

Preparation for Bucking and Felling

Safety Considerations

Great care needs to be taken when bucking or felling. The same principles apply whether a crosscut saw or a chain saw is used, but the sawyer is exposed to risks longer during crosscut saw operations. However, the crosscut sawyer can better bear the forces acting on the wood than a chain saw operator.



Never attempt any action that is above your ability or if you are unsure of the probable outcome. Always be ready to adjust your cutting strategy based on how forces are affecting the cut.

Personal Protective Equipment

Less personal protective equipment is required to use a crosscut saw than is required to operate a chain saw. Although chaps and ear protection are needed to operate a chain saw, they generally are not required to use a crosscut saw.



Crosscut sawyers require eye protection because chips can fly when chopping or wedging and the wind can blow shavings into their eyes. Hardhats, work boots, appropriate gloves, long-sleeved shirts, and long pants also are required. Soft hats, tennis shoes, T-shirts, and shorts are not acceptable.

You should wear leather or cut-resistant fabric gloves. Handling a hot saw left in the sun, placing and removing sheaths, and other hazardous activities all require gloves. Cotton gloves are not acceptable. Wear proper-fitting gloves when sawing.

Boots are required when using a crosscut saw. Boots are defined in the USDA Forest Service's *Health and Safety Code Handbook* (FSH 6709.11) as: *Heavy-duty, cut resistant or leather, waterproof or water-repellent, 8-inch high laced boots with nonskid soles (hard toes are optional).*

A first aid kit must be available at the worksite. Other safety considerations such as a medical evacuation plan, provisions for radio use, and local policies (such as restrictions on working alone) must be followed by crosscut sawyers and need to be documented in the job hazard analysis (JHA).

Determining the Forces on the Log

When cutting a log, three main forces need to be considered: wood under compression, wood under tension, and gravity (figure 45).

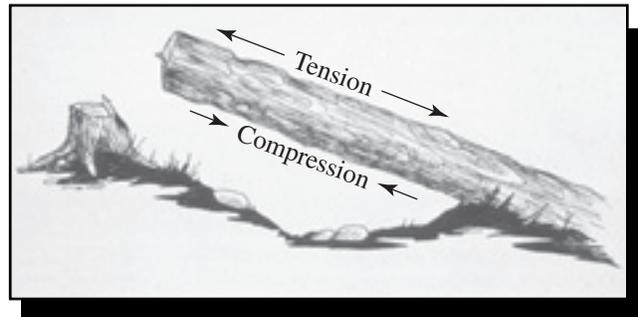


Figure 45—The log is being pulled apart by tension force and pushed together by compression force. Areas of tension and compression occur on opposite sides of the log.

Wood under compression wants to push together when it is severed. Compression wood causes crosscut saws to bind. Chain saws often can cut out minor compression, but crosscut saws cannot. Compression wood will completely bind the saw. Using wedges properly is more critical with crosscut saws than with chain saws. Crosscut sawyers should develop wedging skills to a high level.

Wood under tension wants to separate when it is severed. Tension, especially when combined with gravity, can be very powerful. Whenever wood is under tension in one part of a log, wood will be under compression somewhere else.

Understanding gravity helps the sawyer to work safely. Unlike the forces of tension and compression, the force of gravity is constant.

Situational Awareness

Plan the bucking cut carefully after considering:

- The escape route
- Slope
- Tension
- Compression
- Rocks and foreign objects on the log
- Pivot points
- Adequate saw clearance
- Overhead hazards
- The limits of your ability
- The length of the saw in relation to the log being bucked
- People and property in the cutting zone
- Spring poles
- Proper tool placement
- Falling or rolling root wads
- The log's tendency to roll, slide, or bind
- Broken-off limbs underneath the log that can hook the sawyer if the log rolls
- Safe footing

Bucking Sizeup

Sizing up the bucking situation means that the sawyer must visualize the hazards and consequences of each cutting action. This step is very important.

Overhead Hazards

Visually scan all adjacent trees. A fallen tree blocking the trail may have left broken limbs hanging in adjacent trees as it fell. These hanging limbs or trees are called widow makers for good reason. They can become dislodged and fall at any time.

Do not work beneath any hazard that could come down on you or cause a chain reaction that may strike you. Winds can be a legitimate reason to suspend bucking when hazards are overhead.

Side Slopes

Assess the position of a fallen tree in relation to the slope. If the log lies straight up and down the fall line, end bind will be a concern. The safe uphill side of the log is easy to

identify if the log lies parallel to the slope. If the log lies at a different angle, the safe uphill side will not be so easy to identify. Slope, pivot points, gravity, soil hardness and other factors all need to be considered.

Having good footing is extremely important. Take time to kick out a solid footing before beginning to buck.

On steep slopes it's sometimes a good idea to put a block of wood under the downhill side of the log to prevent it from rolling. The log may damage the saw and the trail if it rolls. The block of wood should be about a foot long with a sound limb on it. I remove the bark on the block to reduce friction and leave the limb up so I can pull the block out later.

