

# Safe Chain Saw Operation

Bulletin No. 599  
March 1981

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Adapted from Michigan cooperative Extension Service Bulletin E-1310 by Thomas J. Karsky, Extension farm safety specialist, University of Idaho, Moscow.

# Safe Chain Saw Operation

## Introduction

Chain saw operators need to know how to:

- match the saw to the job.
- evaluate working conditions.
- perform basic cuts.
- work within the saw's limitations.
- avoid "kickback."
- identify dangerous problem trees.
- do routine saw maintenance.
- dress with proper clothing for the job.
- use safe operating techniques (starting, cutting position, refueling, clean work area).
- "size up" a tree.
- "fell a tree" (cut it down).
- "limb" (remove limbs from a trunk).
- make trunk cuts.
- recognize and sharpen a dull chain.

A chain saw should match the task you want it to do. That is a basic principle of chain saw safety.

The best source of knowledge about the size of chain saw required is an experienced, knowledgeable dealer. To choose the proper saw, you need some idea about the amount and type of cutting you will be doing. Large chain saws, weighing over 15 pounds with long bars, are best used for professional, heavy cutting of large wood and in felling operations. A medium size saw, generally having a total weight of 10 to 15 pounds and a cutting bar from 12 to 18 inches in length, is good for light cutting, bucking and limbing. A small, lightweight saw, usually weighing less than 10 pounds with a cutting bar length of 10 or 12 inches, is best suited for cutting small trees and pruning.

If too small a saw is used continually for tough jobs, the operator will tend to overexert. Similarly, use of a heavy saw for light work may result in excessive fatigue. When you're overtired, accidents can occur.

Several factors affect the safe operation of a chain saw. Among these are the weather, the work, the saw and the operator.

## The Weather

Wind can create very serious hazards when cutting down trees. Sudden gusts may cause a tree to fall in an unexpected direction. Avoid cutting large trees on windy days, or use these days for "limbing" (removing the limbs from the trunk) or "bucking" (cutting the trunk into desired lengths).

Rain, snow and ice can cause a loss of good footing. Always wear proper protective clothing, and work slowly and carefully.

## The Work

Inexperienced operators should not start by "felling" (cutting down) trees. Make trial cuts to become accustomed to a chain saw's cutting and handling characteristics.

Cut small logs supported off the ground so that the chain will not strike the ground. Let the chain do the cutting. Extra pressure does not need to be applied.

Don't try to cut trees with a diameter greater than the length of the chain saw guide bar (Fig. 1). This requires special techniques. You can be seriously injured if the saw makes a "kickback" — jumping backward as the chain at the top of the guide bar is snagged.

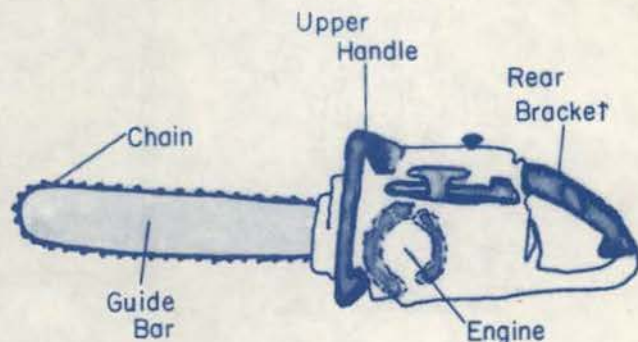


Fig. 1. Basic parts of a chain saw.

Certain trees are dangerous. Lumberjacks use some of the following expressions to identify problem trees:

**Widowmaker** — A tree with broken or dead limbs or a dead tree “hung up” in another tree. A limb doesn’t have to be very big or high in a tree to be capable of causing serious injury if it falls on a person.

**Spring pole** — A sapling that is bent and held under tension by another tree. If the spring pole is cut or the other tree is removed from it, the sapling can snap up with a tremendous force and seriously injure someone nearby.

**Schoolmarm** — A tree with a prominent fork in the trunk, making it difficult to predict which way it will fall.

## The Saw

The noise and vibration of a chain saw can cause hearing loss, fatigue and a swelling of the hands, commonly known as white fingers disease. Buy a saw that runs with minimum vibration (some saws are equipped with anti-vibration mounts) and good vibration-absorbing grips.

