CHAIN SAW SAFETY MANUAL

DANGER!

Misuse may result in serious or fatal injuries. You must read, understand, and follow these safety instructions and the instructions in your Chain Saw Instruction Manual before operating a Chain Saw.

DANGER!

Chainsaw kickback can cause serious or fatal injuries. Read and follow the instructions to avoid kickback. ECHO Inc. supplies an anti-kick back guard called a Kick Guard® with every new chain saw. Read the Kick Guard® instructions to determine which cutting applications and conditions require the installation of the kick guard. Always use the Kick Guard® where possible.

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KEY SAFETY SYMBOLS AND WARNINGS

These important safety symbols are used throughout this manual and may also appear on your chain saw. They are provided to make you aware of potential hazards, and the precautions you must take to protect yourself from injury. You must read and understand the explanations, and obey the instructions. These symbols appear on safety labels as a reminder to follow these important precautions whenever you are transporting, fueling, operating, servicing, or handling your saw.

CIRCLE/SLASH SYMBOL
This symbol means the specific action shown is prohibited. Ignoring these prohibitions can result in serious or fatal injury.

SAFETY ALERT SYMBOL
The safety alert symbol is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid serious or fatal injury.

DANGER!
The safety alert symbol appearing with the word "DANGER!" calls attention to an act or condition which WILL lead to serious personal injury if not avoided.

WARNING!
The safety alert symbol appearing with the word "WARNING!" calls attention to an act or condition which COULD lead to serious personal injury if not avoided.

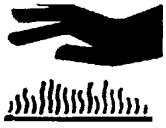
CAUTION!
The safety alert symbol appearing with the word "CAUTION!" calls attention to an act or condition which may lead to minor or moderate personal injury if not avoided.

CAUTION!
The word "CAUTION!" used without a safety alert symbol calls attention to an act or condition which can lead to property damage if not avoided.

READ INSTRUCTION MANUAL
Read instruction manual carefully and follow rules for safe operation. Failure to do so could result in serious or fatal injury.

WEAR HEAD, EYE, AND HEARING PROTECTION
Wear Eye (ANSI Z-87.1), Ear, and Head Protection that meet ANSI requirements

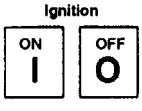
WEAR PROTECTIVE CLOTHING
Wear cut-resistant protective foot-wear and leg protection. Chain-saw leg chaps, or pants with ballistic or cut-resistant fabric may help reduce the risk of injury due to chain contact.



HOT SURFACE SYMBOL
Contact with hot surfaces can cause serious burns.

CHAIN BRAKE SYMBOL
Arrows show how to engage or disengage chain brake. Push chain brake lever (front hand guard) all the way forward to engage, pull back to disengage.

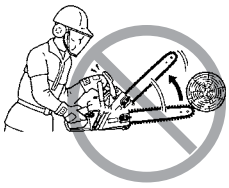
STOP SYMBOL
Indicates the Stop position for the engine ignition switch (Stop Switch).



IGNITION SWITCH ON/OFF POSITIONS
Indicates the ignition ON/OFF positions for the engine ignition switch (Stop Switch).

DANGER!
Kickback hazard. Do not allow guide bar tip to contact objects. Allowing an unguarded guide bar tip to touch any object during cutting may cause the guide bar to suddenly kick up and back toward the operator, a forceful reaction called rotational kickback. Body contact with a moving saw chain will cause serious or fatal injury.

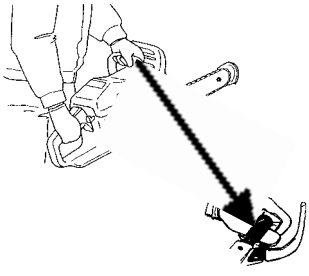
DANGER!
Prevent hazardous Rotational Kickback! Install the Kick Guard® anti-kickback bar tip guard in cutting applications where bar tip contact with solid objects or surfaces cannot be avoided.

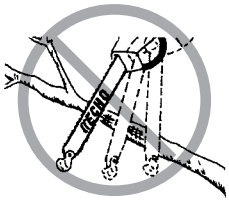


DANGER!
Follow Kick-back prevention instructions to reduce risk of kick-back injury when cutting without kick guard. Replace Kick Guard immediately when cutting application requiring Kick Guard removal has been completed.

WARNING!
Never operate a chain saw using a one-handed grip. Always use a secure, two-handed grip!

WARNING!
Use firm, two-handed control grip with thumb encircling handle.





WARNING!
Always control saw firmly with 2 hands to prevent loss of control and kick back if saw begins skating.

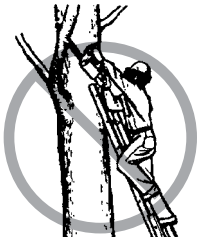
WARNING!
Always use reduced kickback saw chain! Ask your dealer to equip your saw only with certified low- or reduced kickback saw chain.

WARNING!
Always use proper positioning! Keep your body out of cutting plane at all times!

WARNING!
Carrying or transporting a chain saw with a moving chain is hazardous. Turn saw off, or allow the chain to stop, and engage the chain brake when carrying the saw.

WARNING!
Do not over-reach or cut above shoulder height! Gravity may cause the saw to drop toward your legs and feet when the cut is complete. To avoid injury, maintain control of the saw after finishing a cut.

WARNING!
Do not operate chain saw while on a ladder, unless you are a trained professional.



IMPORTANT SAFETY WARNINGS

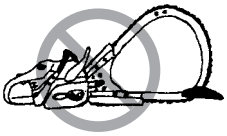
WARNING! Keep hands and arms away from moving chain. Do not reach near a moving chain to grab or remove the material that you are cutting.

WARNING! Do Not cut overhead. The cut material or chain saw can fall on you, causing serious injury.

WARNING! Do Not use a chain saw with a loose chain. A loose chain can be thrown off the guide bar, and cause serious injury.

WARNING! Do Not use a chain saw that has been modified or is in disrepair.

DANGER! Do not use bowsaws! Use of bowsaws can cause extreme kickback and serious or fatal injuries.



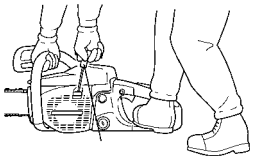
WARNING! Do not allow anyone to use your chain saw without first reading the Instruction and Safety manuals.

WARNING! Never operate a chain saw that is damaged, improperly adjusted, incorrectly assembled, or missing parts.

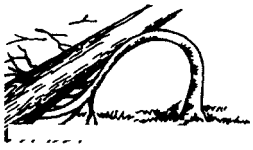
WARNING! Do not operate a chain saw while up in a tree.

WARNING! Do not use an open grip!

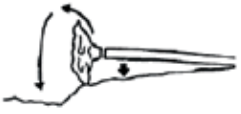
WARNING! Keep helpers and bystanders away from the area where you are cutting. Never let a helper hold material you are planning to cut. Serious injury can occur.



WARNING! Use proper ground starting procedure. Do not "drop start!"



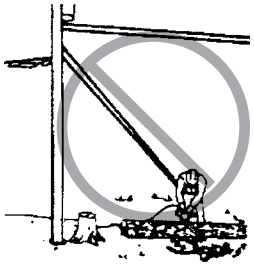
WARNING! Cutting a tree or branch under tension may cause it to spring back suddenly and strike you or the saw, causing serious or fatal injuries.



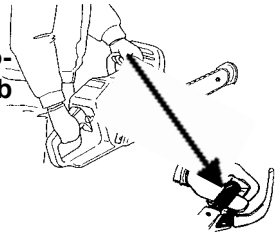
WARNING! Cutting the trunk of an uprooted tree can cause the root ball to fall back into place, causing serious or fatal injuries.

WARNING! Use extreme caution when handling fuel and refueling your chain saw. Gasoline is extremely flammable and can cause serious burns. Keep away from open flames or sparks. Check fuel cap for damage or leaking. Repair or replace leaky cap before using saw!

WARNING! Never cut near power lines!



WARNING! Use a firm, two-handed control grip with thumb encircling handle.



KEY CHAIN SAW TERMS – See Glossary at back for additional terms.

BALLISTIC - A special material used in protection devices designed to reduce the risk of penetration from chain contact.

BINDING - Closing of the cut or shifting of the wood, possibly trapping the saw blade in the cut. Binding includes pinching. (Also, see PINCH.)

CHAIN CATCHER - A projection designed to reduce the risk of the operator's right hand from being hit by a chain, which has broken or derailed from the guide bar during cutting.

CHAIN TENSIONER - The device which permits precise adjustment of the chain tension.

CHAPS - Specially designed leg protection, which can reduce the risk of injury due to contact with a moving saw chain.

FOLLOW THROUGH - After the chain saw completes a cut and is no longer supported by the wood, an uncontrolled chain saw can continue on its path and strike the legs, feet or body of the operator.

FRONT HAND GUARD - This required device is intended to reduce the operator's risk of injury from projecting branches and saw-chain contact with the left hand in the event the operator loses his grip from the upper part of the handle.

GUIDE BAR - The grooved bar that supports and guides the saw chain.

KERF - The grooved cut produced by the saw chain cutters.

KICKBACK - The general term describing rotational and linear kickback, two highly dangerous reactions which can occur when operating a chain saw. When used alone in this manual, the term "kickback" refers to rotational kickback. To prevent kickback, keep the bar nose properly covered with the Kick Guard® device. If the Kick Guard® device is absent, kickback can occur if the unshielded bar nose touches an object or the ground.

ROTATIONAL KICKBACK - The violent reaction which can occur when the chain at the upper section of the nose is suddenly stopped or impeded, thereby dangerously driving the bar nose in an upward arc toward the operator.

