

USDA Forest Service National Sawyer Training: Developing Thinking Sawyers



Student Guide: Classroom

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

This page intentionally left blank.

USDA Forest Service National Sawyer Training

Developing Thinking Sawyers

Module 3.1: Crosscut Saw Basics

Table of Contents

Module 3.1: Crosscut Saw Basics	1
Introduction	1
Module Topics	1
Objectives	1
Prewrite Review.....	1
History	1
Transportation	2
Maintenance.....	3
Review Questions	3
Build and Anatomy of a Crosscut Saw	4
Built for Efficiency: Understanding the Grind	4
Crosscut Saw Anatomy	6
Direction of Force	10
Video: How a Saw Cuts	10
Saw Design	11
Saw Designs	11
What is the Saw Arc?	12
Video: Arc of the Saw.....	12
One- and Two-Person Crosscut Saws.....	13
Felling Saws.....	14
Bucking Saws	14
Companion Tools.....	15
Handles	16
Sheaths	17
Single-Bit Ax.....	17
Wedges	17
Lubricants and Solvents	18
Handsaws.....	18
Optional Equipment.....	19

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Knowledge Check 20
Summary 21

List of Figures

Figure 3.1.1—Flat-ground saw. 4
Figure 3.1.2—Straight-taper-ground saw. 4
Figure 3.1.3—Crescent-taper-ground saw. 5
Figure 3.1.4—Crosscut saw anatomy. 6
Figure 3.1.5—Combination teeth and tooth set. 7
Figure 3.1.6—Crosscut saw tooth patterns. 8
Figure 3.1.7—Direction of force. 10
Figure 3.1.8—Curved-saw shape. 11
Figure 3.1.9—Flat-saw shape. 11
Figure 3.1.10—Convex-arc shape. 11
Figure 3.1.11—Arc depiction. 12
Figure 3.1.12—The saw’s arc determines the amount of lift. 12
Figure 3.1.13—One- and two-person crosscut saws. 13
Figure 3.1.14—A felling saw. 14
Figure 3.1.15—A bucking saw. 14
Figure 3.1.16—Eastern loop handles. 16
Figure 3.1.17—Western bucking handles. 16
Figure 3.1.18—Helper (stinger) handles. 16
Figure 3.1.19—Western felling handles. 16
Figure 3.1.20—Saw in a rigid sheath. 17
Figure 3.1.21—Folding handsaw. 18
Figure 3.1.22—An underbucker in use. 19

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

This page intentionally left blank.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Module 3.1: Crosscut Saw Basics

Introduction

Module 3.1 covers the basics of crosscut saws, how to care for them, and how to use them. The instructor will first present concepts in the classroom and will follow up with demonstrations. You will then practice these techniques in the field under controlled and supervised conditions.

Module Topics

- Build and Anatomy of a Crosscut Saw
- How a Saw Cuts
- Saw Design
- Arc of the Saw
- Companion Tools

Objectives

When you complete this module, you will be able to:

- Explain why agencies use crosscut saws in federally designated wilderness areas.
- Describe the different types of saw grinds.
- Explain the different parts of a crosscut saw and how they function together.
- Describe the best saw transportation methods.
- Describe basic care and maintenance for crosscut saws.
- Describe how a crosscut saw cuts (removes wood).
- Explain the arc of the saw.
- Identify accompanying tools to a crosscut saw and describe their purposes.

Pework Review

History

While human progress and expansion accelerated across the West (both on and off Federal lands), there was also the recognition for a need to preserve and protect some landscapes from development and human influences. As early as 1910 to 1920, several agency advocates, including Arthur Carhart, Aldo Leopold, and Bob Marshall, began work to designate areas as wilderness on National Forest System lands.

After 8 years and 66 revisions, Congress passed the Wilderness Act in 1964. The Act created the National Preservation System, setting aside landscapes and protecting them from development, and limited the types of human influences that can occur within congressionally designated wilderness areas.

USDA Forest Service National Sawyer Training

Developing Thinking Sawyers

Module 3.1: Crosscut Saw Basics

The Wilderness Act legally mandates that we preserve the wilderness character of the landscape. Employees and partners of the agency who seek to understand why agency land managers are legally required to use traditional tools like the crosscut saw should review the Wilderness Act of 1964. The basis for traditional tools is rooted in section 4 (c) of the act:

“...no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.” (Code of Federal Regulations 1964).

Today, there are 803 wilderness areas (111,687,310 acres) in 44 states and Puerto Rico. The Forest Service manages 448 of these wilderness areas—more than 36 million acres established under the Wilderness Act of 1964. If you are instructing or taking this class, you likely have management duties or on-the-ground responsibilities for a designated wilderness area.

Transportation

Saws are difficult to transport because they are long and flexible. You must handle them in a manner that will not damage the saw. Always cover saws with a sheath when transporting them and take care to avoid damage to equipment and property or injury to people or livestock.

You can bend a vintage saw to make it easier for hikers or pack stock to carry; however, do not bend a vintage saw that has a kink or nick. Modern saws are made from softer metal, and you should not bend them. The softer metal will hold the bend and will require filing to straighten the saw before you use it again.

Saws may need several types of protection because crews may transport them on foot; by boat, plane, helicopter, truck, dog sled, or pack stock; or even drop them by parachute during different legs of a journey.

BUCKING SAW EFFICIENCY: ONE SAWYER OR TWO?

In the old logging camps of the early 1900s, felling saw teams would go out in tandem to fell the merchantable timber, while buckers would go out alone to cut the fallen timber into mill-ready lengths. Sawyers operated this way out of efficiency. It takes two sawyers to cut down a tree but only one to buck a tree into lengths. Because a bucking team is not more than twice as fast as a skilled person single bucking, a bucker typically worked alone. This enabled the sawyer to work more efficiently and therefore receive a larger paycheck.