Proper maintenance is also essential. This includes sharp teeth, correct chain tension, proper lubrication and a well-tuned engine. Most routine maintenance can be accomplished by following the owner’s manual recommendations. Unless you are mechanically inclined, consult a saw dealer when serious mechanical problems arise.

Every owner should have a good tool kit to help assure continued operation of his saw (Fig. 2). The kit should contain:

- a few extra labeled cans or a plastic bottle (with attached pouring nozzle) of chain oil.
- wrenches to fit all nuts and lugs on the saw.
- screwdriver.
- round file and guide for touching up the chain.
- flat file and depth gauge to file the depth guides.
- small brush (1/2 inch) to clean away sawdust and wood chips from around the gas cap and cooling fins.
- extra sparkplug.
- owner’s manual (wrapped in a plastic bag).
- cleaning rags.

If you are going to do a lot of cutting, take along an extra chain as a spare. Alternating chains every day will greatly prolong the life of the sprocket upon which they run.

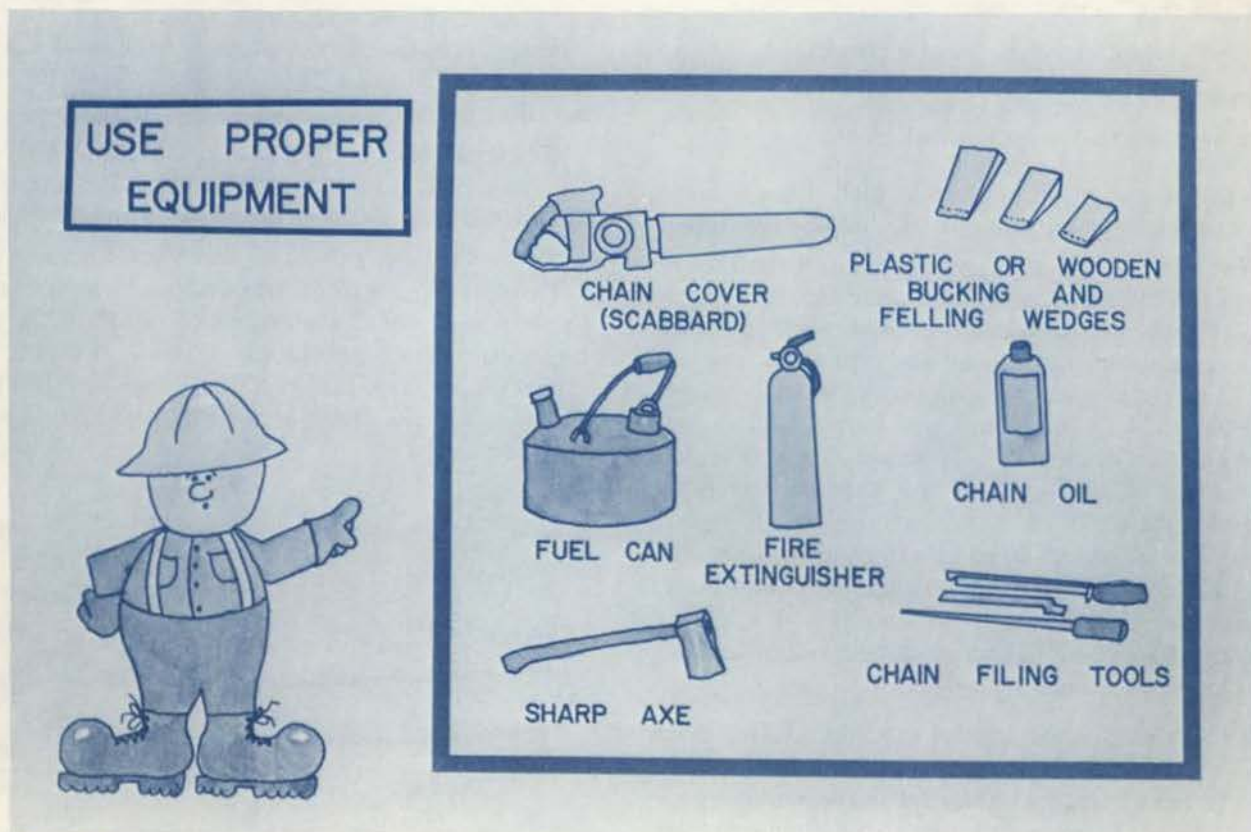


Fig. 2. Use proper equipment to help you do the job safely.