LINEAR KICKBACK - A push reaction, which can occur under certain conditions with the guide bar buried in the cut when the cut closes, pinching the chain along the top rails of the guide bar and propelling the chain saw straight back toward the operator.

KICK GUARD® DEVICE - Anti-kickback device attached to the bar nose.

PINCH - Specifically the closing-in of the wood which pinches and stops the chain along the top rails of the guide bar during a cut. This can result in the chain saw being propelled straight back toward the operator (called a Linear Kickback). Pinch can also occur on the lower rails of the bar, resulting in the chain saw being pulled away from the operator.

PUSH AND PULL - When cutting is done along the bottom rails of the guide bar, the reaction on the saw is to pull away from the operator. When the top of the guide bar is used, the reaction pushes the saw towards the operator. Both are normal reactions which must be controlled by the operator.

REDUCED-KICKBACK GUIDE BAR - Guide bars which are recognized by the ANSI Standard B175.1 as having as small or reduced radius nose to reduce the potential kickback area.

LOW or REDUCED-KICKBACK SAW CHAIN - Saw chain which has been demonstrated to reduce kickback on a selected group of chain saw models during ANSI testing. Before using "reduced kickback" chain, ask your dealer to determine if your chain saw can accommodate "reduced-kickback" chain and still meet the 45-degree CKA requirement explained on page 14.

SKATING - When the chain saw fails to dig in during a cut, the guide bar can begin hopping or dangerously skidding along the surface of the log or branch, possibly resulting in the loss of control of the chain saw. To prevent or reduce skating, hold the chain saw with two hands and make sure the saw chain establishes a groove for cutting.

THROTTLE TRIGGER - Located in the rear handle, it is used to control the speed of the engine.

THROTTLE TRIGGER LATCH BUTTON - The control used on some chain saws to set the throttle for a fast idle speed, which may be required to start a cold engine. The throttle can be unlatched by squeezing and releasing the throttle trigger.

THROTTLE TRIGGER LOCKOUT LEVER - A safety lever on the top of the top/rear handle which must be depressed before the throttle trigger can be activated. When the operator lets go of the top/rear handle, the throttle will be locked in idle position.

INTRODUCTION

⚠ WARNING!

Before using your saw, read this Safety Manual and your chain saw instruction manual carefully. You must completely understand and follow all safety rules, precautions, and operating instructions. ECHO Inc. recommends that you obtain and review the supplemental Chain Saw Safety Video.

Congratulations on taking the right steps to learn basic chain saw safety. Over the years, ECHO Inc. has developed and improved technology to increase the safety of chain saw use. However, chain saws are powerful cutting tools intended to quickly cut trees and branches and to get the job done fast. Like other types of outdoor cutting and wood working power equipment, the chain saw's sharp, high-speed cutters require that you operate the saw carefully to avoid serious or fatal injury.

You must read and understand the specific chain saw instruction manual, the Kick Guard® instructions and this safety manual. Before operating your gasoline or electric chain saw, you must learn about the chain saw reactions, which can occur when cutting. **Unless noted, the safety rules presented apply to both gasoline and electric chain saws.**

This manual describes the hazards and risks associated with cutting, trimming, felling, refueling and other activities involving use of a chain saw. Many vital safety awareness tips are mentioned to help identify the dangers of using chain saws, and to teach you the precautions to take to avoid injury. ECHO Inc. has also provided helpful information about cutting techniques to make the tasks easier, more productive, and safer.

If you have any feelings that the tree removal or cutting task requires you to put yourself, your property, or others at risk, please consider calling a professional to handle the job. Tree trimming and felling mishaps can cause serious or fatal injury to you, others, and possible damage to property.

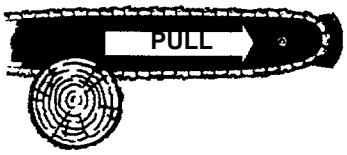
TABLE OF CONTENTS

FORCES YOU MUST CONTROL

This section explains the forces which must be controlled to avoid injury when operating either a gas or electric-powered chain saw. Always remember that your best defenses are to exercise caution and use the chain saw properly, and to be prepared to react to these forces

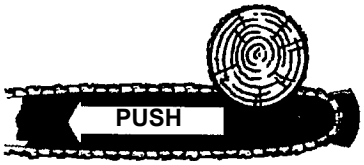
PULL, PUSH and KICKBACK are terms for the direction a reaction takes.

PULL - When you are cutting on top of a log with the lower portion of the chain moving toward you, the chain saw will be pulled into the wood and away from you.



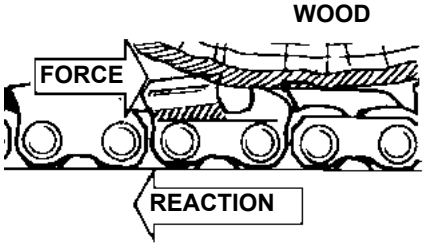
CUTTING ON BOTTOM OF GUIDE-BAR PULLS SAW AWAY FROM YOU

PUSH - Cutting on the underside of a log pushes the chain saw toward you.

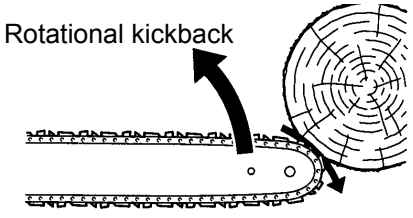


CUTTING ON TOP OF GUIDE-BAR PUSHES SAW TOWARD YOU

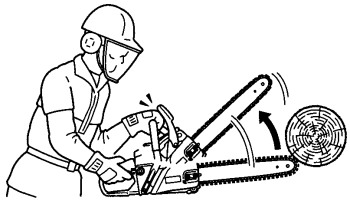
PUSH and PULL forces are controlled by anticipating which reaction will happen and adjusting your position and stance to compensate.



ROTATIONAL KICKBACK - When the chain is moving downward around the upper nose of the bar, solid contact there may drive the bar tip upward in an arc toward you. This is an extremely dangerous reaction called Rotational Kickback. When used alone in this manual, the term kickback will always refer to the rotational kickback.

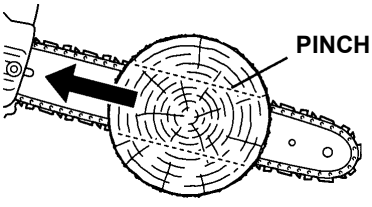


Rotational kickback is predictable, preventable and controllable. If the operator is not alert to the possibility of a kickback, it may come as a complete surprise. The possibility of kickback can be greatest if the chain is not a low- or reduced kickback type, or if the bar is not a reduced-kickback type. The best defense against rotational kickback is making sure the chain does not contact anything solid at the upper nose of the bar. This can be assured by proper installation of the Kick Guard ® device.



ROTATIONAL KICKBACK

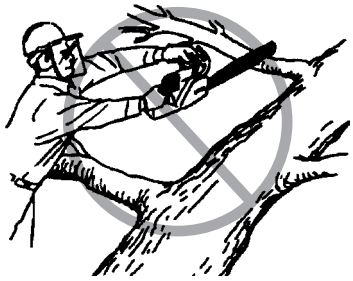
LINEAR KICKBACK - A sudden **PUSH** reaction that occurs when the chain along the top rails of the bar gets pinched in a cut. This type of reaction pushes the chain saw straight back toward the operator. The Kick Guard® device on your bar nose acts as a stop against this type of kickback by stopping the guide bar.



PINCHING TOP OF GUIDE BAR CAUSES LINEAR PUSH OR KICKBACK

FORCES YOU MUST CONTROL

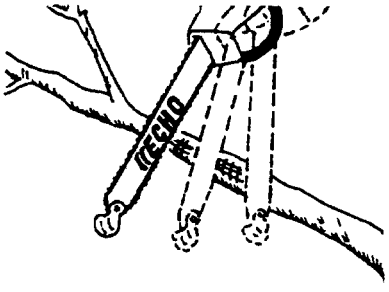
FORCE OF GRAVITY & "FOLLOW THROUGH" – Gravity is always present and you must be prepared for it when you are operating a chain saw. During the cutting operation, the weight of the chain saw is supported by the material being cut. When the saw completes the cut, the saw is no longer supported, and the operator must control both the weight and the downward momentum of the saw. Never reach too far out with the saw. If you reach too far out with the saw, you may be unable to control it. Maintain a proper grip, a balanced stance, and good footing. Never cut when you are off balance – the sudden burden of supporting the weight of the saw could cause you to fall or lose control of the saw. Make no cuts above chest height where control may be more difficult.



DO NOT OVER -REACH TO MAKE A CUT

IMPORTANT: When you're about to complete a cut on an elevated tree branch or limb, be ready to release the throttle and support the chain saw so that the guide bar and moving chain will not "follow through" and cut into your legs, feet, or body after the guide bar breaks into the clear.

SKATING - This condition occurs when the saw chain does not dig in properly when starting a cut, and does not start a defined groove as it attempts to penetrate the wood. The guide bar then begins "hopping" or skidding side-to-side along the surface. When this occurs, you do not have full control of the chain saw, and the bar nose could strike something and cause a kickback. If you are holding the chain saw with one hand and a branch with the other, the chain saw could skate laterally into your hand holding the branch. To prevent or reduce skating, always hold the chain saw with two hands, and make sure the saw chain has established a groove for cutting. For gasoline-powered units, throttling down the chain speed may help the chain get grooved, but once the chain is grooved, throttle up the chain speed to complete the cut.



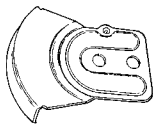
BEWARE OF SKATING

KICK GUARD® INSTALLATION

DANGER!

Chain saw kickback is an extremely dangerous reaction. Kickback can cause serious, or fatal injuries!