When the log is severed, the wedges should allow it to settle against the block. While standing in a safe location, I remove the wedges and use the limb to wiggle the block out. Never finish a cut on the downhill side of a log.

Spring Poles

Spring poles (figure 46) are limbs or saplings that are bent beneath a fallen tree. A spring pole can store a tremendous amount of energy. Spring poles can be dangerous if they are cut accidentally, or without careful planning. Cut a spring pole only when necessary.

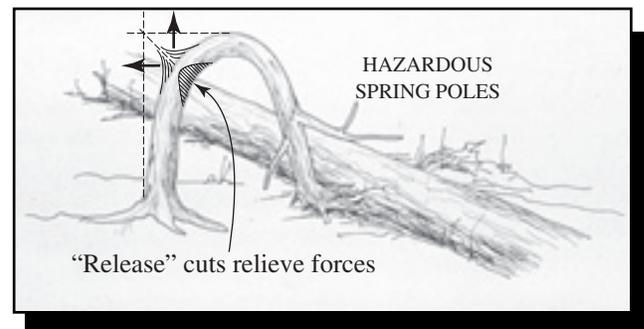


Figure 46—Look out for spring poles (trees or limbs that are being held down by other trees). Spring poles can release with great force, causing serious injuries. Make a series of small cuts on the inside of the bend when severing a spring pole.

Before cutting a spring pole, select the best spot to make the cut. One way to do so is to determine a point where two projected lines intersect. The first line extends vertically from the base of the spring pole. The second line projects horizontally from the extreme top of the pole's bend. From

the intersection of these lines, a 45 degree angle projected back to the spring pole marks the preferred place to make a series of release cuts. This technique is also used when determining where to cut bent limbs. In those cases, *horizontal* and *vertical* become relative terms.

If other safety factors do not prevent you from severing the spring pole at the calculated spot, make a series of small cuts on the side under compression. This is always the inside of the bend. Your cutting position and escape routes need to be carefully considered. You must understand the direction the cut ends will travel when planning a safe escape route.

Never use two sawyers when cutting spring poles.

Do not use a crosscut saw to release a spring pole unless the pole is very large. If a crosscut saw is used, a one-person saw with smaller teeth on the front is preferred. Regular crosscut saw tooth patterns usually do not allow the carefully controlled cuts needed to release spring poles.

Some sawyers prefer to use the small teeth on the extreme end of a crosscut saw because the teeth are finer and because doing so provides more distance from the cut material. My experience has taught me that being closer and in absolute control of my carefully placed cuts is safer than being farther back.

I prefer to use the small folding pruning saw that I carry in my day pack. It provides me the most control over the amount of wood fiber being severed. I do not use a crosscut saw for cutting spring poles except in rare situations, usually associated with limbing, where physical barriers prevent me from using the small saw. An ax or Pulaski also may be used, but be careful to limit the depth of each cut. Releasing compression with an ax requires light hacking or nicking rather than actual chopping.

When using a saw, I cut into the compression wood until the sapling moves or the saw starts to bind. I cut no farther and remove the saw quickly. I place an identical cut about one to one-and-one-half times the sapling's diameter away. When this cut binds, I remove the saw and place a third cut between the first two cuts but closer to the first cut than the second. Usually I can cut a little deeper than I did with the first cut. I continue alternating back and forth, working toward the center between these cuts, always vigilant for the

tension side to rip apart and the spring pole ends to fly away from me. By the time I have made a number of cuts, some of the energy stored in the wood fibers has been removed, making the final break less violent.

The most common form of spring poles encountered by crosscut sawyers during trail clearing are the limbs on the underside of a green tree that has fallen across a trail. If the spring poles are directly under the tree, the limb usually strikes the dirt directly beneath it when the limb is severed. The more hazardous limbs are those located along the sides of the log. These limbs can fly outward when severed.

Avoid making the common mistake of severing bent limbs at the bole of the tree. Always cut at the spot indicated by the intersection of the projected lines, even if it means making a second cut flush with the bole later so the log can be rolled off the trail. Cutting limbs under great pressure at the bole of the tree rather than at the spot indicated by the intersection of the projected lines exposes the sawyer to much greater risk. Be especially careful to clean out a safe working area before cutting these spring pole limbs. I save them for last, after I have removed all other vegetation and have secured a safe working area with escape routes.

Suspended Logs

Cutting a suspended log is a single-buck (one person) operation. Often only one side is safe or has adequate footing for you to make the cut.

If you are standing on blowdown where several trees are jackstrawed in different directions, carefully evaluate the sequence in which trees should be removed. Resist the temptation to dive in and cut the first log you come across. Generally, the bottom logs should be cut and removed first. This practice reduces the chance that logs or other material on top will move.

Be sure there is a safe path for any cut log to follow. This is the reason I remove the bottom logs first. If you cut from the top down, the top logs can fall between bottom logs, making the bottom logs impossible to cut.