Fig. 3. Use protective equipment when operating a chain saw.

Some additional backup equipment is essential. In Idaho and nearly all national forests, the law requires that you carry an axe, bucket and shovel in all vehicles that enter the forest from May 31 through October 31. A 3-gallon, pressure type garden sprayer with a medium spray tip makes a good extinguisher for forest conditions. Dry chemical class AB extinguishers are also good. An approved, functional, spark arresting screen for the saw's muffler is also a must.

## The Operator

Felling and cutting timber is hard work. Operators should be in good physical condition and able to withstand heavy work periods. Persons who become exhausted easily may be potential accident victims. Don't hesitate to take frequent rest breaks.

Proper clothing is a must (Fig. 3). Wear warm, comfortable, trim-fitting clothing that allows easy movements, light nonslip gloves and good gripping boots or shoes. Protective leggings or chaps and shoes with steel toes will provide additional safety. Safety goggles or eye glasses with safety lenses help prevent possible eye injury from flying wood chips

or sticks. A good safety hardhat may prevent serious head injury from falling branches or limbs.

Ear plugs or acoustic muffs are essential because of a saw's high noise level. If your ears ring for an extended time after the saw is used, hearing damage may have occurred.

## Operating Techniques

### Mixing Fuel

Mix fuel according to instructions in the owner's manual. Store and transport fuel in a properly labeled, heavy gauge (26 gauge or heavier) metal gasoline container. Keep the chain and bar well lubricated when cutting. Make certain the oiler device (manual or automatic) is functioning. The oiler is both a safety device and a means of reducing bar wear.

### Refueling

When refueling the engine, use a funnel or flexible nozzle to avoid spillage. If you do spill fuel on the engine, thoroughly clean the engine before starting. Refuel the engine with the saw on the ground and in an area cleared of combustible materials (Fig. 4). Under no circumstances should you smoke while refueling.

Before starting the engine, check the oiler, air filter, sprocket and cooling fins for possible blockage. Check and, if necessary, adjust the tension in the chain. Consult the owner's manual for the proper distance the chain should be from the bottom of the bar. In addition, check that all bolts, nuts and screws are tight because these often become loose during operation.

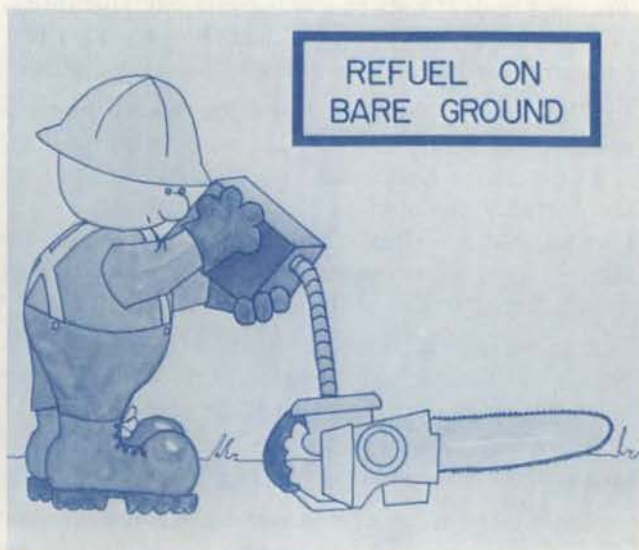


Fig. 4. Refuel on bare ground to reduce the fire hazard.

## Starting the Engine

Start the engine with the saw on the ground, and place one foot in the bracket to the rear of the unit (Fig. 5). Grip the handle at the top of the saw with the thumb wrapped under the handle, and pull the starter rope with the other hand after properly setting the starting controls. Smaller saws may not have a foot bracket, so make certain the saw is held firmly on the ground.

Never “drop start” a saw. A leg injury can result when the saw blade swings down. Also, **never allow another person to help with starting.** If either person slips or lets go, someone may be injured.