Kick Guard®

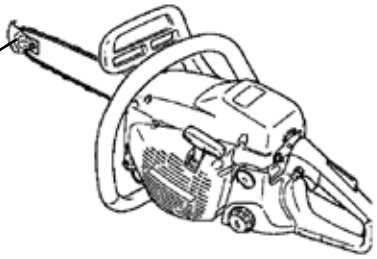


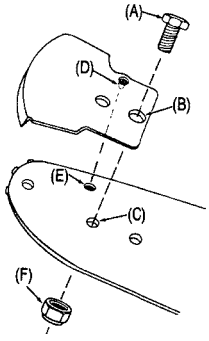
KICK GUARD ANTI-KICKBACK BAR TIP GUARD: This is an anti-kickback device that covers the bar nose to prevent chain contact at the kickback-generating area of the nose. The bar tip guard is called the Kick Guard ® device. With the device properly mounted on the bar nose, rotational kickback cannot occur. The device will also halt linear kickback. (See definitions of rotational and linear kickback.)

The Kick Guard® device is not installed on the guide bar when you purchase your chain saw. It is the operator's responsibility to decide upon the safest cutting approach for the job being done. If you think the Kick Guard® limits or obstructs the cutting operation and you decide to use the saw without the guard, it is your responsibility to know how to operate the saw safely. This manual provides safety information to operate with and without the Kick Guard® .

The Kick Guard® can be used in a majority of cutting operations, and is especially recommended for beginners, homeowners, or chain saw novices. However, it is designed to be removable to allow the saw to be used without the device. Use of the saw without the Kick Guard device requires a higher level of caution on the part of the operator. Study the information and precautions in this manual carefully to learn how to operate the saw safely. Contact ECHO Inc. if you have any questions, or if you do not understand the information.

Kick Guard® Prevents Rotational Kickback!





Kick Guard® Simple to Install! See Installation Procedure in your chain saw Instruction Manual.

Use the Kick Guard® in cutting applications where the bar's tip may come into contact with solid objects or surfaces. Most cutting operations can be accomplished with the Kick Guard® in place.

ECHO Inc. HIGHLY RECOMMENDS the use of the Kick Guard® Device:

1. If you are a beginner or novice chain saw user.
2. If you are cutting in or around adjacent brush, small saplings, trees, or other solid objects that can be contacted by the bar tip.
3. If it is possible that the tip of the saw may come in contact with an adjacent object such as a log, other trees, branches, root, stump, fence, post, wall, rocks, nails etc.
4. If you can't see the tip of the saw and it may come in contact with another object, such as in a log pile, brushy area, or dense leafy area.
5. If you are limbing a tree and can't see the tip due to leaves or other debris blocking the view.
6. If you have any concern that the cutting you will be doing may have an increased risk of tip contact.

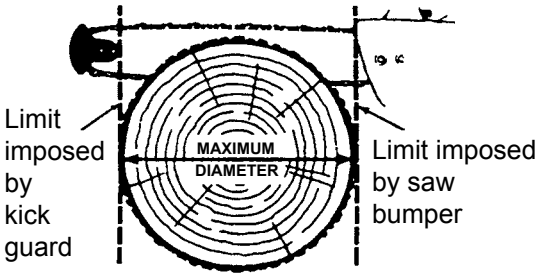
CONDITIONS WHICH MAY REQUIRE REMOVAL OF KICK GUARD®

<u>In any circumstance, it is your responsibility</u> to learn how to minimize the risk of kickback if you are using the saw without the Kick Guard® in place.

Even if you have prior experience with safe chain saw operation, or are trained in the prevention of kickback, please use extreme caution if you choose not to install the tip guard, or if you decide to remove it. If you plan to use the saw without the Kick Guard® device to facilitate cutting, refer to the section "Operating Saw Without Kick Guard® Device".

<u>The Kick Guard® is ideal for most cutting applications, but it may be necessary to remove it in limited situations such as:</u>

1. Felling trees that are larger in diameter than the working length of the guide bar.
2. Cutting trees and logs that are larger in diameter than the effective cutting length of the bar (dimension from engine to the inside of the Kick Guard®).
3. To remove a bound saw out from a cut log.
4. To draw the bar nose through a cut.
5. Making a boring cut into a log or tree. (Professional Users Only)
6. To remove a saw when a wedge is being used.



ECHO Inc. has incorporated additional technology to help minimize the risk of kickback, such as reduced kickback chain, reduced kickback guide bar, and the chain brake system. These other devices only reduce kick back forces, and do not guarantee the prevention of kickback or kickback injuries. **Only a properly installed kick guard absolutely prevents all rotational kick back.**

If you use the saw without the Kick Guard®, you can prevent injury from kickback by: avoiding contact with solid objects at the upper tip of the guide bar; properly positioning yourself out of the line of the guide bar; and using a firm, two-handed grip. It is solely your responsibility to take these precautions.
Prevent Rotational Kickback!

OPERATING SAW WITH THE KICK GUARD® DEVICE

WARNING! Study your safety and instruction manuals, and be sure you understand how to keep control of the chain saw either with or without the Kick Guard® device.

WARNING! The Kick Guard® device prevents rotational kickback when properly installed, but it cannot prevent other chain saw mishaps. Always wear protective articles such as cut-resistant boots, gloves, and leg chaps, and proper attire for chain sawing. Use the correct two-handed grip on the saw handles at all times. Position the saw properly with the cutting plane away from the body, and maintain a balanced body position to the left of the saw.

Check that the Kick Guard® is correctly installed before each use, and is fastened securely to the guide bar.

Illustrations below show various applications, which can be performed effectively and safely when the Kick Guard® device is in place on the bar nose. Notice that the device is often used to protect the saw chain, as well as adjacent objects such as walls, fences and trees. The Kick Guard ® often can be used against an obstruction as a bumper plate.

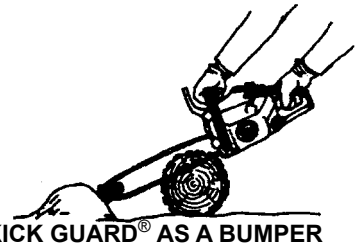
Using the Kick Guard® when cutting in a brush pile eliminates the threat of kickback and helps speed up brush removal. Cutting brush requires that you be alert for brush and branches that may be whipped back at you.

Even when using the Kick Guard® device, you must be alert to control the saw against the forces of gravity, push, pull and "skating." Maintain good footing and balance. Reaching above chest height is extremely hazardous. Twisting and falling limbs are a hazard, which must always be anticipated.

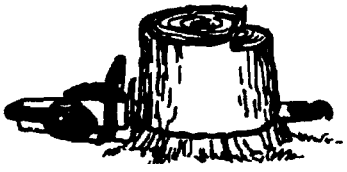
Before buying a new guide bar or new saw chain, check first with your dealer to be sure the new configuration can be mounted to your chain saw. Be sure the Kick Guard® device can be mounted onto the new guide bar. The tip of the bar must be equipped with the proper Kick Guard ® device mounting holes.

KICK GUARD® ALLOWS KICK-BACK FREE CUTTING NEAR MASONRY, FENCES, ETC.

KICK GUARD® APPLICATIONS



KICK GUARD® AS A BUMPER AGAINST OBSTRUCTION.



KICK GUARD® PROTECTS CHAIN FROM GROUND WHEN FLUSH CUTTING.

KICK GUARD® ALLOWS SAFE CUTTING NEAR OTHER TREES

KICK GUARD® ALLOWS SCYTHING ACTION TO REMOVE BRUSH

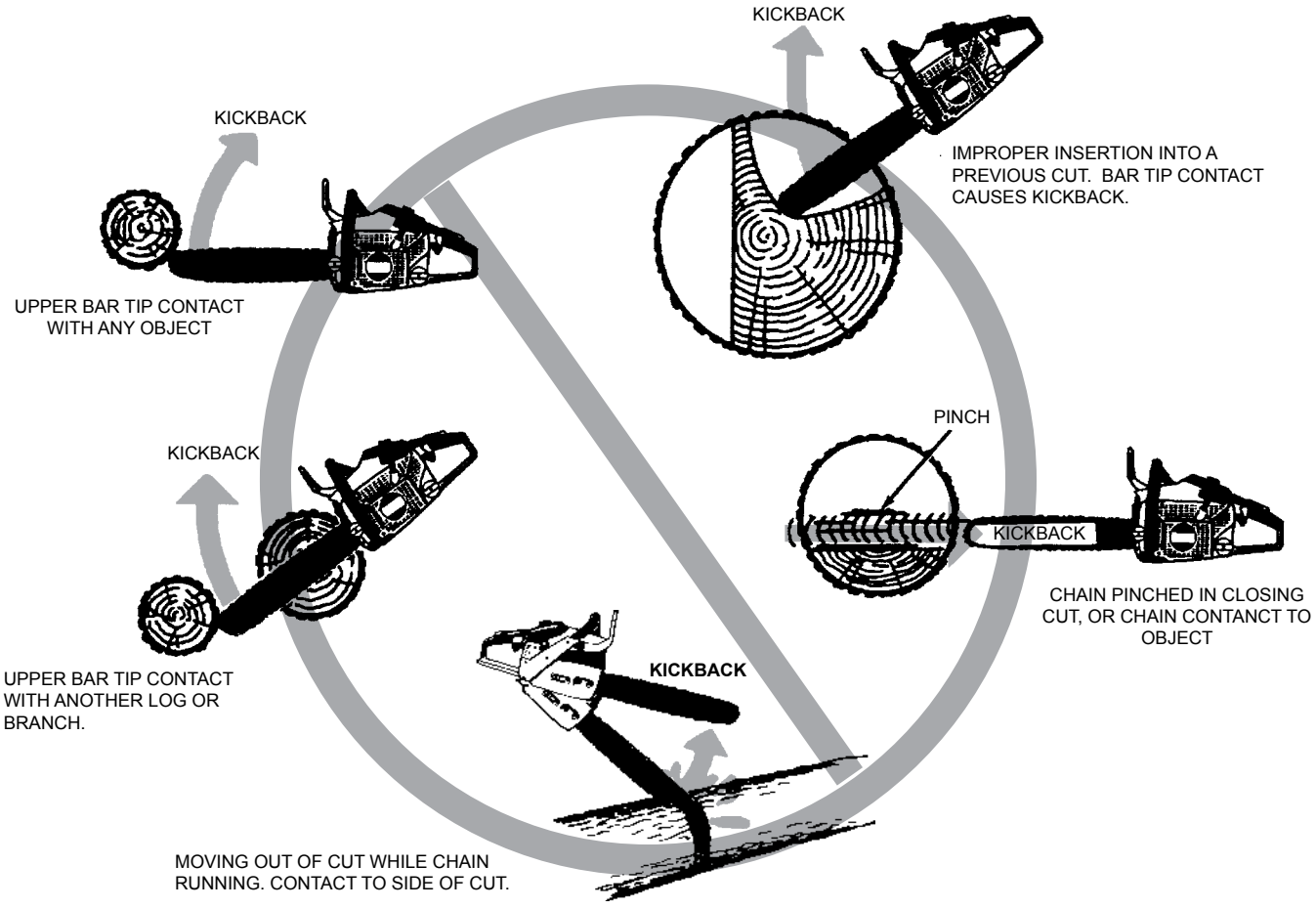
KICK GUARD® ALLOWS SAFE CUTTING IN BRUSH PILE.