Proper use of skid logs makes dealing with jackstrawed blowdown safer and easier. Skid logs are placed underneath the log you are cutting to make it easier to move. Calculate

the results of your planned sequence of cuts, so that you will have skid logs properly positioned to help move the log where you want it to go. Sometimes those logs support the log as it is being cut.

It might not be possible to remove all suspended trees with a saw. Take out only the ones that can be removed safely. Other suspended trees could be removed with winches or explosives, if necessary.

Often, suspended logs roll when they are released. Be sure the log has a safe path to travel. Logs may ricochet off other objects, making their paths unpredictable. Be sure no snags or other weak trees are in the log's path. They could snap if the log strikes them. Fell snags or weak trees first, if they can be felled safely.

Pivot Points

Pivot points are high points on the ground, or a rock, stump, log, or even limbs on the lower side of a log, that catch part of a moving log and cause it to pivot unexpectedly. Pivot points can be very dangerous and may not be easy to detect. The pivot point acts as a lever in either the vertical or horizontal plane. A log lying on an undetected rock can shift violently upward when the log is bucked. A rolling log caught at its midpoint can swing back uphill or sideways toward the unsuspecting sawyer.

Side Binds

Side binds occur when one side of the log is under compression and the other is under tension. Side bind usually occurs when a log has fallen and is resting between a couple of trees or other obstructions. Cut the compression side first and finish by cutting the side under tension. This cut can be difficult, because it may require sawing from a vertical position. Instead of sawing out side binds, I usually chop them out if they are not too large. Chopping is safer.

Rootwad Movement

Take a close look at logs still attached to their upended rootwads. Are the rootwads going to move when they are severed from the rest of the tree? Where will they move? If

the tree is green or the ground is very wet, the roots may be bent over and under a lot of pressure. Try to dig under the rootwad to evaluate any major roots you may not see. These are similar to spring poles, but are more difficult to detect. Spring pole roots also may act as pivot points, causing the tree to swing when the bole is severed.

Rootwads that have no firm attachment to the ground can roll easily, especially on steep slopes, or if the bole is severed near the rootwad. I sometimes secure rootwads by attaching a winch cable to them so I can apply direct holding pressure. This technique also helps to reduce end bind. A rope works just as well. The idea is to keep the rootwad in place.

Unsound Wood

Rotten wood can crack or break without warning. Logs may be sound in one part and rotten in another. Examine the ends of logs and look for indications of rot. Observe the color of shavings the saw is producing. Dark shavings indicate rot. Rotten wood doesn't hold wedges well, making them ineffective. Because rotten logs may hold more moisture, saws tend to load up with shavings, increasing the need for wedges to keep the kerf open.

Test for soundness by thumping the log with the poll of a single-bit ax. The ax will rebound from the sound wood and the thump will produce a high-pitch noise. Rotten wood has a hollow, low-pitch sound. Loose bark can be a problem to the crosscut saw buckler, although loose bark is not as hazardous on a fallen tree as on a standing tree. Remove loose bark before bucking. Vertical or spiral cracks may indicate weakness and can cause a log to spiral open, especially when it is bucked on steep side hills. Fire-weakened trees need to be sized up carefully as well.

Log Movement

Assume that most logs will move when bucked. Not all log movement is hazardous, but even the slightest movement can pinch a crosscut saw, bend it, or damage the saw's set. Larger logs present more potential risk because their center of gravity is higher and they are heavier.

Planning the Cut

Think the cut through. Make sure that you have the correct saw, the right complement of wedges, and an ax or single-jack hammer to drive them. Know exactly where each cut will go, the types of cuts you will need, and the sequence of the cuts.

Figure out what the severed log is likely to do, and what you would like it to do. You can sometimes control the log by managing the energy that is released when the log is severed. You can retard energy release with wedges or with blocks that prevent the log from rolling. You can accelerate energy release by using ramped skid logs. Expert crosscut saw users apply the principles of force and movement to get the log to its final resting place.



Can the log be bucked safely with existing skills and equipment? Sawyers should not feel pressured to perform any task that is beyond their ability. Ask other crewmembers to size up the situation silently. Discuss your findings afterward. Listen to dissenters. Sizeups based on “group think” where dissenters’ views are not expressed or not considered often miss important factors.

Shattered logs are especially troublesome, because each splintered section may have its own bind. The sawyer may have to cut first from one side, then move to the other. Chopping out a V-notch with an ax is another good alternative to cutting it with a saw.

Types of Cuts

The three basic types of cuts are: the straight, compound, and offset. Each type of cut and its usual application (figure 47) is described.

A straight cut is made through the log, usually starting from the top. It can be performed by single or double bucking.