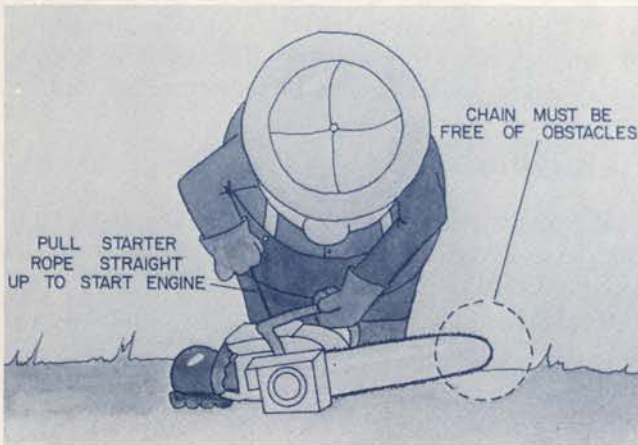


Fig. 5. Take extra precautions when starting a chain saw.

## Making a Cut

When making a saw cut, be sure your thumb is wrapped under the bar atop the saw, not laid alongside the index finger on the bar (Fig. 6). This will prevent your hand from slipping into the chain.

While cutting, hold the saw close to your body to provide maximum control. Do not work with your arms extended. Keep your knees flexed and one foot comfortably behind the other to provide a firm footing with maximum balance. When cutting on steep slopes, always stand on the uphill side to prevent being struck by rolling logs.

Before “felling” (cutting down) a tree, size it up carefully. Check the distribution of the larger branches and wind direction to determine how the tree is likely to fall. Allow no one else within two tree lengths while you are felling a tree.

Be sure the work area around the tree is cleared of underbrush or obstacles that could be tripped over. Clear an escape path 45 degrees opposite the

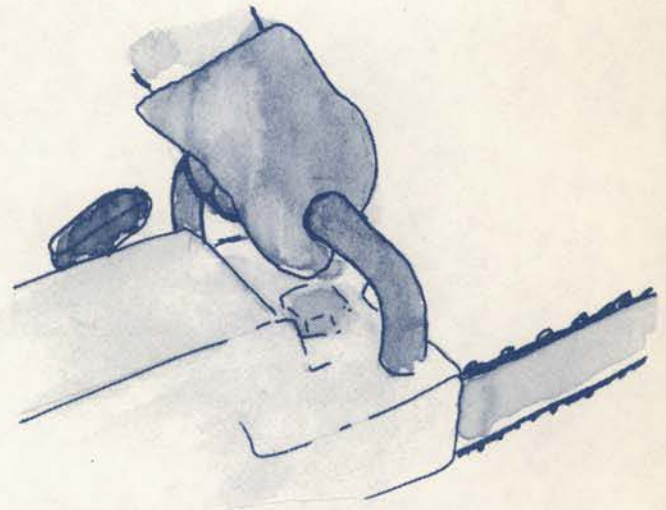


Fig. 6. Keep your thumb wrapped around the bottom of the chain saw at all times.

direction the tree will fall (Fig. 7). Examine the tree for loose or dead limbs before felling. If they appear to be a hazard, remove them before felling the tree.

When changing your locations, carry the chain saw with the blade to the rear and with the hot muffler away from your body. Never carry a chain saw on your shoulder or with the chain in motion. Make certain the chain stops rotating around the bar when the throttle control trigger is released. If you are moving any distance, or if you let the saw down, stop the engine.

When you have completed the cutting, shut off the saw. Do not move out of the immediate cutting area with the saw running. If you're not going to use the saw for a while, place a chain cover over the guide bar to prevent the chain from snagging or becoming damaged by other objects.

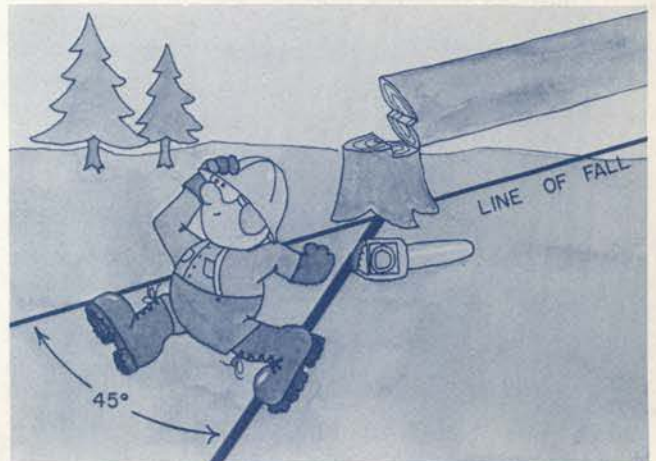


Fig. 7. Plan a safe retreat before felling a tree.