OPERATING SAW WITHOUT THE KICK GUARD® DEVICE

DANGER! IF YOU REMOVE THE KICK GUARD, BE AWARE OF THE INCREASED RISK OF KICKBACK DUE TO THE BAR NOSE NOT BEING PROTECTED. PREVENT KICKBACK YOURSELF. DON'T LET THE BAR TIP CONTACT ANYTHING!

Study the following illustrations related to kickback, and never make these kinds of errors!

COMMON CAUSES OF KICKBACK



OPERATING SAW WITHOUT THE KICK GUARD® DEVICE

WARNING! Hold the saw firmly with both hands. Make sure your left thumb is always on the underside of the front handle. Never over the top! Keep your left arm straight with the elbow locked to prepare for any sudden or unexpected reaction of the chain saw, and to maintain better control.

DON'T CROWD THE SAW

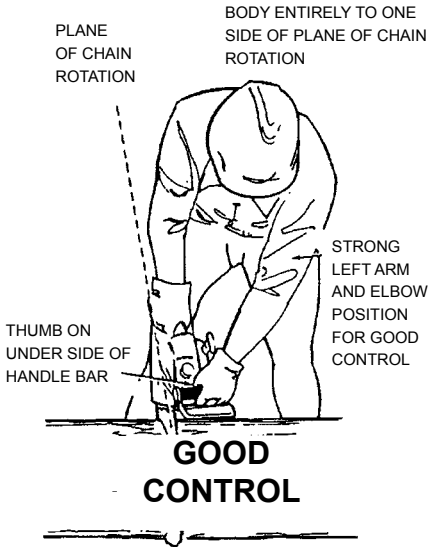
WARNING! Do not let the tip or nose of the saw come near any solid object while the chain is rotating. Never let the saw dip into the ground.

WARNING! Keep your body out of the path of a potential kickback as follows:

1. When making any vertical (bucking) cut, keep your body to the left of the guide bar, out of the plane of chain rotation.

2. When making felling cuts, alongside the tree so that the direction and path of a kickback would be away from and not toward your body. If necessary, angle the cut to keep your body out of the kickback path, and be extra careful to keep the bar nose in the clear.

3. During all cutting, do not bend towards or otherwise "crowd" the guide bar. Cut only one piece of wood at a time.



GOOD CONTROL

WARNING! Do not thrust the nose of the saw into a pile of branches or dense brush where you cannot see whether the nose is in the clear. A high risk of kickback exists under such conditions. INSTALL THE KICK GUARD® DEVICE before attempting such applications.

When starting a cut, be ready to control any tendency of the saw to skate as it attempts to penetrate the wood. Kickback will be a secondary reaction if the nose bar skates into something.

When completing an bucking cut, be ready to hold up the saw as it breaks into the clear, so it will not follow through and cut your legs, feet or body, or contact an obstruction and kick back.

WARNING! Limit your cutting to the range within which you can fully control the saw. Don't reach out when cutting. Forces of gravity, falling branches or wood can cause you to lose your balance and increase the risk of injury. Don't make any cut above chest height, because a saw is difficult to control under such conditions. It can kick back or fall on you.

WARNING! There is always an element of danger in boring, even when done by experts. Until you have become an experienced operator do not attempt to plunge cut or bore with the nose of the saw.

Make limbing and pruning cuts one at a time. Whenever possible, stand on the opposite side of the tree from limbs being cut, so the tree is a barrier between you, the saw, and the falling material.

ADDITIONAL SAFETY DEVICES DESIGNED TO REDUCE THE RISK OF INJURY FROM KICKBACK

Your chain saw and its operator's manual have been certified to meet the requirements of Voluntary Standard B175.1 of the American National Standards Institute (ANSI). B175.1 sets forth the minimum safety requirements for the manufacture of gasoline-powered chain saws.

ANSI B175.1 addresses rotational kickback, which can occur when the chain saw tip contacts an object and propels the saw upward and rearward toward the operator at rapid speeds. Kickback can cause severe and even fatal injuries. ANSI B175.1 requires that chain saws with an engine displacement of under 3.8 cubic inches (62.3CC) have a maximum Computed Kickback Angle (CKA) no greater than 45 degrees. CKA is computed (under laboratory conditions) from a kickback test machine, plus other data including the dimensions of the chain saw. Any deviation from laboratory conditions may result in a higher CKA; and thus require chain saws in this class to have at least two of the following devices to reduce the risk of injury from kickback: anti-kick tip guard which mounts at the nose of the guide bar, chain brake, reduced kickback chain, or reduced kickback guide bar. Learn which specific devices are included on your saw model.

CHAIN BRAKE: When activated, this device is intended to stop the saw chain rotation immediately after a kickback has occurred. A chain brake does not prevent kickback.

The chain brake can be activated both manually and automatically. Manual chain brake engagement occurs if the operator's left hand or wrist applies a force against the front hand guard, which is part of the brake lever. Automatically activated chain brakes are intended to respond to kickback accelerations without brake lever contact. These are sometimes called inertia brakes, which respond to a certain level of acceleration, and do not require manual activation by the hand guard lever. Chain saws combine both hand guard lever and inertia chain brakes. Review your instruction manual or contact ECHO Inc. to find out the specifications of your saw model.

WARNING! It is the responsibility of the owner or operator to ensure that the brake is serviced, adjusted, and tested in accordance with the instructions as detailed in your instruction manual in order to ensure that the brake performance is maintained in compliance with ANSI B175.1- 2000, which stipulates that the brake shall stop the chain in a maximum of 0.15 seconds after activation (0.12 Average).

WARNING! Do not rely on the chain brake for protection against kickback. The chain brake may never activate; and even if it does, its chain-stopping capability, even under ideal conditions, may not be fast enough to prevent injury to the operator due to the rapid dynamics of a kickback.

Even with a chain brake, depend on your own good sense and proper cutting methods just as though there were no chain brake. Additionally, even with normal use and proper maintenance, the initial stopping time of the chain brake may increase, or the chain brake may become incapable of stopping the saw chain, or stopping times may become inconsistent. Eventually, a major rebuild or complete replacement of the chain brake may be required for the chain brake to meet the ANSI B175.1 Standard.

The following may interfere with the chain brake's ability to reduce the risk of injury to the operator:

- Saw wrongly held too close to operator's body (no fault of the brake). Kickback may occur faster than a perfectly maintained brake can be activated.
- The operator's hand may not be in position to contact the hand guard. Brake will not be tripped.
- In the case of certain kickbacks, such as in a low intensity kickback, the inertia brake may not activate as intended because forces are below the required activation level. **Loss of control of the saw still may occur!**
- Lack of proper maintenance increases the chain brake's stopping time, making it less effective.
- Dirt, grease, oil, pitch, etc. getting into the working parts of the mechanism may increase the stopping time or render the chain brake inoperable.

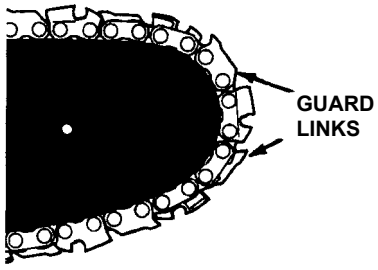
- Improper assembly of the chain brake to the chain saw may render the brake inoperable.
- Wear and fatigue of the activating brake band or spring, and/or wear of the brake/clutch drum and pivot points may lengthen the brake's stopping time or render the chain brake inoperable.

Chain brakes are designed to retain stopping times as close as possible to their original times, however periodic cleaning and or adjustment are required for the brake to perform properly.

The brake linkage is in a compartment designed to shield out sawdust and oil. The brake and surrounding area will require regular and frequent cleaning. There will be a time when adjustment cannot compensate for wear. Your servicing dealer will be able to tell you when parts replacement or a complete brake assembly replacement is necessary. The Chain Brake is a device which cannot be replaced on your saw by another brand chain brake.

Reduced Kickback Chain

LOW OR REDUCED-KICKBACK SAW CHAIN: Low-kickback saw chain meets the kickback performance requirements of ANSI B175. 1. Before using "reduced kickback" chain, see your dealer to determine if your chain saw can accommodate "reduced-kickback" chain and still meet the 45-degree CKA requirement. Always use the proper replacement chain recommended for your saw.



