



Chainsaws—Safety, Operation, Tree Felling Techniques

A chain saw is a valuable, labor saving tool for homeowners, forest landowners and professional loggers. However, when used improperly, it can cause serious injuries. Read and follow operating instructions provided in the chain saw manual.

Good judgment and common sense are essential to operating a chain saw safely. Equipment varies, but if a chain saw manual is not available, the following guidelines will provide some important information on chain saw safety, operation, and tree felling techniques.

Safety

Many safety advancements in chain saw design have been made, but accidents still happen. All chain saw users must observe safety practices. Working safely requires a personal commitment to be constantly aware of your actions and surroundings.

The selection and use of chain saws with good safety features are very important. Select a saw that includes features to reduce kickback and an anti-vibration system to reduce saw vibration to the user's hands. This reduces user fatigue and ensures greater safety. Saws also should be equipped with a continuous pressure throttle control system that will shut off the power to the saw chain when pressure is reduced.

Wear comfortable, close-fitting clothing when using a chain saw. Also, include the following protective equipment:

- safety boots with steel toes and nonskid soles;
- face shields or plastic goggles, to prevent injuries from wood chips, and sawdust;
- ear plugs or muffs to prevent hearing loss. Chain saw noise is greater than the human ear can

tolerate; sustained exposure can cause hearing loss that cannot be restored.

- heavy duty leather gloves to protect hands from cuts and scrapes.
- leg protection pants or chaps that cover the upper thigh to boot tops.
- first aid kit available at the work site.

Planning reduces the hazards of working with a chain saw. Chain saw operators should know their physical limitations, work slowly, rest often and remain alert to potential problems and hazards. Fatigue leads to accidents.

Before starting the chain saw, be sure to check the operating manual for the recommended fuel mixture, choke setting and throttle control. The saw should be properly adjusted so the chain will stop when the throttle is released. Start the chain saw at least 10 feet away from the fueling area. Always fill the oil reservoir when refueling the saw.

When starting the saw on the ground, be sure to hold the saw firmly on the ground, with the right foot in the rear handle. Grip the front handle with the left hand. Be sure the area under the bar and chain is clear. Check to see that the starter mechanism is engaged, then pull the starter rope sharply with the right hand, keeping hold of the starter handle as the rope retracts. Rev up the engine briefly to release the throttle control latch and let the saw idle.

Starting a chain saw in your hands is recommended only for experienced chain saw operators, and requires that



the front handle be held with the right hand. Hold the saw so the guide bar points forward. The starter rope is pulled with the left hand. Do not reverse hand positions, as the guide bar could swing against the left leg, causing serious injury.

When handling the saw the following techniques will allow the chain saw user to keep control of the saw:

- maintain firm footing with legs well apart to support the body. Keep the body away from the saw's cutting path. Keep the weight of the saw close to the body, arms slightly flexed, allowing the trunk and legs to carry the weight, relieving the load on the back and arms. The hands and arms mainly serve to guide the saw, bearing as little weight as possible.
- when working in a crouched position, avoid back strain by supporting the elbows on the knees.
- keep wrists straight to prevent muscle strain in the arms. let the rear handle twist when changing saw direction. At times the thumb must operate the throttle.
- keep the thumb around the front handle to prevent the saw from being wrenched from the hands in the event of a kickback. Let the left hand slide along the handle to keep the saw stable and to change positions.

Operation

The safest and least tiring way of sawing is to cut with the backward-running, or lower part of the saw bar close to the bumper. Sawing with the forward-running or upper part makes it difficult to control the saw and increases the risk of kickback. Do not try to overreach while using a chain saw. It can cause a loss of a grip on the chain saw. Never cut over your head or cut with the nose of the saw. Avoid forcing the saw when cutting. Be alert for wire and nails in the wood.

Carry the saw at your side with one hand, holding the cutting bar to the rear and the muffler side away from your body. Stop the engine to carry the saw in a rough, brushy area or if the distance between cuts is more than 30 feet.

Chain saw kickback can cause serious injuries. When cutting, the chain is traveling about 65 feet per second. If kickback occurs, it will be over within $\frac{2}{10}$ of a second. This does not give the operator time to react.

Kickback often occurs when cutting with the nose of the saw. During this process, only one or two cutters engage in the wood at a given time and the chain will jam. This will cause the saw to kickback rapidly, backward and upward.