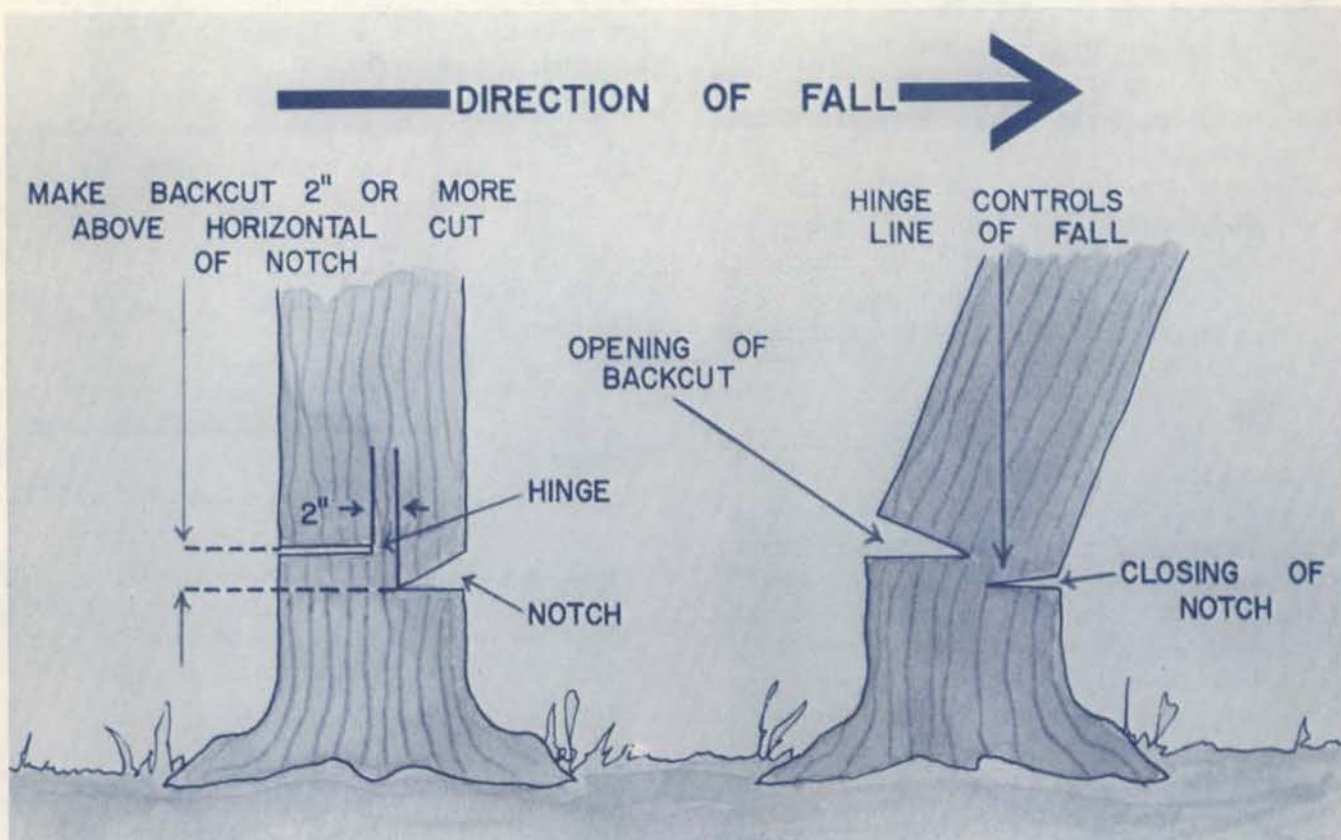


Fig. 8. Notch and felling cuts must be made correctly to make a tree fall in the desired direction.

## Felling

- On larger trees, make a notch on the side of the tree on which it is expected to fall. This notch should have a depth of about one-third the diameter of the tree (Fig. 8).
- Make the felling or back cut at least 2 inches higher than the horizontal notch cut. Keep the felling cut parallel with the horizontal notch cut. Cut it so wood fibers are left to act as a hinge, keeping the tree from twisting and falling in the wrong direction or making a kickback on the stump.
- Keep the guide bar in the middle of the cut (horizontal) so the cutters returning in the top groove don't recut. Guide the saw into the tree — don't force it. The rate of feed will depend on the size and type of timber being cut.
- Remove the saw from the cut, and shut it off before the tree falls. Do not cut through the hinge because this may cause the tree to fall in any direction, possibly on you as you retreat. Move away from the tree at a 45-degree angle through the retreat lane that has been thoroughly cleared.