The low-kickback saw chain on your saw has depth gauges and guard links to reduce kickback. Depth gauges control the depth of cut. The guard links help to prevent the cutters from digging in too deeply at the bar nose. Low-kickback chain tends to resist penetration of the bar tip, which is the cause of kickback; however, the chain may "skate" along the surface of the wood. Skating the nose bar into an obstruction could result in a kickback.

Low-kickback chain may gradually lose some of its kickback-reduction ability even when properly filed. The following items will cause it to lose its kickback reduction ability rapidly:

- Depth gauges not set uniformly to correct depth.
- Cutters dull or uneven in filing angle or length.
- Cutters have been filed to a forward hook.
- Chain runs too loose on the bar.
- Worn chain repaired with new cutters or side links, causing some cutters to take a larger bite than the others.

NOTE: Proper chain tension cannot be maintained if:

- Drive sprocket is worn.
- Guide bar is improperly clamped to the chain saw.
- Tension adjuster has not engaged the guide bar, thus causing the guide-bar to shift.
- Bar rails are in poor condition.
- Guide bar and chain are improperly lubricated.

ADDITIONAL SAFETY DEVICES DESIGNED TO REDUCE THE RISK OF INJURY FROM KICKBACK

REDUCED-KICKBACK GUIDE BAR: In general, guide bars that meet this requirement, have small or reduced-radius noses. All guide bars with reduced nose radius have been machined to accept a bar tip guard. (Some large radius bars may not accept a tip guard.)

SYMMETRICAL REDUCED RADIUS

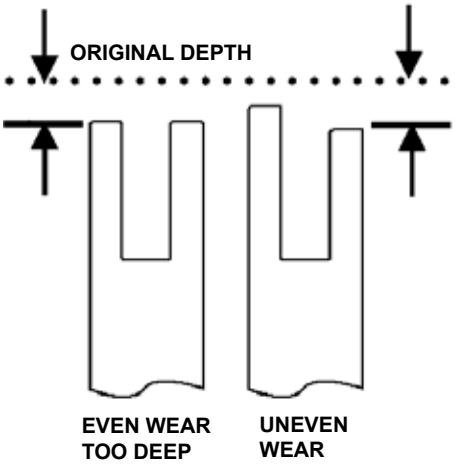
BANNANA NOSE REDUCED RADIUS

REDUCED-KICKBACK GUIDE BAR AND KICK GUARD® DEVICE - These devices both provide strong protection against kickback. As stated previously, there can be no rotational kickback when the Kick Guard® device is properly assembled on the bar nose. Linear kickback will be stopped if the device is drawn against the wood. Your chain saw may be equipped with either the more common symmetrical nose bar or an asymmetrical nose bar. The symmetrical nose bar can have a sprocket or welded tip. The asymmetrical nose bar is shaped differently and is commonly referred to as a "banana-nose bar." The ability of these bars to partially reduce kickback is possible because the kickback-generating zone of the bar nose is small. If you wish to equip your chain saw with any bar other than manufacturer-approved bars, be sure it falls within limitations specified for your chain saw, is designated "Reduced-kickback Guide Bar," and is machined to permit installation of a Kick Guard® device. The Kick Guard® device works properly only when it fits correctly on the bar. A bent or damaged Kick Guard® device must be replaced. Do not use a replacement guide bar that does not have proper mounting holes for the Kick Guard® device.

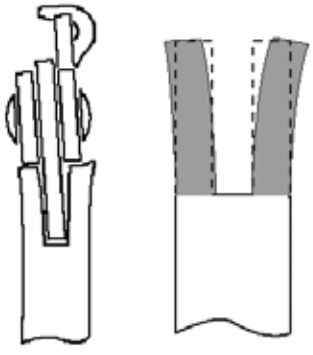
It is always safer to cut with the Kick Guard installed. If you believe it is not practical to use the Kick Guard in certain situations, it is your responsibility to use other means to control kick back. ECHO Inc. recommends use of the Kick Guard wherever possible.

Normal wear, as well as lack of maintenance or cleaning, will reduce both saw performance and the ability of the guide bar to reduce kickback. Inadequate lubrication can wear bar rails. Non-uniform chain filing can wear the rails to an uneven height. In particular, uneven height or worn-down rails and wear inside the bar rails can permit excessive cutter side play, creating a lack of chain alignment and increasing the probability of kickback. Inspect guide bar for uneven or excessive wear or damage before each use, and replace bar if worn, deformed, or damaged. See Chain Saw Instruction Manual for correct bar/chain combinations.

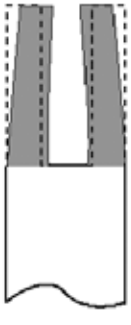
GUIDE BAR RAIL DAMAGE- TIME TO REPLACE



GUIDE BAR WEAR



INSIDE WEAR OR SPREAD CAUSES CUTTER SIDE PLAY



PINCHED GUIDE BAR

PHYSICAL CONDITION – Chain saw work and the associated clearing of branches and logs is a strenuous activity. You should be in good physical and mental health in order to handle your chain saw safely. Errors in judgment can be serious or fatal. If you have any physical condition which strenuous work could worsen, check with your physician before using a chain saw.

Take frequent breaks and drink fluids, especially in warmer weather. Do not operate when ill, fatigued, upset, or under the influence of any substance or medication which could affect your vision, dexterity or judgment.

DO NOT OPERATE UNDER THE INFLUENCE OF ANY SUBSTANCE

PERSONAL EQUIPMENT - Always wear eye protection eyewear with adequate top and side protection conforming to the ANSI Z87.1 Standard when operating a chain saw (Z87 is stamped on the eyewear). ANSI Z87.1 certifies protective eyewear to limited, but protective resistance levels, to debris. Wood chips, dust, snapping branches and other debris can be tossed by the cutting chain into the operator's facial area. Z87 safety eyewear may also offer limited protection in the event of the cutting chain hitting the operator in the eye area. If conditions warrant that a ventilated face shield be worn, always wear protective eyewear underneath.

WEAR PROTECTIVE Z-87.1 EYEWEAR

Also, ECHO Inc. recommends wearing hearing protection at all times. If not followed, hearing loss can occur. You should reduce the risk of hearing damage by wearing either "headset" type protectors or approved ear plugs. (Note: Stuffing ears with cotton is not recommended.) All persons who make part of their living using chain saws should be tested periodically for hearing deterioration.

COMBINATION EAR, HEAD AND FACE PROTECTION

⚠ **WARNING!** Never wear loose clothing, unbuttoned jackets, flared sleeves and cuffs, scarves, tie strings, neckties, cords, chains, jewelry, etc. which could snag the saw chain or underbrush. Avoid short pants.

PROTECT YOURSELF AGAINST HEARING DAMAGE. WEAR EAR PLUGS FOR HEARING PROTECTION

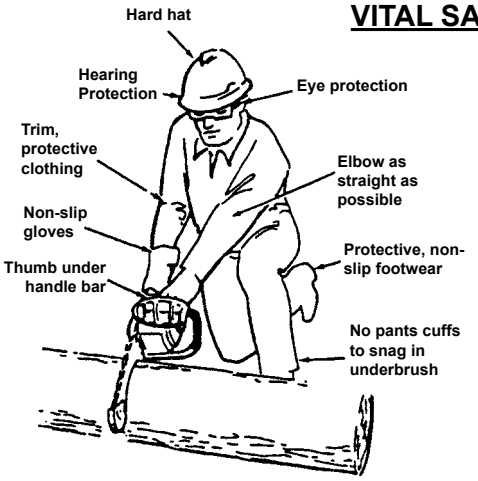
⚠ **WARNING!** Never operate a chain saw when you are alone. Arrange to have someone remain within calling distance in case you need help.

A safety "hard hat" is highly recommended when felling or working under trees, or when objects can fall on you. Wear heavy duty, non slip gloves for improved grip, and also for protection against cold and vibration.

Cut resistant, high top safety tip shoes or boots with non slip soles should be worn. Clothing should be of sturdy, protective material. It should be snug-fitting to resist snagging, but roomy enough for freedom of movement. Trouser legs should not be flared or cuffed, and should be either tucked into the boot tops. Safety vests, chain saw protective leg chaps, or logger's pants of ballistic nylon material are available. It is the operator's responsibility to wear such additional protection if conditions warrant it.

No open-toed shoes, or loose fitting clothing.

OPERATOR SAFETY



VITAL SAFETY GEAR TO WEAR WHEN CUTTING:

ANSI Z-87 Eyewear

Hard Hat

Hearing Protection

Protective Gloves

Cut resistant Leg Chaps

Cut Resistant Steel-Toe Boots

PRECAUTIONS IN HOT, HUMID WEATHER - Heavy logger's clothing can cause overheating and increase the risk of operator fatigue. Heat stroke is possible. Under these adverse conditions, you must judge whether wearing heavy protective clothing, or lighter but less protective items, bears the least risk. Or you might choose to work early in the morning or delay work until the temperature drops. Take plenty of water breaks during periods of strenuous activity, especially in warmer weather.

PRECAUTIONS AGAINST VIBRATION AND COLD - It is believed that a condition called Raynaud's Syndrome, which affects the fingers of certain individuals, may be brought about by exposure to cold and vibration. Accordingly, your chain saw has shock mounts designed to reduce the intensity of vibration received through the handles. Exposure to cold and vibration may cause tingling and burning followed by loss of color and numbness in the fingers. We strongly recommend the following precautions, because the minimum exposure which might trigger the ailment is unknown.

