the other ax or its handle. With a little practice, you can use this method to split your own rails. Figure 11–82 shows hand-split Ponderosa pine rails. You can split other types of wood, such as cedar, more easily and cleanly.

Figure 11–81—Continue to drive wedges down the length of the log until the log splits.

Figure 11–82—Hand-split rails.

Removing Bark With an Ax

The best time to remove or peel bark with an ax is in the spring, when sap is flowing. When sap flows through the cambium layer that lies just beneath the bark of a tree, it is easy to remove the bark with a sharp ax. Other tools, such as a bark spud or draw knife (figures 11–83 and 11–84), can make the job easier, but an ax works well if these tools are not available.

Figure 11–83—A bark spud with a spur.

Figure 11–84—A draw knife.

Be cautious when peeling bark; you are not chopping to sever wood fibers, but are instead using the blade of the ax to lift the bark off the log. Traditional chopping methods cut too deep. Use a much shallower angle to remove bark (figure 11–85). Because of the shallow angle and because the ax does not sink into the log, there is a much greater risk of a glancing or scooping blow. Shave the bark rather than chopping it. If you do chop, choke up on the ax handle to make short, controlled chops.

The thickness of the bark and the flow of sap are key components in safely peeling logs. The thicker the bark, the more difficult the task. Rather than chopping, try to get the ax blade under the bark and slide or push to lift and remove the bark. You need to adjust your grip on the ax handle to find the right motion and leverage to remove the bark. You may often find yourself holding the ax head with one hand and the handle with the other, while using the blade like a drawknife or wood plane.

Even if the sap is not flowing, you may still be able to remove bark easily from green trees. Dry wood with tight bark can be difficult to peel on some tree species and easier on others. The wood shrinks as it dries and the bark pulls away from the wood naturally on some species.

Figure 11–85—Removing bark with an ax blade. Note the shallow angle of the blade in relation to the log.


NO CALKS OR
HOBNAILS