## Limbing

After the tree is on the ground, take a look at each limb before removing it. Be sure that cutting a limb off will not bind the guide bar or cause the trunk to roll toward you.

Do not face the limb squarely. Stand at about a 45-degree angle so that if the saw slips or completes the cut sooner than expected, the chain will not strike your leg.

Avoid sawing with the point of the guide bar (nose sawing). This greatly increases the chances of saw kickback (Fig. 9). Kickback can occur if the chain suddenly hits a solid object or takes too large a cut. Kickback can force the saw backward and may result in a serious accident.

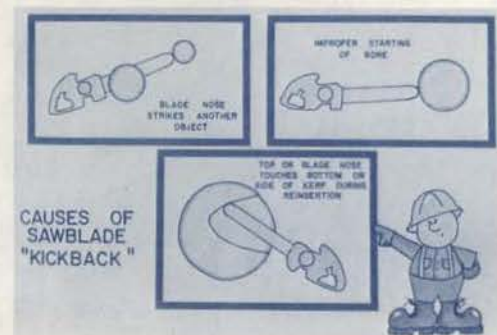


Fig. 9. Avoid situations that can cause saw kickback.

NOTE: See page 10 for factors to consider when felling a tree.

Kickback can be prevented by:

- holding the saw firmly with both hands.
- gripping the top handle with the thumb around it.
- using a saw equipped with a chain-brake or kick-back guard.
- watching for twigs that can snag the chain.
- not pinching the bar while in the log cut.
- sawing with the lower part of the bar, close to the bumper, not on the top near the nose.
- maintaining high saw speed when entering or leaving a cut in the wood.
- keeping the chain saw chain sharp.
- not reaching above shoulder height to cut. (The chain is too close to your face in this position.)

Many newer models of chain saws are equipped with a safety tip, a chain brake or a special chain, all of which are anti-kickback features. Ask the dealer to explain how these help reduce kickback. Look for anti-kickback features on any new or used saw you are considering buying.

Never make cuts with the saw between your legs or straddling the limb to be cut. Always be aware of the direction the chain will go if it breaks, and keep people clear of this area. Stand on the opposite side of the trunk from the limb you are cutting. This gives your legs additional protection (Fig. 10).

While limbing or cutting the trunk (bucking), make sure the chain does not hit the ground. An operator can cut 40 trees and not do the damage to the chain that striking the ground one time can do.

## Bucking

If the trunk is supported along its entire length, make cuts from the top (called overbucking) one-third the diameter of the log deep, the length of the

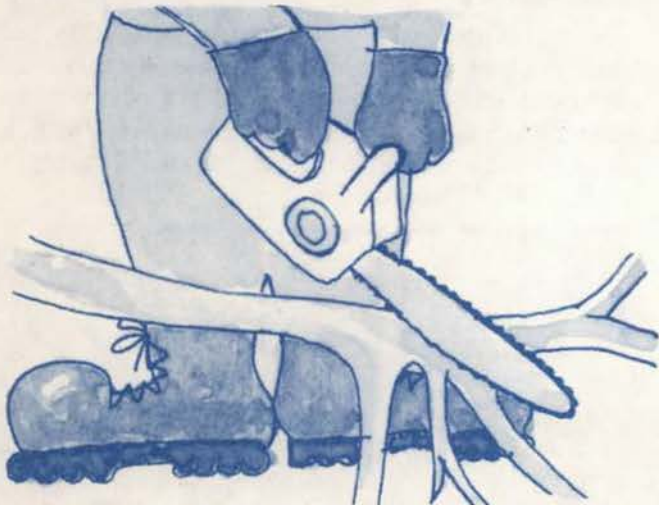


Fig. 10. Whenever possible, keep the tree limb or similar barrier between yourself and the saw blade.

trunk. When this is completed, roll the trunk over and make the final cuts. This prevents pinching the guide bar and chain (Fig. 11A).



Fig. 11A Use this bucking procedure on work supported along the entire length.

If the log is supported on one end, make the first cut (underbuck) one-third the diameter. Then complete from the topside by overbucking the upper two-thirds to meet the underbuck (Fig. 11B).