Experienced crosscut sawyers in our wilderness areas see the value and efficiency of single bucking noncomplex and smaller trees that they can move on their own. One-person single bucking logs out of the trail enables others on the crew to focus on different tasks or different trees.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Maintenance

A properly maintained crosscut saw is straight and sharp. The opposing cutting teeth are offset to the exact same degree, and the rakers are all precisely set to slightly lower than the cutting teeth. These settings are measured to the 1,000th of an inch and must match exactly from tooth to tooth and raker to raker.

Field maintenance is generally limited to not damaging the saw and keeping the saw clean and rust free. At the end of the day, wipe off the saw to remove dirt, grime, and wood pitch. Depending on the wood you have been cutting, you may be able to wipe off the saw with just a dry rag or you may need a solvent. Traditionally, sawyers used kerosene to clean and oil a crosscut saw. Today, WD-40 or a citrus-based cleaner are more readily available. If using citrus-based cleaner to remove pitch, be sure to clean the all the citrus-based oil off the saw; the acidic nature of these products can cause rust.

If you have been cutting in wet conditions, be sure to wipe your saw dry and coat it with a light oil or WD-40. Do not use a cooking oil, such as canola, which can polymerize to a hard finish. When the saw is in use, this hard finish heats up and becomes gummy, adding friction to the cutting operation.

Use a razor scraper, fine-grit sandpaper, a pumice grill block stone, or an ax stone to remove rust on saws. Never use a dry stone on a saw; this will scratch the surface. Water is often a suitable lubricant for your pumice or ax stone. If there is pitch and rust, you may need to use a solvent instead of water. Do not apply pressure on the cutting teeth themselves as this can remove some of the tooth's set, changing its cutting characteristics.

When the saw is not in use, place it in a safe location to protect it from damage and to prevent injuring anyone. Sheath an unused saw or place it on the ground parallel to a downed log with the teeth pointing towards the log.

For long-term or end-of-season storage, clean the saw and coat it with a lubricating oil. Hang the crosscut saw, unsheathed, in a safe location. Sheaths (especially rubber-lined firehose) can attract and trap moisture against the teeth and body of the saw, which can cause rust.

Review Questions

What act of Congress created the National Preservation System?

Can you bend a crosscut saw to make it easier to transport? Why or why not?

What can you use to clean and oil your crosscut saw?

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Build and Anatomy of a Crosscut Saw

Starting with the anatomy, we'll look at how manufacturers build and design crosscut saws.

Built for Efficiency: Understanding the Grind

Saw manufacturers grind the sides of vintage saws in three different ways—flat, straight taper, and crescent taper. Each method affects the thickness of the saw in a particular way and has major implications for the overall quality of the saw.

Flat

Sawyers consider flat-ground saws the least desirable (figure 3.1.1). The main disadvantage is that the saw rubs against the wood on either side of the kerf because of its thickness. It also takes more set—the cutter tooth's offset from the plane of the saw—to enable the saw to clear the kerf. For flat-ground saws, the kerf must be wider and therefore requires more energy to use.

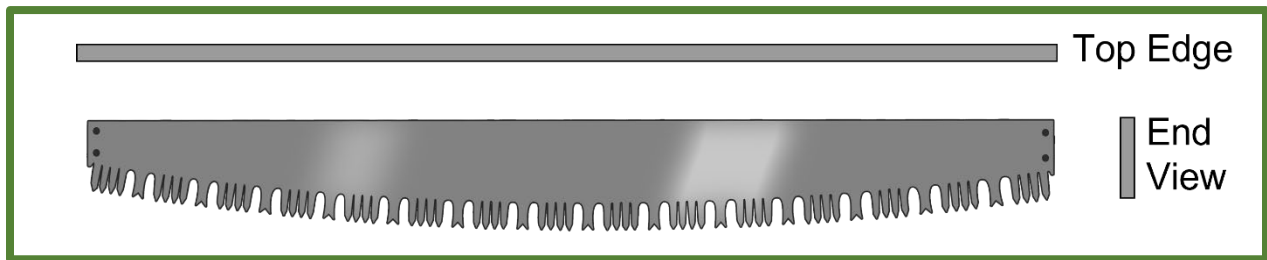


Figure 3.1.1—Flat-ground saw.

Straight Taper

The teeth of straight-taper-ground saws (figure 3.1.2) are thicker near the center of the saw than along either end. Straight-taper-ground saws require less set than flat-ground saws and pull through the kerf with less friction.

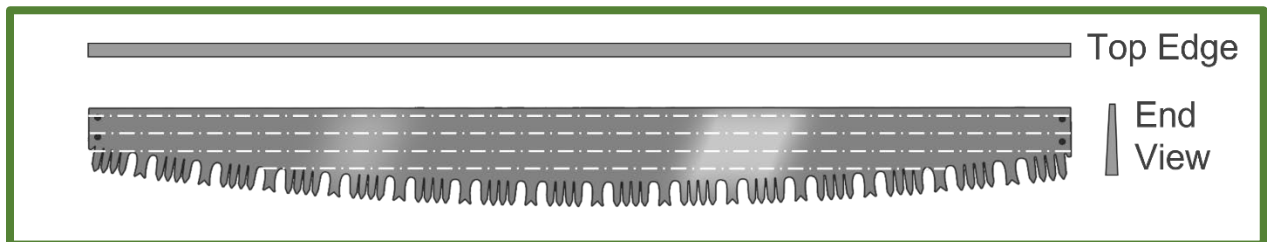


Figure 3.1.2—Straight-taper-ground saw.

Crescent Taper

The difference between the straight taper and crescent taper (figure 3.1.3) is that the lines of equal thickness for the straight-taper-ground saw are straight, and those for the crescent-taper-

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

ground saw are concentric to the arc of the saw. This means that the teeth of the crescent-taper-ground-saw are all the same thickness, whereas the teeth of the straight-taper-ground saw are thicker toward the center of the saw.