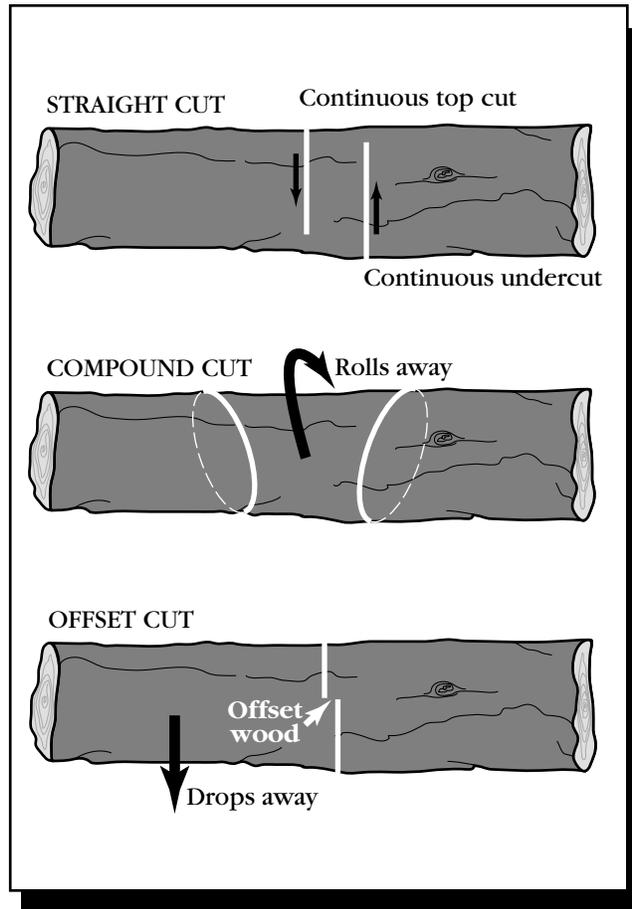


Figure 47—Three basic cuts: straight, compound, and offset.

It can also be cut continuously from underneath the log by a single sawyer using an underbuck.

The forces on the log allow the saw to cut through the log only with the help of wedges. Unfortunately, inexperienced buckers sometimes try to use a straight cut when a compound or offset cut is needed. When a saw is bound tight in a log, the bucker probably used a straight cut inappropriately.

A compound cut is placed at an angle that is narrower than perpendicular to the log and angled so that the bottom of the cut slopes toward the part of the log that is being removed. This cut typically is used when clearing a large log that is across a trail. Two cuts need to be made and the severed chunk of the log has to be removed.

By placing a compound cut so that the severed log is longer on the downhill side, the bottom of the cut log is

narrower than the top of the cut log. This reduces the chance that the log will bind when it is rolled out of the way. This cut is performed either as a straight cut or as a combination of top cut and undercut.

The offset cut is placed so that the bottom underbucking cut *does not* match up exactly with the top cut.

This kind of underbucking operation is used when a log is suspended and will drop free when severed. Once the top cut has been made, a single sawyer selects a groove (about 1/2 inch toward the ax head from the top kerf) from the grooves cut into the saw handle or installs a mechanical underbuck. The ax head is always secured to the side of the log that won't move when the log is cut.

In underbucking, offset wood prevents the severed log from damaging the saw or causing injury when the log drops. This small amount of offset wood acts like the holding wood left when trees are felled. In felling, the holding wood keeps the tree from kicking back.

Determining the Safe Working Side of the Log

Whether you are sawing alone or in tandem, you need to determine the safe working side of the log. This is the side where the final cut will be made.

Planning and Clearing Escape Routes

Escape routes when bucking need to be thought of differently than escape routes when felling, but the principle is the same. Determine danger zones and plan an escape route that avoids them. Clear debris along the route. Although you may not have to use your escape route, your life may depend on it if a log pivots or another problem arises.

Establishing a Work Platform

Because crosscut sawing requires good balance, you need a fairly level platform under your feet. Remove logs, branches, brush, and other vegetation. Use a digging tool to create footholds on steep ground.

Saw blades work best when they are operated perpendicular to the force of gravity. Keeping saws level often requires cutting from a kneeling or crouching position. Kneeling or half-kneeling is better than crouching, both for

ergonomic reasons and to maintain control over the cut.

Too often a sawyer working from a crouch allows the saw to hit the dirt on the offside of the log, or the saw pinches because the sawyer left too much holding wood on the near side of the log.

Providing Adequate Saw Clearance

Remove rocks and dirt under the log that could dull the saw. I try to dig under the log and place bark or other soft material there to protect the saw when it finishes the cut. Remove all vegetation from the path of the saw.

Bark Removal

The bark on logs often contains sand, dirt, and small rocks that can dull the saw. Fire-charred logs also dull saws. Most crosscut sawyers remove the bark with an ax before starting to cut. In addition, bark is spongy and can reduce the effectiveness of wedges. Remove enough of the bark so that wedges will contact firm wood.

Tool Placement

I usually place wedges and axes on top of a large log where either the uphill or downhill sawyer can reach them. Do not place tools on top of the log if they can fall on the downhill sawyer. The sawyer at the uphill position will set the top- and near-side wedges and ensure the safety of the lower sawyer. The lower sawyer sets the hanging wedge on his or her side of the log, if it is needed.