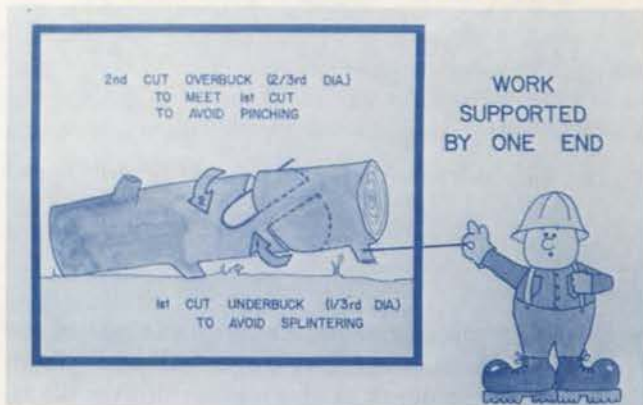


Fig. 11B. Use this bucking procedure on work supported by one end only.

When the log is supported from both ends, cut one-third the diameter from the top (overbuck), and then complete the cut by cutting upward from the underside (underbuck) to meet the first cut (Fig. 11C).

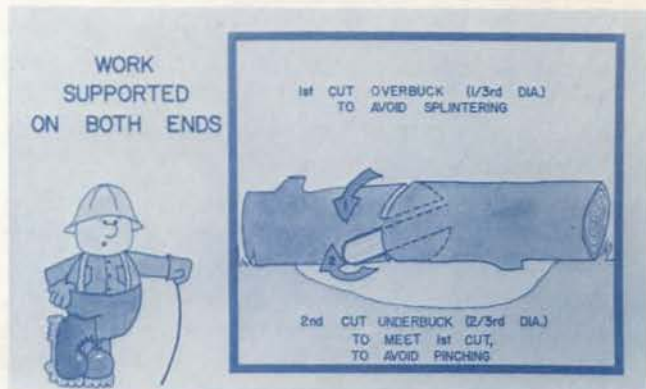


Fig. 11C. Use this bucking procedure on work supported at both ends only.



Whenever you operate the saw, keep people well out of the cutting area. If a person is assisting by removing limbs, be aware of his position and activity at all times.

## Special Situations

### Cutting at Heights

Using a ladder to remove limbs from trees is very hazardous. Don't carry a chain saw up and down a ladder with the engine running. Use a rope to hoist the chain saw, with the engine not running, up into the tree.

You need a very stable position on a ladder to start a chain saw without losing your balance. When cutting, always keep a firm grip on the chain saw with both hands. Don't let it "fall" through the cut, or it may strike your legs or other objects. Overhead cutting is extremely tiring and dangerous.

### Using Wedges

Place wedges in the saw cut to prevent binding. When using wedges, stop the chain so there is no danger of driving a wedge into the moving chain. Use only wooden, aluminum or plastic wedges. Do not use steel or iron wedges. They may do considerable damage to the chain if struck.

Wedges are essential for felling leaning trees, for felling trees on windy days or for felling a tree that has to fall in a specific direction. Two wedges are usually used. When the final cut is up to the proper depth for felling the tree, remove the saw. Shut the chain saw off and move it back to a safe position. Then tap the wedges with a sledge or mallet to fell the tree.

If the chain cuts a wide groove or the cut shows fine powder instead of wood chips, it needs sharpening. If the saw tends to cut a circular path

instead of a straight line through the log, the guide bar track, along which the chain runs, is worn on one side or the chain may be improperly sharpened. Study the operator's manual for proper chain sharpening and chain saw trouble shooting. If you are not a competent do-it-yourselfer, take the chain and guide bar to a dealer or a shop for filing and regrooving.

### Buying a Chain Saw

When buying a chain saw, consider these safety features:

**Anti-kickback device** — Most newer saws have this important safety feature.

**Vibration and noise characteristics** — Look for noise and vibration reduction features on new and used saws.

**Throttle interlock** — This device prevents accidental throttle advance. Also, a high engine idle latch allows the operator to start the engine while holding the saw firmly on the ground.