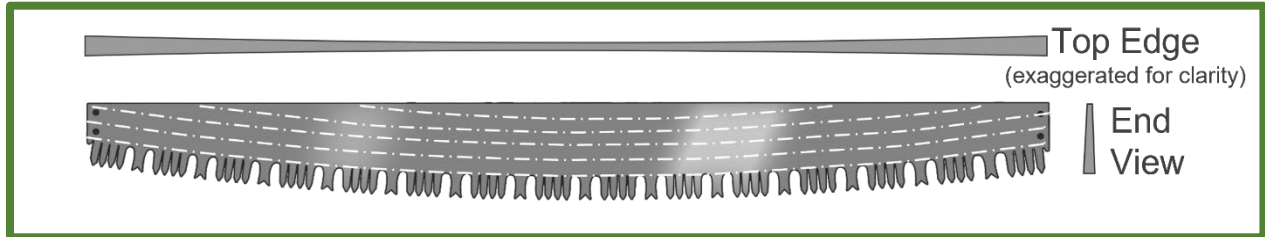


Figure 3.1.3—Crescent-taper-ground saw.

Note: Crescent-taper-ground saws are no longer in production. These saws provide the maximum cutting efficiency with the least amount of human effort and are the pinnacle of ergonomic design. While you should properly care for all the saws in your organization’s tool cache, you should care for these saws above all others.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Crosscut Saw Anatomy

The teeth of a saw perform three functions: cutting wood, breaking the material loose, and removing the material from the kerf. To do this, saws have teeth that cut and others that rake (figure 3.1.4).

Cutter teeth: All saws, regardless of the tooth pattern, are made up of two rows of cutting edges. As the saw passes through a log, it scores wood fibers on each side of the kerf.

Rakers: A special kind of tooth, the raker, allows the cutter teeth to work more effectively with less effort. Even though rakers don't sever fiber, they perform the other two functions of saw teeth: chiseling the cut fiber and removing it from the log. Rakers remove material whether the sawyer is pushing or pulling the saw.

Gullets: Gullets have a rounded shape so shavings will bend rather than break. The gullet must be large enough to store all the shavings until the gullet clears the log and the shavings fall free.

Arc of the saw: The teeth of most crosscut saws lie on the arc of a circle. This is called the arc of the saw. This arc makes cutting faster, easier, and smoother. The arc of the saw works in conjunction with the arc of the sawyer's arm.

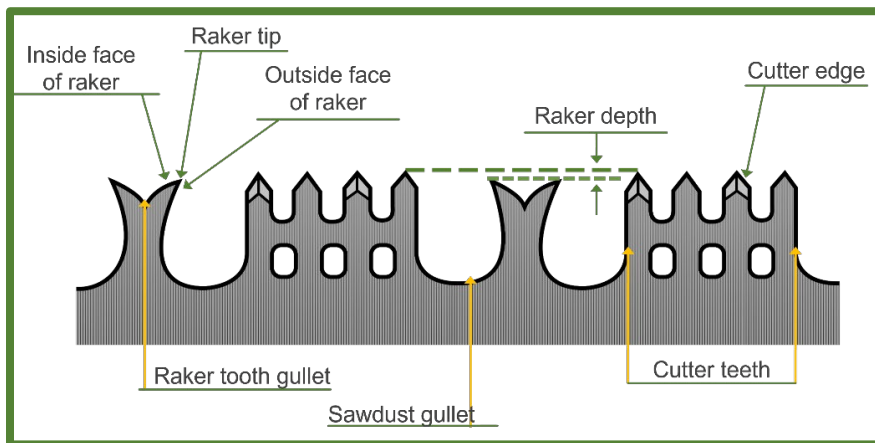


Figure 3.1.4—Crosscut saw anatomy.

Combination teeth: Combination teeth (figure 3.1.5) are a compromise between cutter and raker teeth, as they both score and remove wood fiber in whichever direction they move—usually with greater sawyer effort—for more specialized cutting circumstances. Combination teeth come in different sizes and shapes, depending on their intended use.

Set is the cutter tooth's offset from the plane of the saw, or the amount of bend hammered into the tip of the cutter teeth during the sharpening process. The amount of set required, measured in thousandths of an inch, varies by the grind of the blade, tooth pattern, local wood fiber characteristics, and is ultimately based on the sawyer's preference. In saws with a flat grind, greater set is usually needed to achieve an efficient, smooth cutting motion with less friction when compared to a straight taper or crescent taper where the saw blade is thickest at the teeth.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

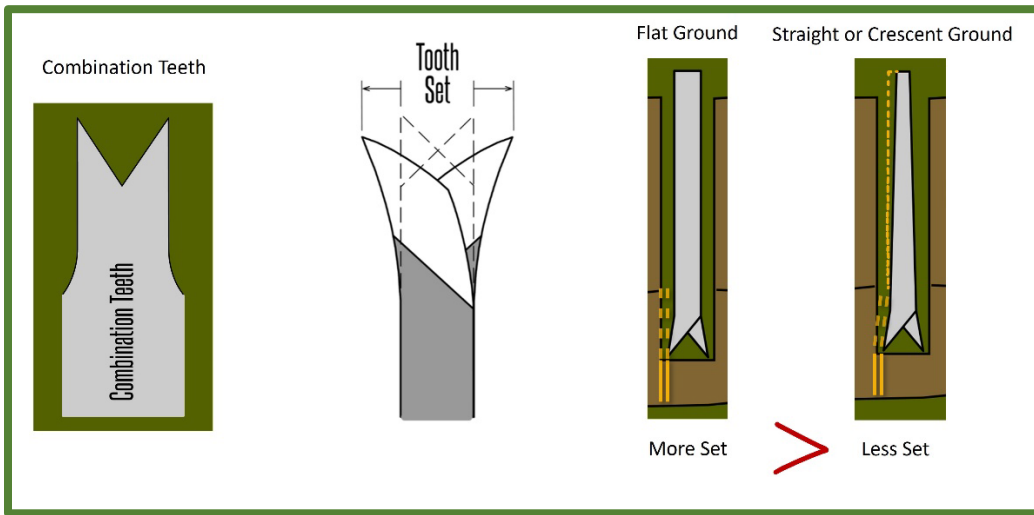


Figure 3.1.5—Combination teeth and tooth set.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Crosscut Saw Tooth Patterns

The type and frequency of cutter teeth to raker teeth, or the type and frequency of combination teeth used in series along the blade, is known as the “tooth pattern” (3.1.6). In the past, saw designers had to consider questions such as:

- What is the anticipated size of the log or tree?
- Is the saw for hardwood or softwood?
- Are the gullets far enough apart to effectively pick up all the fibers severed by the cutters?
- Is the tooth strong enough for the intended work?
- Is there enough room to sharpen and maintain the teeth and rakers?
- What is the best way to reduce vibration and chatter, so the saw cuts smoothly?