Prevent kickback injuries by:

- holding the saw firmly with both hands;

- keeping the thumb around the top handle;
- using a saw equipped with a chain-brake or kickback guard;
- watching for twigs that can snag; not pinching the bar;
- sawing with the lower part of the bar, not on the top near the nose;
- maintaining adequate saw speed when beginning or completing a cut.

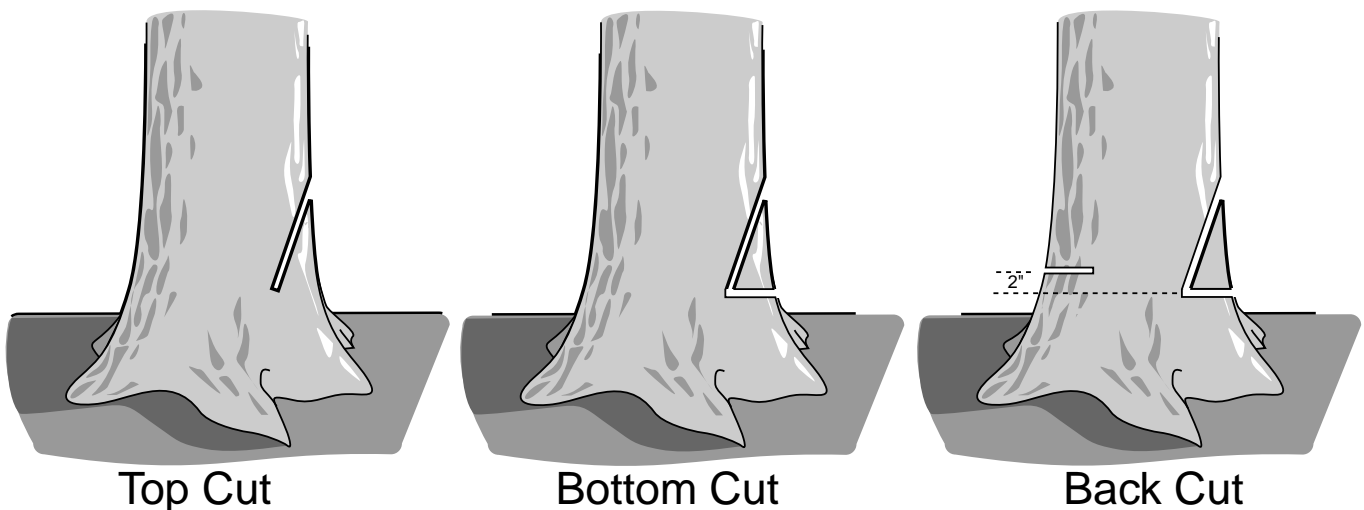
Chain breaks can cause serious accidents and are nearly always the result of a poorly maintained saw. Because of the saw's high speed, the flying cutters can embed themselves in the body. There is little risk of breakage in a chain that is properly sharpened, well lubricated and correctly adjusted for tension.

Tree Felling Techniques

Accurate tree felling is an art and takes practice to master. Because of the hazards involved, never work alone.

The first step in felling a tree is to identify all the hazards around the tree, such as structures, power lines, roads, vehicles, and other trees. Also look for hazardous dead branches or rot on the tree being felled.

The second step is to determine the height of the tree and the direction it should fall. The tree's high center of gravity causes instability and makes its movement difficult to predict and control. Other factors to consider in felling a tree include wind direction and



velocity. Never attempt to fell a tree into the wind. Trees that have a definite lean should be felled in the direction of the lean if possible. Other factors to consider in felling a tree include:

- large branches on one side
- crookedness in the trunk or crown trunk decay (Decay in the center of the tree will affect the direction of fall may be unpredictable)
- other trees near the one being cut the slope of the ground in the area

The third step is to plan an escape route. Establish and clear at least one escape route to the rear and another at a 45-degree angle away from the direction of the fall. If the butt end of the tree kicks up as it falls, it will generally kick up toward the back or to one side.

Make sure the area is clear of people and animals before beginning. Check that the chain saw has enough gas and chain oil to finish felling the tree. Work behind and slightly to the side of the direction of the fall.