- Keep your body warm, especially the head and neck, feet and ankles, and hands and wrists.
- Maintain good blood circulation by performing vigorous arm exercises during frequent work breaks, and also by not smoking.
- Limit the number of hours of chain saw operation. Try to fill a part of each work day with jobs other than chain sawing.
- If you experience discomfort, redness and swelling of the fingers, followed by whitening and or loss of feeling, consult your physician before further exposing yourself to cold and vibration.
- Maintain a firm grip, but do not squeeze the handles with excessive pressure.
- Assure good maintenance of your saw - loose parts can add to vibration levels.

PRECAUTIONS AGAINST REPETITIVE STRESS INJURIES - It is believed that overusing the muscles and tendons of the fingers, hands, arms, and shoulders may cause soreness, swelling, numbness, weakness, and extreme pain to the areas just mentioned. Certain repetitive hand activities may put you at a high risk for developing a repetitive stress injury (RSI). An extreme RSI condition is Carpal Tunnel Syndrome (CTS), which could occur when your wrist swells and squeezes a vital nerve that runs through the area. Some believe that prolonged exposure to vibration may contribute to CTS. CTS can cause severe pain for months or even years. To reduce the risk of RSI/CTS, do the following:

- Avoid using your wrist in a bent, extended or twisted position. Instead, try to maintain a straight wrist position. Also, when grasping, use your whole hand, not just the thumb and index finger.
- Take periodic breaks to minimize repetition and rest your hands.
- Reduce the speed and force with which you do the repetitive movement.
- Do exercises to strengthen the hand and arm muscles.
- See a doctor if you feel tingling, numbness, or pain in the fingers, hands, wrists, or arms. The sooner RSI/CTS is diagnosed, the more likely permanent nerve and muscle damage can be prevented.

IF IT HURTS, TAKE A BREAK

⚠ **DANGER!** **KICKBACK** may occur when the nose or tip of the guide bar touches an object, or when the wood closes in and pinches the saw chain in the cut. Tip contact in some cases may cause a lightning-fast reverse reaction, kicking the guide bar up and back toward the operator (this is called a rotational kickback). Pinching the saw chain along the top of the guide bar may push the guide bar rapidly back toward the operator (this is called a linear kickback). Either of these reactions may cause you to lose control of the saw and come in contact with the moving chain, which could result in serious or fatal injuries.

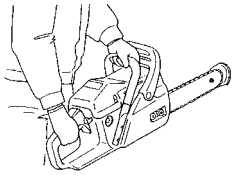
IF the Kick Guard® anti-kickback device is not installed on your chain saw, you cannot rely on the other devices built into your saw. As a chain saw user, you must take the steps necessary to keep your cutting jobs free from accident or injury. With a basic understanding of kickback, you can reduce or eliminate the element of surprise. Sudden surprise contributes to accidents. Understand that rotational kickback is preventable by keeping an unshielded bar nose from touching a solid object, wherever it may be positioned.

DON'T ALLOW TIP CONTACT

SAFE OPERATION: Stand with your weight on both feet. Adjust your stance so as to be away from the saw chain and the line of cutting. When the saw is used without the Kick Guard ® device, the cutting line becomes the potential path of a rotational kickback.

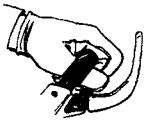
DON'T OPERATE ONE-HANDED

⚠ **WARNING! Do not operate a chain saw with one hand!** Serious injury to the operator, helpers, or bystanders may result from one-handed operation. For proper control, always use two hands when operating a chain saw. Never operate the saw with only the hand that operates the throttle trigger. This can result in the chain saw "skating" or skidding, which can result in personal injury due to loss of control.



FIRM TWO-HANDED GRIP

Always keep a good firm grip on the saw with both hands, with the right hand on the rear handle and the left hand on the front handle, when the engine is running. Use a firm grip with thumbs and fingers encircling the chain saw handles. A firm grip will help you to better position the saw to reduce kickback and to maintain control of the saw. Do not let go. Two hands must be used to control the saw at all times. Always assure proper footing when cutting to prevent slips or falls. Make sure that the area in which you are cutting is free from obstructions. Do not let the unshielded bar nose contact a log, branch, or any other obstruction which could be hit while you are operating the saw.



FIRM ENCIRCLING GRIP

Cutting at high engine speeds may reduce the likelihood of kickback. But cutting at part-throttle or low engine speeds may be preferable to control the chain saw in tight situations and may also reduce the likelihood of kickback. Increase chain cutting speed before letting the chain make contact. To reduce risk of kickback when plunge-cutting or boring, start at part throttle and wait until the saw tip is buried deeply in the wood before slowly going to full throttle.

DO NOT CUT WHILE IN TREES OR ON LADDERS

⚠ **WARNING!** Cut only those branches that can be reached from the ground. Do not over-reach or cut above chest height. Do not attempt to cut in awkward positions.

⚠ **WARNING!** Do not cut while standing on a ladder or up in a tree unless you have been specially trained to do so. Cutting while on a ladder is extremely dangerous because the ladder can slip and your control of the chain saw is limited. Working aloft should be left to trained professionals.

KEY SAFETY AND RISK PREVENTION RULES

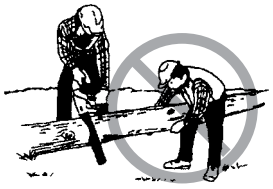
DANGER! Carbon monoxide is a poisonous odorless gas produced by gasoline engines. Operate the chain saw only in well-ventilated areas. Do not run chain saw inside, in garages or sheds, or in confined areas with the possibility of poor ventilation such as drainage ditches, low & confined creek beds, etc.

WARNING! Do not operate a chain saw when you are upset, fatigued or under the influence of alcohol or drugs.

DO NOT OPERATE UNDER THE INFLUENCE

WARNING! Do not allow other persons to be near the chain saw when you are starting or cutting with the chain saw. Keep bystanders and animals out of the work area. Do not let anyone hold the wood that you are going to cut.

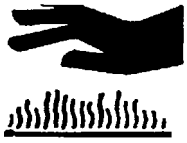
Do not start cutting or felling until you have a clear work area, secure footing, and a planned retreat path from the falling tree.



DO NOT LET HELPER HOLD WHAT YOU ARE CUTTING!

Keep all parts of your body away from the saw chain when the engine is running.

To assure a good grip on the saw, keep the handles dry, clean, and free of oil or fuel mixture.

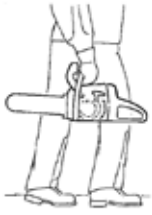


DON'T TOUCH HOT SURFACES

Before you start the unit, make sure that the saw chain is not contacting anything. If you decide to shut off the engine, wait until the chain stops before setting the chain saw down.

Carry the chain saw with the engine stopped, or chain brake engaged with the guide bar and saw chain to the rear. For gasoline operated chain saws, keep the muffler away from your body. When transporting your chain saw, use a protective guide bar scabbard.

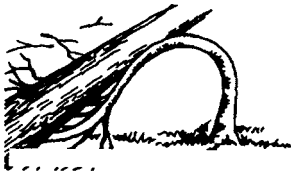
WARNING! Do not operate a chain saw that is damaged, improperly adjusted, or not completely and securely assembled. Be sure that the saw chain stops moving when the throttle control trigger is released.



CARRY SAW WITH BAR TO REAR & ENGINE STOPPED

DANGER! NEVER run the saw with an exposed clutch. An exposed clutch running at high speeds can shatter, causing serious injury to occur.

Keep your chain sharp- this will improve cutting performance and reduce physical exertion. Follow sharpening and maintenance instructions for the saw chain. Use only specified replacement guide bars and chains, or guide bars and chains that meet ANSI B175.1 requirements.



BEWARE OF HIGH TENSION BRANCHES. STAY OUT OF THE PATH

Use extreme caution when cutting small-size brush and saplings because slender material may catch the saw chain and be whipped toward you or pull you off balance.

When cutting a limb that is under tension, be alert for spring back so that you will not be struck by the limb or chain saw when the tension in the branch is released during the cut.

GENERAL SAFETY INSTRUCTIONS

All chain saw service, other than the items listed in the operator's manual maintenance instruction, is to be performed only by competent chain saw service personnel. (For example, if improper tools are used to remove the flywheel, or if an improper tool is used to hold the flywheel to remove the clutch, structural damage to the flywheel could occur. This could cause the flywheel to shatter, resulting in serious injury to operator and bystanders.)

Spark arrester mufflers are standard on chain saws to reduce the possibility of forest fires. Do not operate the chain saw with a loose or defective muffler. Do not remove the spark arrester screen.

Insist on a replacement guide bar with holes to allow the mounting of the Kick Guard® device. Insist on the proper replacement saw chain for your chain saw.

DON'T USE AN OPEN GRIP

PROPER GRIP ON THE SAW - A firm grip is one requirement for chain saw control. The saw should always be held firmly with both hands whenever the engine is running.

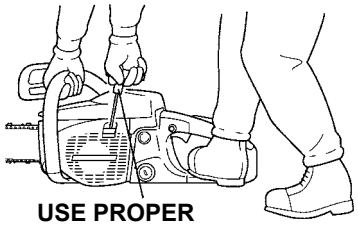
Wear heavy-duty, non-slip gloves to improve your grip on the handles.

Grasp the front handle firmly behind the front hand guard with your left hand. Always use a wraparound grip, with fingers encircling and the thumb on the underside. Thumb position is the key to a strong grip.

KEEP BODY OUT OF CUTTING PLANE

⚠ **WARNING!** Never use a grip where the thumb and finger do not encircle the saw handle. If you use an improper grip, even a slight push or kick of the saw may dislodge your hand. The hand guard is not a handle. Do not pick up or hold the saw by the hand guard.

Grasp the rear handle in the same manner as the front handle. Use index finger to work the throttle trigger, and practice turning off the engine stop switch without losing your grip on the saw.



USE PROPER GROUND STARTING

⚠ **WARNING!** Never hold the saw directly in front of your body where you would be in the line of a kickback. Always keep to the left of the saw.