I often place skids under the log so it won't drop into a hole or trench. Long steel rock bars work as skids; so do native poles. Leave branch stubs about 2 to 3 inches long on the bottom of the skid to help anchor it. If extremely heavy log segments need to be skidded, I use a green tree with the bark removed for a skid. I can make the peeled log slide more easily by pouring water on it.

Crew Communication

Clear communication among all crew members is vital for safety and efficiency. Be sure everyone knows the planned sequence of events. Know where the severed log is going to

roll. If a portion of the trail is below the path of the log, post a trail guard in a safe place to warn unsuspecting visitors of the hazard. Be sure everyone knows who will give the *all clear* signal.

Determining Binds

Understanding directional forces, or binds, is important. Binds determine bucking techniques and procedures.

Landforms, stumps, blowdown, and other obstacles that prevent a log from lying flat cause binds. The four types of bind are: top, bottom, side, and end (figure 48). It is possible for logs to have no bind. Normally, logs have a combination of two or more binds:

- **Top Bind**—The tension is on the bottom of the log. The compression is on the top.
- **Bottom Bind**—The tension is on the top of the log. The compression is on the bottom.
- **Side Bind**—Pressure is exerted sideways on the log.
- **End Bind**—Weight compresses the log's entire cross section.
- **No Bind**—This log could be cut without a wedge and it would not move. It is difficult to predict binds, so a safe practice is to wedge logs even though you don't think they have binds.

Determining Bucking Locations

It is best to start bucking at the top of the log and work toward the butt end, removing the binds in smaller material first. Bucking is generally a single-person operation. Two sawyers may be used when it is safe to do so.

Determine the offside (figure 49). The offside is the side the log will probably move to when it is cut, normally the downhill side. Watch out for possible pivots. Clear the work area and escape route. The work area should be at least 8 feet wide in the vicinity of the log to allow plenty of room for escape when the final cut is made. Establish solid footing and remove any debris that may hinder your escape.

Cut the offside first. If possible, make a cut about one-third the diameter of the log. This allows the sawyer to step back from the log on the final cut.

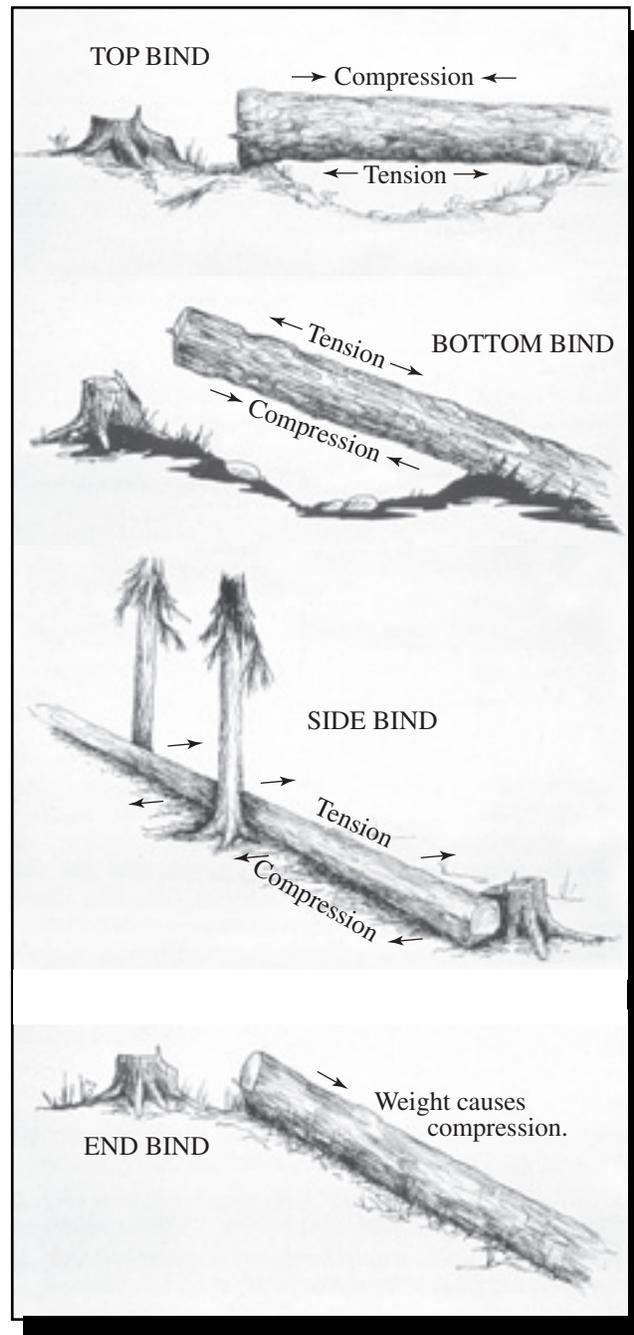


Figure 48—There are four types of binds. A log can have a combination of two or more binds.