Determining Saw Length

Ensuring wood shavings can fall out of a gullet will determine the length of saw to use for a given application. For example, a gullet in the middle of a 3-foot-diameter log must travel 1½ feet to allow its shavings to clear the log. If a two-person team is using the saw, the sawyers would need to use at least a 6½- or 7-foot saw to allow the shavings to clear this log. A single sawyer could use a shorter saw.

Among the many attributes of a specific tooth pattern, the variable with the greatest influence on saw performance is tooth spacing. Generally, the longer the saw, the larger the teeth and the wider the space between teeth. Knowing the effect of tooth spacing helps the Sawyer select the proper length of saw. Larger crosscut saws with more space between the teeth work poorly on smaller timber. Likewise, a short saw with closely spaced teeth doesn't work well on large trees or logs.

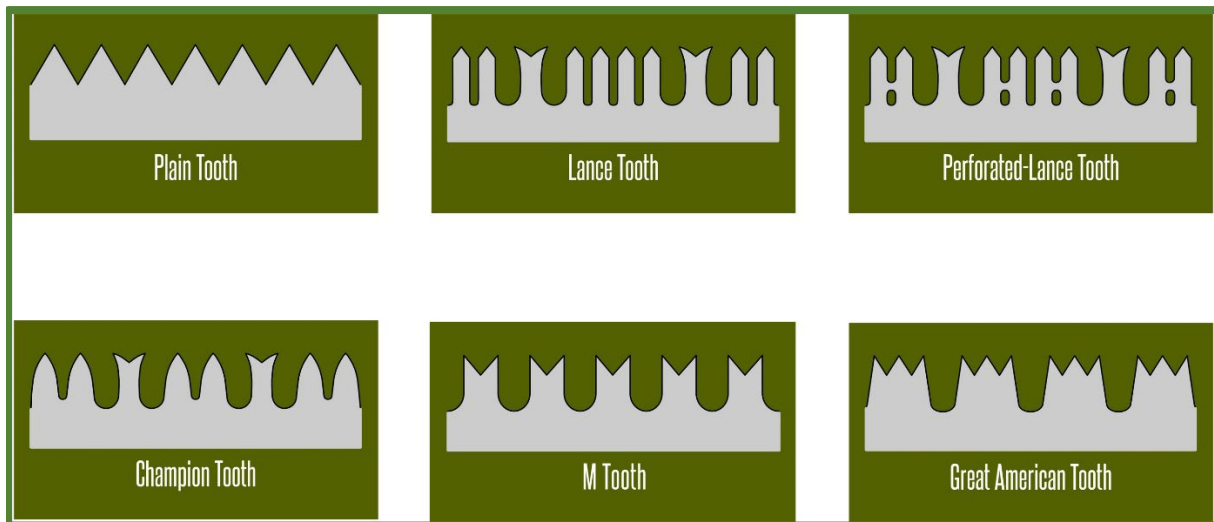


Figure 3.1.6—Crosscut saw tooth patterns.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Following tooth spacing, the type of pattern further dictates the saw's intended use. Cutter, raker, and combination teeth evolved into many different patterns to achieve greater cutting efficiency in different situations.

The **plain tooth (or peg tooth)** is the most basic tooth pattern and has been used for centuries. It consists of alternately set triangular teeth. Being simple, it is easy to manufacture and maintain, but lacks in performance when compared to other patterns. Generally, the teeth are smaller, relative to other tooth patterns, and are consequently used for small-diameter timber in dry or very hard wood, or cuts needing a higher degree of precision.

The **lance tooth (or peg and raker)** is the most efficient cutting pattern in soft wood. It consists of groups of four alternately set cutters separated by an unset raker with gullets on each side. It is best suited for larger diameter green timber in softwood species such as fir, spruce, and redwood.

The **perforated lance** is a good all-around pattern for working in medium and large-diameter mixed timber locations where both soft- and hardwood species are encountered. It consists of groups of four alternately set cutters separated by an unset raker with gullets on each side. The opposing set pairs of lances bridged together gives increased tooth stiffness and forms the perforations that give the pattern its name. It works well for all but very hard and frozen wood.

The **champion tooth** is best suited for cutting medium and large timber diameters in hardwood species and is popular in the hardwood regions of North America. It consists of two alternately set cutter teeth and an unset raker with a gullet between them. It works well in even the hardest dry or frozen wood.

The **M-tooth** pattern cuts aggressively (requiring more force) and is historically best used for cutting dry, medium to hard hardwood species. Modern M-tooth variations work in many different species. The M-tooth consists of pairs of combination teeth separated by a U-shaped gullet. The outer edges of the teeth (the legs of the M) are vertical and act like rakers. The inside edges of the M are filed to a bevel, making a point.

The **great American tooth** pattern cuts slightly less aggressively than the M-tooth, but still more aggressively than a champion tooth. It is typically employed in medium- and small-diameter timber, in dry, medium to hard hardwood species. It is a type of combination tooth pattern consisting of one plain tooth between two opposing set combination teeth, separated by a U- or slightly V-shaped gullet. This pattern is preferable for cutting at an angle closer to 45 degrees to the fiber, such as when needed for an exaggerated compound cut, which we will discuss in more detail later, or a sawn undercut because of its tendency to more easily start and hold an angle throughout the cutting process.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Direction of Force

There are two holes at each end of the bucking saw to change the angle of force on the push stroke of the saw (figure 3.1.7). Placing the pin in the upper hole and using the top portion of the handle will direct more force into the teeth and perform a more aggressive cut. Cutting like this makes your partner's pull stroke more arduous. Using this method demands more muscle but does cut quickly.