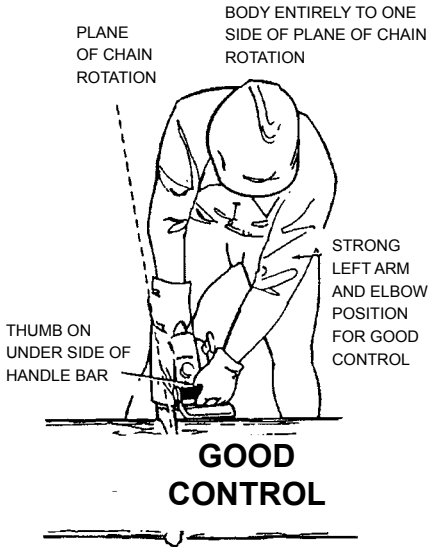
PROPER STARTING TECHNIQUE- Start the chain saw on the ground. Grip the front handle with your left hand and hold the saw down by putting your right foot on the rear handle. Pull the starter rope with your right hand.

⚠ **WARNING! DROP STARTING IS PROHIBITED! DROP STARTING CAN CAUSE LOSS OF CONTROL OF THE SAW AND POTENTIAL INJURY.**

PROPER STANCE, BALANCE AND BODY POSITION FOR CUTTING
After starting, pick up the saw and proceed as follows:

At completion of the cut, let go of the trigger, carefully lift the saw clear, and allow the engine to slow and chain to come to rest before moving away or to another cut.

Moving toward the next place to cut before throttling down and lifting the chain saw clear of the cut can cock the saw blade against the sides of the cut. This can result in a kickback. Always throttle down and let chain come to a stop and lift the saw clear of the wood before moving away.



GOOD CONTROL

KEY SAFETY AND RISK PREVENTION RULES

⚠ WARNING! DO NOT WALK AROUND WITH A MOVING CHAIN, ESPECIALLY IN AREAS OF POOR TERRAIN OR AROUND OBJECTS OR DEBRIS THAT CAN CAUSE TRIPPING. ALWAYS BE SURE OF YOUR FOOTING WHEN REPOSITIONING YOUR SELF FOR THE NEXT CUT.

⚠ WARNING! IF YOU SENSE A TRIP OR FALL, THROW THE SAW AWAY FROM YOU SO THAT YOU DO NOT FALL ON IT .

EQUIPMENT TO BRING ALONG - When using gasoline powered engines, fuel supplies should be carried in approved type fuel containers. Every owner should have a good tool kit to help ensure continued operation of the saw. The kit should contain the following:

- Multi-purpose fire extinguisher.
- A few extra labeled cans or a plastic bottle (with attached pouring nozzle) of chain oil.
- Wrenches, screwdriver, or combination wrench to fit all nuts and screws on the saw.
- 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 gas cap and cooling fins.
- Extra spark plug.
- Owner's manual (wrapped in a plastic bag).
- Cleaning rags.
- Sharp ax. Sledge hammer and wedges. Shovel.
- First aid kit. Despite taking all precautions operating a chain saw, or just working in the forest, presents dangers.

DO NOT transport fuel, or a saw containing fuel, in the same compartment as passengers. The saw must be transported and secured in the truck bed, equipment trailer, or trunk. Cover the chain and bar with a scabbard (protective sheath).

⚠ CAUTION: When sharpening a chain saw, to prevent cuts to the hands, be sure to wear protective gloves when moving the chain or holding the bar. Use a tool to move the chain. Do not push against the sharp cutters, instead move the chain the same way it runs, from engine to bar tip direction.

CHAIN TENSION: Tighten your chain according to the directions supplied in to your instruction manual.

⚠ WARNING! After running, a saw chain will heat up and expand, and may become loose on the guide bar. If not tensioned properly, the chain may derail from the guide bar at high speeds. Stop the saw, recheck the chain tension. Use the proper steps to tension the chain. Always recheck chain tension before using a saw, as the tension may vary due to heating or cooling of the chain.

⚠ WARNING! A thrown chain can cause injury. Assure correct chain tension. Don't run with a loose chain.

RULES FOR SAFE FUELING

WARNING! The engine exhaust from this product contains chemicals known to the State of California to Cause cancer, birth defects, or other reproductive harm.

WARNING! Gasoline and gasoline vapors contain chemicals known to the State of California to Cause cancer, birth defects, or other reproductive harm.

No Lighting Up Or Smoking When Handling Gasoline!

DANGER: Gasoline is an extremely flammable fuel. If spilled or ignited by a spark or other ignition source, it can cause fire and serious burn injury, or property damage. Use extreme caution when handling gasoline or fuel mix.

WARNING! Use only approved safety containers that do not leak to store and dispense fuel. It is best to use a container with a sealable spout and resealable vent to help minimize spillage. DO NOT USE GLASS CONTAINERS FOR GASOLINE.

WARNING! Fuel your chain saw in well-ventilated outside areas only. Select bare ground for fueling. AVOID spilling any fuel on your clothing or shoes. If this happens change into clean clothing immediately. Wipe off any spilled fuel and check for leakage before starting the chain saw. If fuel leakage is discovered, do not start or run the chain saw until the leak is fixed and any spilled fuel has been wiped away. Move the chain saw at least 10 feet (3m) from the fueling point before starting the engine.

WARNING! Chain saw vibration can cause an improperly tightened fuel cap to loosen or come off and allow fuel to escape. After refueling, take care to inspect and clean any debris off the fuel cap seal and tighten the cap as much as possible by hand. Be sure the fuel cap is properly tightened and sealed before starting the unit.

WARNING! ALWAYS INSPECT your fuel cap for damage or leaks. If you experience leaking of fuel onto your clothing or shoes, do not start or use the saw until you have changed your clothing! DO NOT USE A Chain saw WITH A LEAKY CAP! Order a new replacement cap immediately before using the saw.

WARNING! Combustible fuel vapors may be vented from the fuel system. Do not smoke or bring any fire, flame, ignition source or equipment that could cause sparks near the fuel or the chain saw.

Always shut off the engine and allow it to cool before refueling. Due to agitation, weather, heat due to operation, or the type of venting system, gasoline vapor pressure may build up inside the gas tank of the engine. **To reduce the risk of burns or other personal injury from escaping gasoline vapors and fumes, remove the fuel cap slowly and carefully to allow any pressure to release slowly. NEVER remove the fuel cap while the engine is running.**

WARNING! When filling a fuel container at the gas station, to avoid gasoline ignition due to static shock, place approved container on ground away from vehicle when filling and keep the gas nozzle in contact with the container when filling. Do not fill any container while it is in a truck bed or in the trunk of a car.

WARNING! Store fuel and unit where fuel vapors cannot reach sparks or open flames from water heaters, electric motors or switches, furnaces, etc.

If you plan to store the unit for an extended period carefully empty the unused fuel back into a safety can. Following the safe starting directions, run the unit until it completely runs out of fuel.

SAFE WOOD CUTTING PRACTICES

Operating a chain saw safely requires that the chain saw be in proper working order, with the chain properly tensioned. It also requires sound judgment, knowledge of proper cutting methods, and having a plan for every cut you make.

⚠ WARNING! Do not let any person use your chain saw unless he or she has read the operator's manual and this safety manual, and fully understands all instructions. Never let children or minors operate the saw.

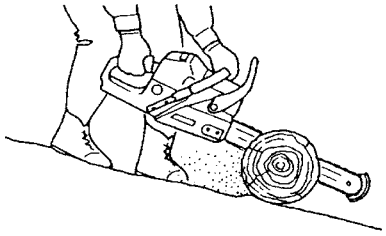
⚠ WARNING! Do not let helpers hold wood for you to cut. Keep helpers and bystanders a safe distance away. Don't reach in to grab cut material until the saw chain has come to a complete stop.

Use your saw only to cut wood or wood products. Do not cut metal, sheet metal, or any non-wood materials.

Maintain good control at all times, using a secure, balanced stance and a firm, two-handled grip.

Stay on the uphill side when bucking or limbing logs, which might otherwise roll toward you after being cut.

STAY ABOVE LOG ON DOWN SLOPE



⚠ WARNING! Keep both feet on the ground. Do not work from off-the-ground positions. Working from ladders is extremely dangerous because they can slip, your footing is confined, and your control is extremely limited. Working aloft should be left to the experts.

⚠ WARNING! Do not work from metal ladders when there are power lines close by. Do not work on any tree if any of its branches may be in contact with power lines. If a tree hits a power line DON'T GO NEAR! Notify the power company as soon as possible.

Work only when there is adequate lighting to see clearly.

When there are several workers, they should be stationed where they will not interfere with one another. During felling and limbing operations, only the chain saw operator should be working on a tree, which can shift at any time.

When felling a tree or any chain saw process, keep people and animals away a distance of at least twice the height of the tree. This "rule" also applies when hung-up trees are being dragged down.

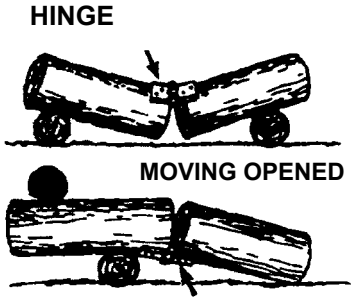
Before cutting, clear the area of materials likely to be ignited by the saw or that may interfere with your footing or the cutting process. Be sure the path of retreat is clear. It is wise to plan two exit paths in case one becomes blocked during the tree's fall.

⚠ WARNING! If a tree starts falling toward you, or you see a branch ready to fall, **LEAVE THE SAW AND GET AWAY FAST!** Any tree with a hollow rotted trunk, thick loose bark, and suspended dead branches is extremely dangerous to disturb by cutting. Such trees should be taken down by professionals.