Points to Remember When Planning the Cut

- Do a complete sizeup. Identify the hazards and establish your escape routes and safety zones.
- Use objects such as rocks, stumps (if they are tall enough), and sound standing trees (with no overhead hazards) to



Figure 49—Determine the offside (usually the downhill side), and stay clear of that side when you are single bucking.

protect you from the log if it springs sideways toward you when you finish the cut.

- Removing a single section of log may require that other binds be eliminated first.
- Angled bucking cuts, wide on top and made on the offside, allow a single section of log to be rolled away from the rest of the log.
- Buck small sections of the log that will be easy to control when they begin moving.
- Binds and potential log movement will change as you cut. Reevaluate them as necessary.
- Warn workers who are working in and below an active cutting area. Give them time to move to a safe location. Verify their safety, visually and verbally.
- Announce when a bucking operation has been completed.
- All logs must be completely severed when they are bucked.
- Use flagging to mark an incompletely bucked log as a hazard.
- Never approach a cutting operation from below.

Single-Bucking Techniques

New sawyers should master the skill of single bucking before learning double bucking. If new sawyers can handle a long two-person saw alone, they have mastered the principles

of keeping the saw running smoothly without buckling. Thinner, lighter felling saws are harder to use for single bucking than the stiffer, heavier bucking saws.

The reasons to single buck include:

- The sawyer starts out double bucking and needs to finish the cut from one side because of safety considerations or log movement.
- The log is too large for the length of the saw, so one handle has to be removed to increase the effective length of the saw. The end of the saw can be drawn into the log once the handle has been taken off, allowing shavings in the gullets to be removed when the end of the saw leaves the log.
- The sawing sequence starts or ends with underbucking, which can be done only by a single sawyer.

When making compound cuts, the length of the cut determines the length of saw that is required. The saw does not work as efficiently in a sloping or compound cut as it does in a straight cut. The more angle that is placed on a compound cut, the less effectively the saw will work. Compound cuts can make sawing difficult.

Single Bucking With No Bind: Top Cutting

- Remove the bark where the cut will be made.
- Lay the unsheathed saw on its side over the log. Sprinkle lubricant on both sides of the saw.
- Hold the saw with your dominant hand and guide the back of the saw with the other hand for a few strokes until the saw is securely in the kerf.
- Insert wedges as soon as they will clear the saw, driving them snug. Do not hit the back of the saw with the wedge.
- Lubricate the blade as needed just before the push stroke. On a smaller log, the sawyer may be able to lubricate the far side of the saw just before the pull stroke. Lubricate both sides of the saw blade equally.
- As you finish the cut, use only the teeth at the end of the saw blade. This technique prevents the log from damaging the “production” cutters near the center of the saw if the log rolls or pinches the saw.

Single Bucking With Top Bind: Underbucking Required

Underbucking is used when the log has a top bind and you can get under the log. Sometimes, a V-notch can be chopped out of the top of the log, then finished with underbucking. More frequently, the first cut must be started from the top because the top of the log is under compression. If the compression is not corrected, the kerf may close and pinch the saw.

After you have inserted the wedges and driven them snug, continue cutting down from the top, leaving enough uncut wood to support the log's weight. Because the top of the log is under compression, the bottom is under tension. The more compression you relieve, the greater the tension on the bottom of the log. The log will start to equalize this pressure by exerting pressure on the wedges. If you use two or more wedges spaced at the 10 and 2 o'clock positions, you can spread the force over a larger area. If only one wedge is used at the 12 o'clock position, all the energy is directed to that relatively small area.

Listen for the sounds of wood fibers popping as they are severed as an indication of the intensity of compression and tension. The louder the sound, the stronger the forces at work.

Watch the kerf to detect log movement. Position yourself so you can detect a slight opening or closing of the kerf. This is the best indicator of the log's reaction on the release cut. If the bind cannot be evaluated, proceed with caution. It may be necessary to move the saw back and forth slowly to prevent the saw from getting bound as compression pressure closes the kerf. Cut just far enough to place a wedge. Continue cutting. Watch the kerf. If the kerf starts to open, the log has a bottom bind. If the kerf starts to close, the log has a top bind.

Remove the saw from the top cut and prepare to finish the cut from the bottom by underbucking. A log or rock can be placed under one side of the cut, supporting the log so it will be less likely to drop as far as the ground when the cut is completed.

Underbucking—During sizeup, you determined which side of the severed log probably would remain the most stationary, providing the anchor point for the underbuck. A common mistake is to place the underbuck on the side that is easiest to reach. If this side of the log moves, the saw or ax handle could be damaged.

To underbuck, use a mechanical underbuck or plant an ax in the log (after removing the bark) so the handle can be used as a support for the back of the saw (figure 50). Line up the underbuck grooves in the ax handle with the top saw kerf and forcefully swing the ax into the log.



Figure 50—An ax planted in the lower part of the log can work as an underbuck.

Place the back of the inverted saw in the underbuck groove. The saw typically starts at an angle of about 45 degrees from horizontal. Your guiding hand holds the back of the saw. With a light downward pressure on the underbuck, push the saw forward. Pressure on the underbuck needs to be consistent on the push and pull strokes.