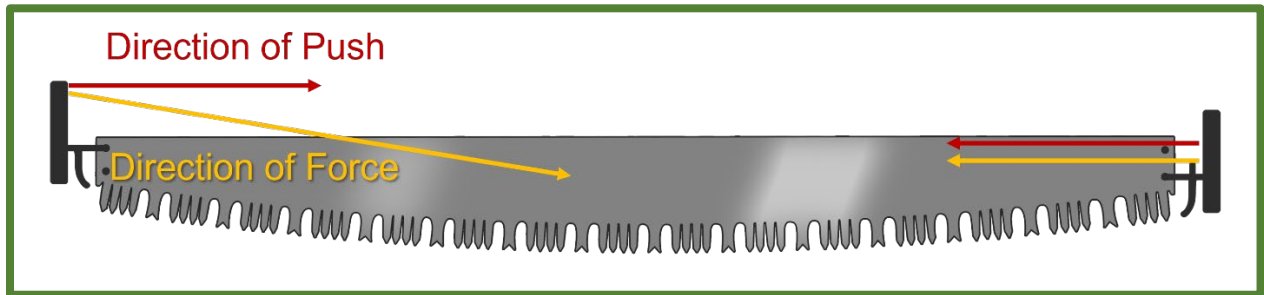


Figure 3.1.7—Direction of force.

To Pull or to Push?

Sawyers have stated for years, “pull, don’t push,” if you are in a two-person saw team. The truth is both a push and pull are necessary for the crosscut saw to correctly function. New sawyers tend to push too much and lock the teeth of the saw on their partner. If we name the two strokes of double bucking the **pull stroke** and the **return stroke**, new sawyers grasp the concept more easily.

Both the pull stroke and the return stroke in single bucking and double bucking follow the arc of the saw. The return stroke guides the saw to the sawyer’s partner and engages the teeth into the kerf with slight down pressure. This enables the saw to enter the kerf in a straight manner and helps the pulling sawyer move the saw with ease, hence removing more wood with each stroke.

Video: How a Saw Cuts

Watch the video about how a crosscut saw cuts. Discuss any questions with your instructor and the class.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Saw Design

All saws are designed for the sawyer to follow the arc on which the teeth are built. Following the arc of the saw engages all the saw's teeth and rakers throughout the entire kerf instead of only engaging teeth in the center of the saw if the sawyer pulls the saw completely flat. This allows the sawyer to cut faster and more efficiently.

Saw Designs

The figures in this section show three differently shaped saw blades with different handles. The different saw shapes—curved, flat, and convex arc—dictate the length or type of kerf they are designed to cut.

Curved-saw shape: The curved-saw shape helps you engage more teeth in a short kerf and prevents over-pulling (figure 3.1.8). As you pull the saw, the angle at which each tooth interacts with the wood becomes more aggressive toward the tip of the blade. The curved tip also allows you to perceive when the saw blade is about to run out of length.

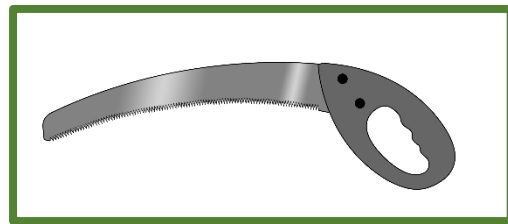


Figure 3.1.8—Curved-saw shape.

Flat-saw shape: The flat-saw shape works well for creating a precise kerf (figure 3.1.9). It allows you to make flat pulls that reduce complex blade movement, though the flat shape compromises its cutting efficiency in long kerfs. A flat blade works best for cutting hinges into small-diameter trees.

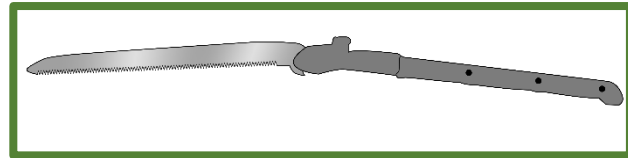


Figure 3.1.9—Flat-saw shape.

Convex-arc shape: The crosscut saw with the convex arc maximizes cutting efficiency in a long kerf by isolating the number of teeth in contact with the wood over the saw's greater length (figure 3.1.10). This allows you to use minimal effort to pull a large saw while creating a deep, long kerf.

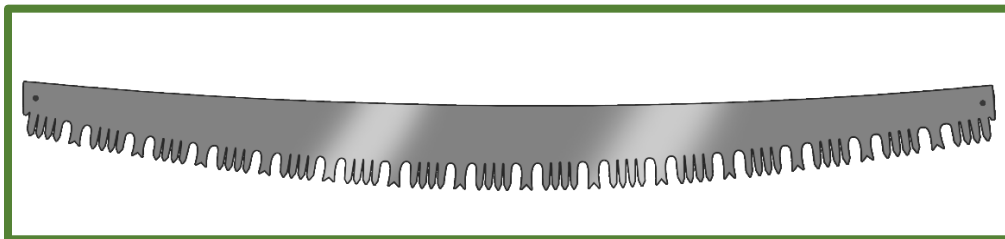


Figure 3.1.10—Convex-arc shape.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

What is the Saw Arc?

A saw radius determines the amount of arc (or lift) a saw has over the length of the saw (figure 3.1.11).

An efficient sawyer or saw team follows the arc of the saw as they use it. For the human body to pull a 4-foot saw, our arms naturally lift. As you pull, your arms naturally follow the arc of the saw. Consequently, the saw team will lift the saw 4 inches over 4 feet of pull (figure 3.1.12).