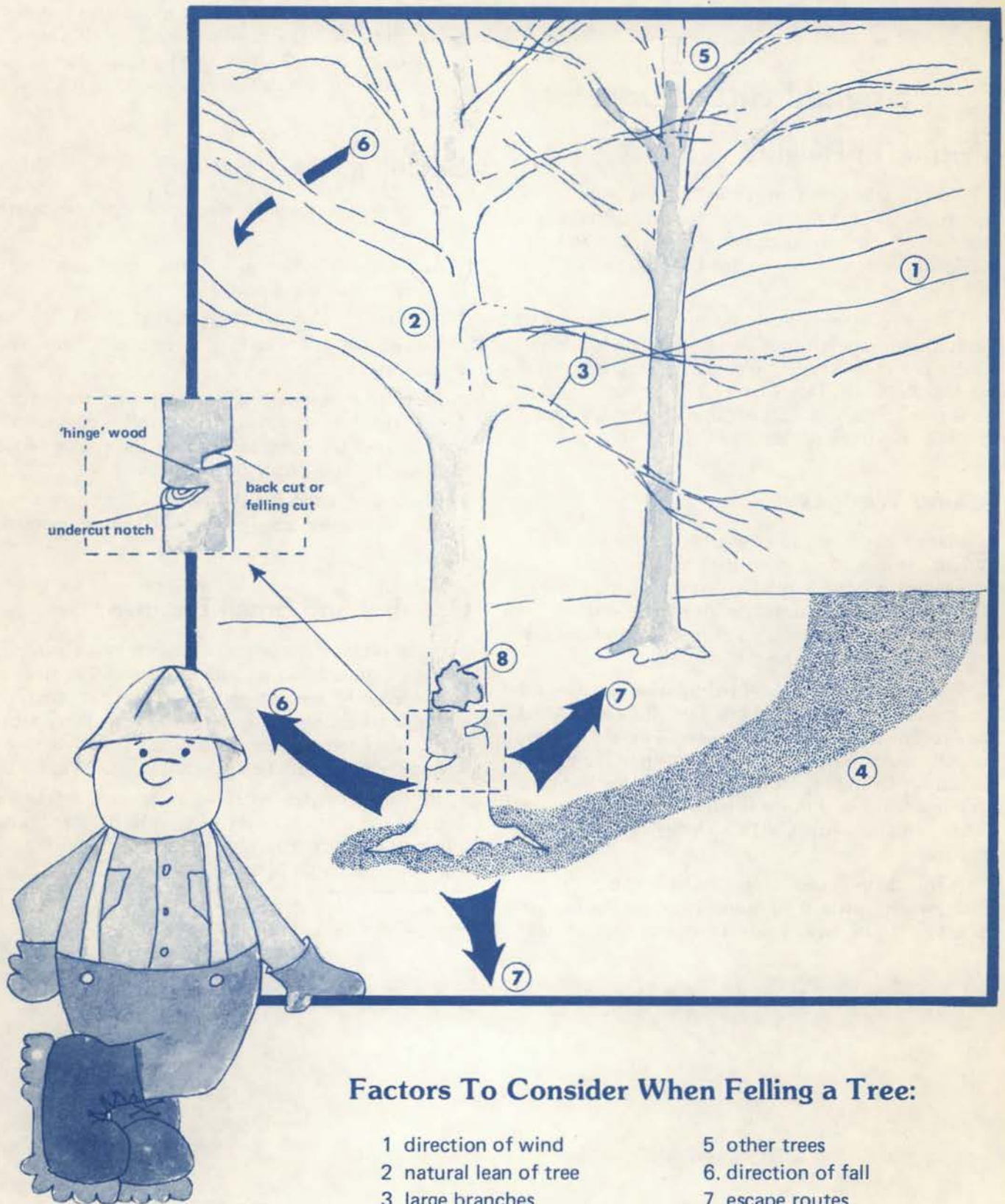
**Chain saw sized for the job** — The correct bar length and engine size (power) will reduce operator fatigue.

### Gasohol and Small Engines

According to a major small engine manufacturer, using gasohol as a fuel source for small engines is not currently recommended because of possible damage to certain gaskets, seals, hoses and packings. Also, overall engine life was reported to be severely decreased when gasohol was used as fuel.\*

Be sure to check with an authorized dealer or contact the manufacturer of your particular brand of small engine concerning the advisability of using "gasohol," as a gasoline substitute.

\*Tecumseh Research Laboratory, Ann Arbor, Michigan.



### Factors To Consider When Felling a Tree:

- |                        |                      |
|------------------------|----------------------|
| 1 direction of wind    | 5 other trees        |
| 2 natural lean of tree | 6. direction of fall |
| 3 large branches       | 7 escape routes      |
| 4 skidding direction   | 8 trunk rot          |





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