Oil in the underbuck groove will help the saw run easily and will reduce wear on the ax handle. Adjust the handle angle to allow room for the saw to be inserted and for the underbuck to be parallel to the saw kerf, but offset slightly closer to the ax head unless you are underbucking a compound cut.



If I'm finishing a cut by underbucking, I make sure that my undercut does *not* exactly meet the top cut. Rather, I align the saw on the ax handle so the saw is offset about a half an inch from the top cut in the direction of the ax head. When the log breaks away and drops, the saw is protected by remaining in the kerf. If the technique is reversed, the moving log will drive the saw into the ax, possibly damaging the ax and injuring the sawyer.

If you are underbucking a compound cut, the cuts must match exactly. Any offset could prevent the log from being freed. If the cuts do not match, several more wedges may have to be placed in the top cut to provide additional bearing pressure on the kerf faces, holding the log in place. If there is a chance that the wedges will not hold, remove the saw and start another cut, rather than risk damaging the saw.

After several strokes, you can remove your hand and continue normal cutting. With continued downward pressure, the end of the saw will be doing more of the cutting and the saw blade will level out. As the cut nears completion, be prepared in case the severed log drops.

Often the wedges hold the log stationary after the cut is completed. To remove the hanging wedges, stand on the near side and reach across the top of the log to remove the offside hanging wedge. Then remove the near-side wedge.

Single Bucking With Top Bind: Top Cutting

Several methods can be used to buck a log with top bind that does not have enough room underneath for underbucking.

All sawing will be from the top. After removing the bark and beginning the cut, wedge the log well to keep the kerf

open. Follow the instructions for wedging given earlier. Periodically, drive all the wedges until they are snug. Do not allow the wedges to contact the saw.

The cut will want to open up at the bottom. Place a log or other material under the log segment that will drop when the cut has been completed, reducing the distance the severed section of log will fall and helping to direct it to the place you want it to go.

The severed log may roll. A log that drops and rolls may damage the saw. Inserting metal hanging wedges at the 10 o'clock and 2 o'clock positions across the kerf will reduce the likelihood that the log will roll.

For very heavy logs with serious binds, a steel plate can be driven into the saw kerf as added insurance that the kerf will not close. Because steel plates are thin, they can be driven deeply without spreading the log apart. Steel plates are easier to drive than wedges and provide a large surface area to hold back the top bind. I rig these plates with a lanyard that can be secured to an ax placed on top of the log. This technique prevents the plate from dropping onto the saw when the log is released. Often there is enough bind on the steel plate to keep it in place. I also use lanyards on my pair of hanging wedges to prevent them from dropping onto the saw.

Single Bucking With Bottom Bind: Top Cutting

When there is bottom bind and too little room to get the saw underneath for an undercut, all the cutting will be done from the top. The main problem with bottom binds is that standard wedging does not help. In addition, when the log is severed, sections of the log may drop or roll, possibly damaging the saw blade.

Cut the log as explained for top cutting with single bucking. Place a small plastic wedge snugly at the top of the cut. Do not drive the wedge in.

When this wedge starts to drop into the kerf and the kerf is beginning to open, drive two fan-shaped metal hanging wedges across the kerf at the 10 and 2 o'clock positions to slow the opening of the kerf and keep the log from settling or rolling.

As the kerf opens at the top, the uncut wood is under more and more compression. If the force becomes too great, the uncut wood may slab off, possibly damaging the saw. To prevent slabbing, the sawyer needs to keep sawing or even speed up sawing to keep the kerf opening and relieve the compression pressure. When the log is sawed through, the log's weight may pull out the metal wedges, allowing the log to drop and roll.

Perhaps the best technique to reduce the effects of a bottom bind is to insert a stick into the opening saw kerf just before driving the hanging wedges. A straight, finger-sized limb about a foot long can be inserted (figure 51) into the opening kerf at the top of the log (do not use plastic wedges).

As the kerf continues to open, the stick slides into the kerf. The stick will not drop to the back of the saw because it is too thick. As the cut is completed, the two halves of the severed log will hinge on the stick. The bottom opens up, allowing the saw to drop free.



Figure 51—A stick dropped into the kerf on a log with bottom bind will serve as a pivot when the log is cut through. This is a lost trick that is very practical and can prevent damage to the saw.—*Now You're Logging*, by Bus Griffiths, with permission of Harbour Publishing, Madeira Park, BC, Canada

Single Bucking With Bottom Bind: Under-bucking

If you have bottom bind and can get under the log, make the first cut from the bottom. In this case, wedging is not as critical. If the first cut is from the top, fan-shaped metal

wedges can reduce the speed with which the kerf opens. A stick can be inserted into the opening top cut if the log is large enough for the stick to fit into the kerf.

Finish the top cut, trying to match the bottom cut exactly. Offset cuts are not used unless you are finishing with an undercut.