Manufacturers build crosscut saws with ergonomics in mind to create a smooth and efficient saw.

Vintage crosscut saws are built on a consistent radius. This radius creates an arc over the length of the saw.

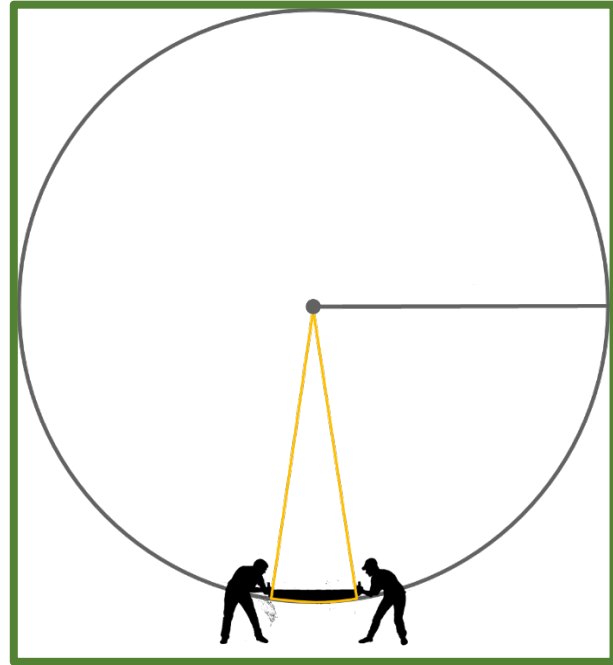


Figure 3.1.11—Arc depiction.

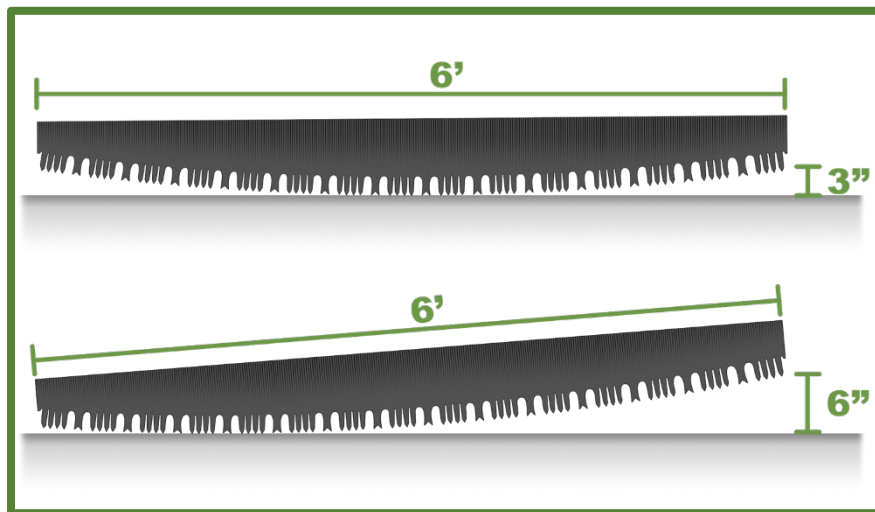


Figure 3.1.12—The saw's arc determines the amount of lift.

Video: Arc of the Saw

Watch the video about the arc of the saw. Discuss any questions with your instructor and the class.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

One- and Two-Person Crosscut Saws

Sawyers can use one- or two-person crosscut saws (figure 3.1.13):

- **One-person crosscut saw:** A one-person crosscut saw is asymmetrical. The saw has a D-shaped handle and holes for a supplemental handle at the tip and near the D-handle. These saws are usually 3- to 4½-feet long.
- **Two-person crosscut saw:** Two-person crosscut saws are symmetrical and are 4- to 12-feet long for general sawing. Some are up to 16-feet long for working in the California redwoods.

Note: Saw manufacturers made saws from 4- to 7-feet long in ½-foot increments and made saws longer than 7-feet long in 1-foot increments.

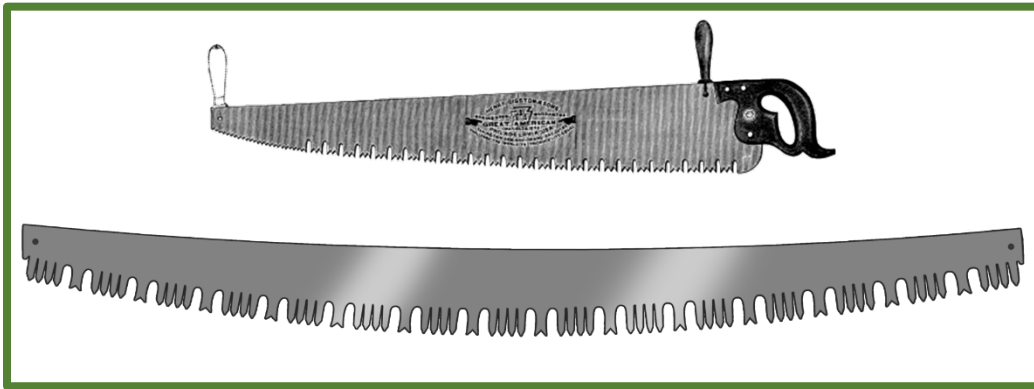


Figure 3.1.13—One- and two-person crosscut saws.

Many vintage saws have teeth all the way to the ends, but saws manufactured today do not. Using a saw with teeth all the way to the ends of the saw provides the greatest versatility for starting or ending a cut, for underbucking, and for using a shorter saw.

Historically, manufacturers used 15-gauge (.070-inch) steel for shorter 4- to 5-foot two-person saws, and they used a thicker, 14-gauge (.078-inch) steel for 5- to 7-foot saws. Longer saws were typically 13-gauge (.094-inch). These thicknesses are measured at the tooth and represent the thickest metal in the saw. Straight-taper and crescent-taper saws were often five gauges thinner at the center back of the saw.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Felling Saws

Felling saws (figure 3.1.14) are lighter and more flexible than bucking saws. The curved back of a felling saw makes the saw lighter and allows the sawyer to insert a wedge sooner. The flexibility of the felling saw allows it to conform on a horizontal cut to the pull. The saw rises as you pull it toward you, keeping it from binding.