The fourth step is making the notch cut. This cut determines the direction of the fall and will reduce splitting of the tree. For trees more than 10 inches in diameter, a notch cut is recommended to help control the direction of the fall. The depth of the notch cut should be about one-third the diameter of the tree, with the wedge cut making a 30-degree angle. Make the top cut of the notch first at 45 degrees. The bottom cut of the notch should be level and meet the top

The final cut is the back cut, or felling cut. It is made opposite the notch cut and should be one to two inches above and parallel to the horizontal cut of the notch cut. Never make the back cut lower than the horizontal cut. Stop the back cut about one to two inches before cutting through to the undercut notch. The holding wood left uncut in the tree's center acts as a "hinge" to control the direction of the fall. If the back cut goes completely through, the tree may swivel on the stump, slide, or bind on the bar and chain.

If the tree is larger in diameter than the length of the chain saw bar, cuts on each side of the tree may be needed.

Keep an eye on the top of the tree and the back cut for signs of movement. If the tree begins to fall in the intended direction, immediately stop the saw, set it down away from the path of the falling tree, and retreat diagonally backwards. Do not stand near the tree and watch it fall. A falling tree can bounce back and strike the chain saw operator.

If the tree leans back, closing the back cut and binding the saw's cutting bar, remove the saw or stop the engine and drive one or two wedges into the back cut. Wedges should not touch the chain or cutting bar.

Bucking and Limbing

Once the tree is felled, look over the area and tree carefully to determine just how the tree will respond when cutting the trunk into usable log lengths; whether it is for commercial sales, or farm use, or firewood.

Limbing is the removal of unwanted branches from the trees. Start limbing from the base of the trunk, working toward the top of the tree. Work slowly and cautiously. Accidents occur frequently during limbing because footing is poor and obstructing branches can impair vision and cause kickback injuries. For protection, keep the tree trunk between yourself and the branches being cut. However, if the tree is lying on a hillside, always limb from the uphill side. Do not walk on the tree trunk because it can roll. Maintain footing by clearing away the cut branches, and be alert for nails and wire in the wood.

Cut as close to the trunk as possible. Support the saw against the trunk when using the forward running part of the chain. This reduces fatigue and strain. Run full throttle as the saw cuts into the limb.

Pull the saw across the trunk and support the saw against your right leg. The guide bar will then be in the correct position for removing the limbs on top.

Using full throttle, move the saw forward, using your legs to keep it pressed against the trunk. Use the forward-running part of the chain. Tilting the saw will be easier if it is lifted slightly.

Support the saw against the trunk and your right leg when limbing the side next to you. Use the backward-running part of the chain.

When sawing top limbs, move the saw forward, using the trunk to support the saw. Tilt the saw to the right, using the thumb to operate the throttle.

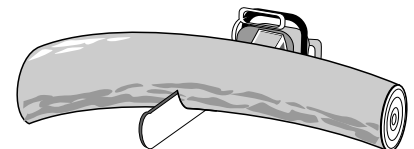
When sawing limbs on the other side, support the saw against the trunk and use the backward running part of the chain. Move forward only when the guide bar is moving downward on the other side of the trunk.

Remove the underneath branches last, using the forward-running part of the chain. For support, rest your right hand against your right knee. Never let the chain saw cut into the ground.

Bucking is the process of cutting the tree into usable lengths. When bucking the tree be sure to maintain sure footing, hold the saw firmly in both hands, and stand to one side as the cut



Downward Bend



Upward Bend

is started. Care should be taken to avoid cutting all the way through the log and hitting rocks or soil that will damage the chain. Also, keep an escape route open in case the trunk kicks out.

Allow the saw to pull into the log against the bump spikes when sawing.

If the trunk has a downward bend, start the cut in the top and then saw from underneath. When the bend is upward reverse the cutting sequence.

Moderate tension in the trunk requires a cut through half the trunk with the saw upright, then quickly saw through the remainder. If a trunk is under tension, prevent the saw from

binding by first cutting a wide notch in the inside of the bend. Saw a little at a time, slowly, until the trunk breaks. Be ready for kickback.

When working on sloping ground, stand uphill from the log and see that no one is working below the bucking area.

Preventive maintenance and careful use are the best insurance against accidents and breakdowns.

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MF-2103

January 1997

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Richard D. Wootton, Associate Director. All educational programs and materials available without discrimination on the basis of race, color, national origin, sex, age, or disability.

File Code: Forestry 8

MS 1-97—5M