Single Bucking With End Bind

If more than one cut is being made on a log, as is often the case during trail clearing, I usually make the first cut at the largest diameter, especially if it is uphill. This reduces the amount of end bind pressure on the second cut.

If you are cutting down directly from the top, use more plastic wedges around the cut, especially as the cut progresses below the centerline of the log. The wedges will reduce the possibility of binding.

Single Bucking With Side Bind

This is one of the most difficult and hazardous binding situations.

If there is room below the log for the end of the saw to clear, cut the side with compression wood first. The finish cut is on the side with tension wood. Alternately saw and chop out wood with an ax. The saw should be in a nearly vertical position. Always find a safe position before making the finish cut.

If the log is on the ground in a side-bind situation, options are limited. For trees larger than 20 inches in diameter, the only options are to place a cut beyond the side bind area or to cut out the area with an ax.

Double-Bucking Techniques

New sawyers should master the skills of single bucking before learning double bucking. The reasons to double buck include:

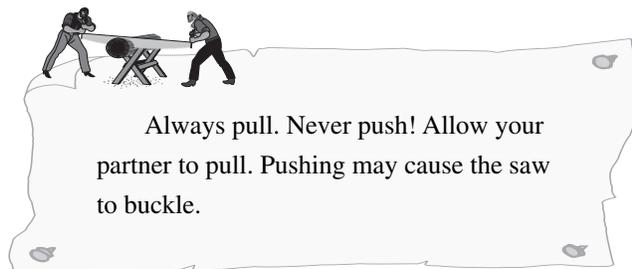
- Large logs can be sawed more easily by two sawyers.
 - Two sawyers can transport equipment more easily than one.
- Attach both saw handles before removing the sheath.

Do not use a saw with damaged handles or handles that are difficult to remove. After the sheath has been removed, the uphill sawyer normally hands the saw to the downhill sawyer by grasping one handle and the middle of the saw blade with the teeth facing away from the downhill sawyer who is receiving the saw.

Usually the uphill sawyer (the primary sawyer, who will finish the cut) lubricates the saw and positions a guiding hand on the back of the saw for the first few strokes.

If you are planning to roll the log out of the way, be sure to make a compound cut. The goal is for the sections of log to have as little surface resistance against each other as possible. The larger the log, the more careful the planning needs to be for the compound cut. Make the cuts where you will be safe and you will be able to move the log.

Your dominant hand (the power hand) should be placed firmly around the saw's handle. Your other hand can rest on top of the handle to guide the saw and to help you maintain your balance. Your dominant hand pulls the saw straight back to the side of your body. Sawyers often grip the non-power handle too tightly. This tends to pull the saw across their body.



As one sawyer pulls, the other sawyer keeps a relaxed grip on the handle. The sawyer neither pushes nor holds back. Holding back is called riding the saw, which makes it harder for the other sawyer to pull. Your partner will not like this.

If you momentarily relax your grip, the saw will reposition itself in your hand for the pull stroke. Relaxing your grip also increases circulation in your hands and reduces fatigue.

If one sawyer needs to change body position (to drop to a kneeling position, for instance), the other sawyer needs to adjust the angle of the saw to accommodate the change.

Wedges should be placed as soon as there is room to insert them behind the back of the saw. Usually for large logs, two wedges are inserted at the 10 and 2 o'clock positions and driven firmly until they are snug. If the wedges are not snug, the saw could be damaged.

Be sure the saw travels into and out of the kerf in a straight line. Look down the saw toward the other sawyer to make sure the saw is traveling in a straight line.

If the log is going to be finished up by single bucking, whenever *either* sawyer determines it is time to stop sawing, both sawyers stop. If you are on the downhill side, you should quit sawing and leave whenever you feel you are in jeopardy. Do not allow your judgment to be swayed by your partner. Each partner must honor the other's request without pressure.

On flat terrain, be sure that the arc of the saw remains parallel to the ground. Do not raise one end of the saw higher than the other.

Usually the bottom bark has not been removed. Carefully look at the shavings. When they change to the color of the bark, the log has been severed and only the bark is holding it. If the log falls on mineral soil, the impact can force rocks into the bark. The rocks can dull the saw's teeth. Usually the cut is stopped when wood-colored fibers are no longer being removed.

When the cut is finished, or when it is being finished by single bucking, remove the handle on the downhill side of the saw and allow the uphill sawyer to pull the saw free. Make sure the downhill sawyer is in a safe location before the uphill sawyer continues the cut.

Do not remove the wedges before removing the saw. The wedges may be holding the log in position. If they are removed first, the severed log may shift, binding the saw. If the wedges are loose enough to be lifted straight up, it is safe to do so—but do not wiggle them out. Once the saw is free, the wedges can be removed safely from the uphill side. Be prepared for the log to move.

Crosscut saw cuts need to be made where the cuts are safe and in a manner that allows the log to be removed. Sawyers may need to make additional cuts to meet the visual or trail clearing width objectives once the log has been removed.