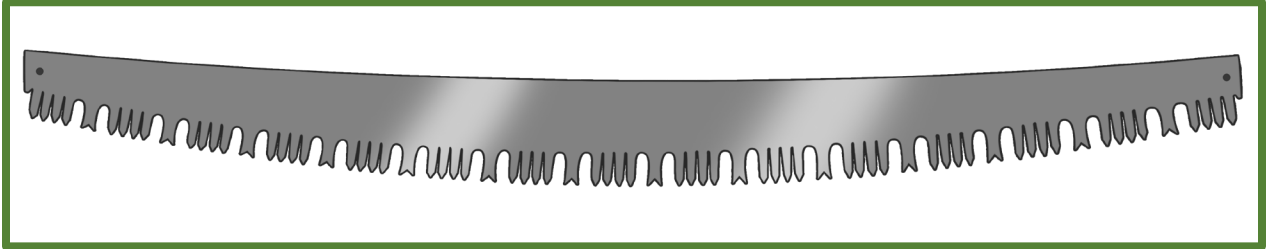


Figure 3.1.14—A felling saw.

Bucking Saws

Bucking saws (figure 3.1.15) have a straight back so they are heavier and stiffer. For example, a 6-foot Simonds 513 felling saw weighs 6¼ pounds, and a 6-foot Simonds 503 bucking saw weighs 8½ pounds.

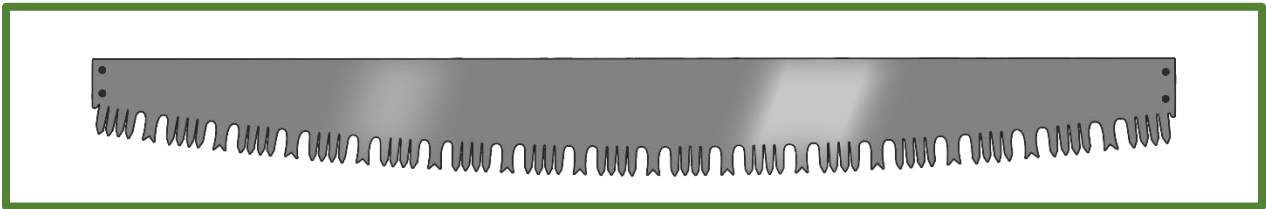


Figure 3.1.15—A bucking saw.

The straight back of a bucking saw gives the saw the following characteristics:

- The added weight allows the teeth to engage in the wood more aggressively, thus bucking faster.
- The added metal from the straight back adds rigidity to the saw and thereby improves the ease of single bucking.

Double Bucking

A general rule for double bucking is to use a saw that is twice the diameter of the tree, plus 6 inches. Therefore, to double buck a 30-inch diameter tree, a saw team would need a 5.5-foot saw or larger to ensure shavings do not clog the rakers.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Companion Tools

Companion tools to the crosscut saw include:

- Saw handles
- Saw sheaths
- Wedges
- Lubricant and solvents
- Handsaws
- Axes

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Handles

Crosscut handles: Crosscut handles are typically hardwood with a metal bracket that contains either a pin or a loop to secure the saw to the handle. The length of the handle, where it attaches to the saw, and where you grip it dictate the transfer of energy into the saw.

Loop handles: Loop handles (figure 3.1.16) have a threaded metal rod on one end and a linear loop on the other end. The threaded end inserts into the bottom of a wooden handle. A nut inside the wooden handle secures the threaded bolt. The crosscut saw fits inside the linear loop opening. Many manufacturers make crosscut saws with notches/cutouts on the ends of the saw to position the handles. By turning the wing nut, the threaded rod moves in or out, which tightens or loosens the saw's placement in the handle.

Bucking handles: Longer than felling handles, bucking handles (figure 3.1.17) enable you to grip the saw below or above the teeth, depending on footing, cutting height, etc.

Helper handles: Helper handles (figure 3.1.18) attach with a pin through a hole in the body of the saw and are most common on one-person saws.

Felling handles: Shorter than bucking handles, felling handles (figure 3.1.19) do not catch your belt or suspenders while pulling the saw handle past your body.

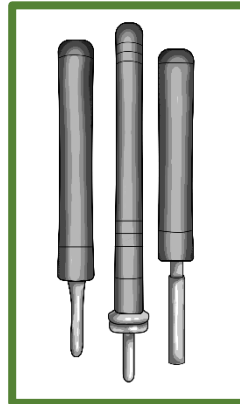


Figure 3.1.16—Eastern loop handles.

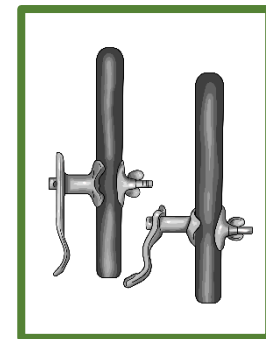


Figure 3.1.17—Western bucking handles.

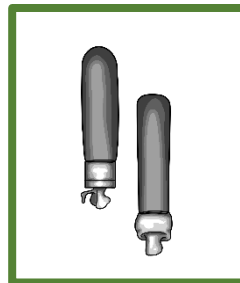


Figure 3.1.18—Helper (stinger) handles.

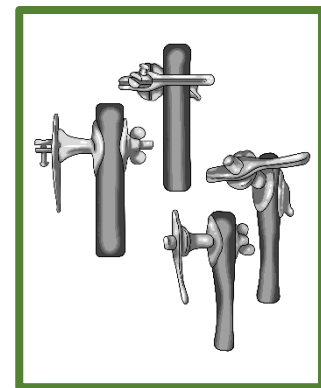


Figure 3.1.19—Western felling handles.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Sheaths

Sheaths protect the saw and prevent it from causing damage or inflicting injury to the sawyer. You should sheath saws as often as possible unless you are using them or storing them. Saw sheaths can be rigid or flexible.

Rigid sheaths: Rigid sheaths (figure 3.1.20) are often easier for hikers to carry for long distances because the saw blade doesn't flop up and down on the hiker's shoulder. Rigid sheaths can cover just the teeth of the saw or the entire blade.



Figure 3.1.20—Saw in a rigid sheath.

Flexible sheaths: Flexible sheaths provide protection while allowing saws to bend over pack animals. Flexible sheaths also are lightweight and easier to carry when they are not on the saw.

Note: It is best to avoid bending saws if you can. Use caution with a flexible sheath; constant flexing of a saw can lead to metal fatigue and can ultimately fracture the saw.

Single-Bit Ax

Single-bit axes need to be heavy enough (3 to 5 pounds) to drive plastic wedges into the trees you are felling. The back of the ax (poll) should be smooth, have rounded edges, and be free of burrs to minimize damage to wedges.

Wedges

Wedges come in steel, soft metals like aluminum or magnesium, and plastic. Wedges also come in a variety of thicknesses and lengths. You should select wedges based on the type of work you are doing and the timber type with which you are working.

Plastic wedges: Plastic wedges are the most commonly available, inexpensive, and lightweight. Plastic wedges also rarely damage the saw because the wedge will become damaged first.

Hanging wedges: Hanging wedges are used as a pair—the sawyer drives one across the kerf at the 10 o'clock position and the other across the kerf at the 2 o'clock position. Hanging wedges are tied together to ensure that when the log is severed, they remain hanging by the cord that ties them together. This helps prevent the hanging wedges from falling onto and damaging the saw.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Lubricants and Solvents

Most sawyers choose to carry some sort of lubricant with them when they operate a crosscut saw. Oil-based lubricants often also act as solvents, and therefore you can use them to cut pitch, lubricate the saw, and coat the saw to prevent rust.

Citrus-based solvents are biodegradable, and WD-40 applies easily and well because it's an aerosol.

Handsaws

When working with traditional tools, using the most efficient tool for the job is paramount. Knowing when it is better to use an ax, handsaw, or crosscut saw is based on an individual sawyer's experience and comfort level.

Some sawyers prefer a handsaw (figure 3.1.21) with a curved blade, while others prefer a handsaw with a straight blade. Curved saws are easier to use for limbing than straight-bladed saws. A straight-bladed saw is more effective for underbucking and any cutting operation where you may need to construct a hinge into a tree.

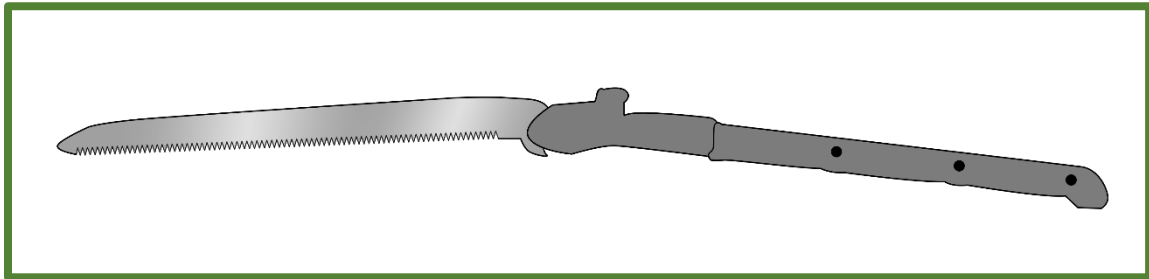


Figure 3.1.21—A folding handsaw.

Example uses:

- Limbing
- Cutting small trees
- Removing brush
- Underbucking
- Making a final cut to sever a log
- Removing a spring pole
- Overhead cutting

USDA Forest Service National Sawyer Training

Developing Thinking Sawyers

Module 3.1: Crosscut Saw Basics

Optional Equipment

This section covers some of the more commonly used tools, though there are many from which to choose.

Underbucker: At times, you will need to underbuck a log due to its binds. For these instances, some crews choose to carry a mechanical underbucker, such as the one shown in figure 3.1.22. Using this tool or using an ax handle allows you to underbuck a log without having to support the full weight of the saw.

Peavy: A peavy is a kind of leveraging tool that allows saw teams to roll medium (and even large) logs by hand. Surprisingly effective, a peavy greatly diminishes the risk of back injuries when moving large material.

Rigging: Rigging is the use of various rope and pulley configurations in more complex operations. Rigging can provide extra safety or a solution for moving a log or tree when other tools fall short. Rigging operations require special training and safety considerations.



Figure 3.1.22—An underbucker in use.

Digging tool: There are times when log removal is not possible without a digging tool. For example, you would need a digging tool if a log was laying directly on the ground or in a cupped trench, and the only way to cut the log in pieces is to dig out a spot in the ground for the crosscut saw to pass through.

Loppers: Sawyers often carry loppers with a crosscut saw and use them to remove brush from alongside the trail, cut small limbs, and clear the work area to operate the crosscut saw.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Knowledge Check

Take a few moments to answer the questions below. Discuss the answers with your instructor and the class.

What is the difference between a flat-ground saw and a crescent-taper-ground saw? What are some advantages and disadvantages?

What is the purpose of the gullets on a crosscut saw?

Why should you follow the arc of the saw when cutting?

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

Summary

In this module, you learned to:

- Explain why agencies use crosscut saws in federally designated wilderness areas.
- Describe the different types of saw grinds.
- Explain the different parts of a crosscut saw and how they function together.
- Describe the best saw transportation methods.
- Describe basic care and maintenance for crosscut saws.
- Describe how a crosscut saw cuts (removes wood).
- Explain the arc of the saw.
- Identify accompanying tools to a crosscut saw and describe their purposes.

USDA Forest Service National Sawyer Training
Developing Thinking Sawyers
Module 3.1: Crosscut Saw Basics

This page intentionally left blank.