⚠ WARNING! Be extremely careful when attempting to fell trees during periods of high wind or with unbalanced forces from heavy precipitation. If a fallen or broken tree creates an emergency, leave removal to the professional tree removal services.

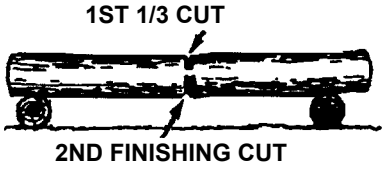
⚠ WARNING! Anytime you use a chain saw, beware of electrical lines in the area, electrified branches in contact with power lines, or electrical lines that may have been knocked down by natural occurrences such as an ice storm, heavy winds, or fallen limbs or trees. Also beware of electrical fences while using a chain saw. DO NOT CUT NEAR ELECTRICAL LINES!

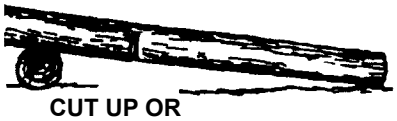
Wind bends trees. Gravity bends logs that are not flat on the ground. A log weakened by a cut over 1/3 the log diameter is like two logs hinged together. The cut may either close or open wider, depending on how the log is positioned.



In bucking logs, always make the weakening cut from the direction (opposite the “hinge” side) which causes the cut to widen. If made from the wrong side, the cut will close, binding the saw and pinching the chain.

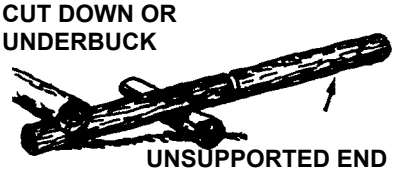
If the log is under heavy stress, prevent splitting by making a shallow cut (up to 1/ 3 dia.) on the “hinge” side first. But, always finish with the final cut in a direction towards the “hinge” side.



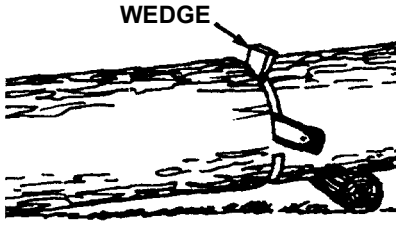


CUT UP OR
UNDERBUCK

When the log is supported on both ends and is best to be cut in between, underbuck (cut upward from the bottom side) for the finishing cut.



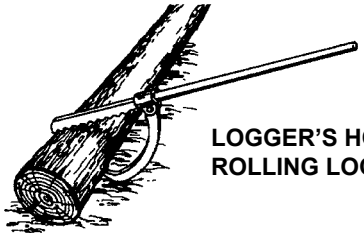
When you wish to cut off an unsupported section from the end of a log, the weakening or finishing cut should be an overbuck (from top down). However, you may begin with a shallow underbuck to avoid splitting.



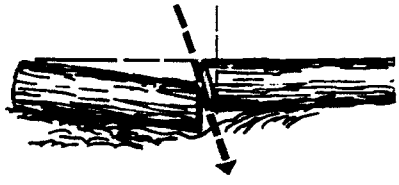
When the lie is such that the cutoff section will settle, guard against binding and pinching of the saw between the log sections. This can be done by inserting a soft wedge into the cut (after the chain is out of the way) to hold the cut open. In certain cases, the cut may be made on an angle so that it will widen as the log settles.

If you’re unsure how a log actually lies, and how it will bend, change its lie. If too heavy to move without strain on the back muscles, use a lever bar such as a cant hook to move or roll it. NOTE: You may have need to use this procedure to free the saw, if you misjudged the position of the log.

When a log is flat on the ground, overbuck as far through as possible without cutting into the earth. Then roll the log over to finish the cut.



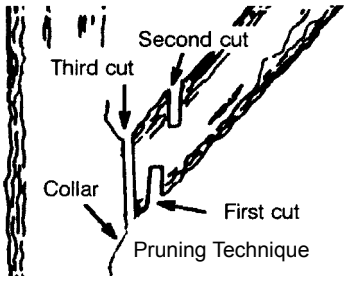
LOGGER’S HOOK FOR
ROLLING LOGS



MAKE ANGLED CUT WHEN ONE SECTION MAY SETTLE AGAINST ANOTHER. KEEP BODY OUT OF BAR/CHAIN PATH!

PRUNING SHADE TREES AND CUTTING SAPLINGS

Whippy growth, such as saplings and tree branches, may resist being cut. Be prepared for the saw chain to skate along the surface and the material to vibrate from side to side. This can result in a sharp sudden pull on the saw or can cause branches to snap back at the operator. Be ready to resist this pull and avoid snapping branches. With the Kick Guard ® device in place as a shield on the bar, you can flush-cut brush and saplings close to the ground to reduce this rough cutting. The pruning of small gauge branches may be better done with pruning saws or shears rather than chain saws. Likewise, clearing brush or heavy weeds may be better done with a brush cutter.



TRIMMING TECHNIQUE TO AVOID BARK PEELING

Trees have both branches and stems that look like branches, called condominant stems. If a condominant stem must be removed, cut at an angle outside of the bark ridge. Avoid leaving any stub.

When removing a branch, always cut outside the branch bark ridge and collar. Do not make a flush cut when removing a main branch. You may need to undercut a notch first to allow a hinge for the lowering process. After the branch has been cut off, make your finished cut in the desired location.

⚠ WARNING! Do not cut while in a tree unless you are specially trained to do so.

Branches that do not have a distinct collar should be cut at a right angle to the branch outside of the branch bark ridge.

DO NOT CUT UP IN TREES

When removing heavy limbs, first make an undercut several inches outside of the collar. Then remove the limb by a second cut an inch or so outside of the first cut. Remove the stub with a third cut just outside of the collar. This process will prevent bark peeling

WOUND DRESSINGS NOT USEFUL - Wound dressings have been shown to interfere with the natural development of callus tissues that eventually close the pruning wound. In some cases, wound dressings can even harbor disease organisms much like what occurs when a bandage is left on a skin cut too long. It is far more important to make a smooth cut outside of the collar, and allow the wound area to dry.

If a wound dressing is desired for aesthetic purposes, use a very thin coat, just enough to darken the wound area. The best are the aerosol sprays of water emulsified asphalt sold in garden centers. Do not use oil-based paints, thick tars or other materials containing petroleum solvents.

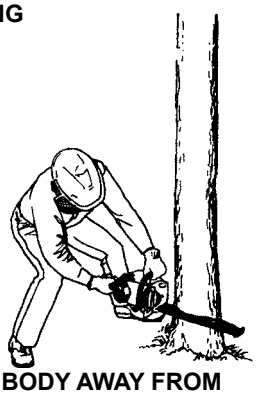
MAINTAIN TREE HEALTH - The key to good wound closure following pruning is to maintain a healthy tree through proper watering, fertilizer application and pest control. Trees under stress from drought, over-watering, pest attack, lawn mower, and other mechanical damage, and poor nutrition cannot successfully fight off invasion of organisms.

Please note that felling a tree is more complicated than often expected. Take time to plan cuts, fall path and escape route before felling the tree. Electric powered units may not be suitable for felling some trees. Consider such factors as tree size and location, circuit breaker capacity, and weather and ground conditions to determine if an electric powered saw is appropriate. Refer to instructions on using an electric saw.

SURVEY TREES BEFORE FELLING

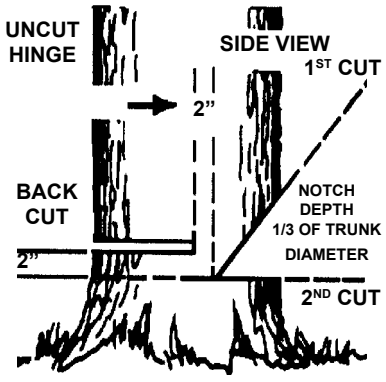
⚠ **WARNING!** Call a professional tree-felling service to handle jobs that are beyond your abilities and knowledge. This includes trees that are precariously located near power lines, homes, buildings, and public roads.

PLANNING THE FALL - Check the tree and the weather for wind speed and direction. The trunk should be sound, not rotted and hollow. Look for branches, which might become free and fall on you during the cutting work. Wear a hard hat. Prepare the working area and clear your escape route. This route should be to the rear, but not straight back. Going more to the side is safer. Decide whether wind conditions plus the natural lean and balance of the tree will enable you to fell the tree in the desired direction. At any risk of a wrong-way fall, consider using a wedge to help start the tree in the right direction. If the trunk is too small in diameter for insertion of a wedge, consider tethering the tree. The tether line must be attached before cutting is begun.



KEEP BODY AWAY FROM KICKBACK PATH

NOTCHING FOR DIRECTIONAL CONTROL - Make two cuts on the side the tree is to fall. Make the bottom cut first, at 90 degrees to the intended line of fall and to a depth of 1/3 the trunk diameter. Then angle the top cut downward at a 45-degree angle to intersect the first cut at the 1/3 trunk diameter depth. Remove the cut piece.

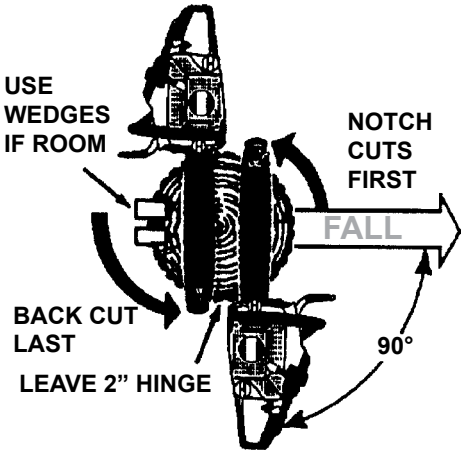


BACK CUTTING AND HINGING - It is important to leave approximately a 2 inch (50 mm) wide strip of wood uncut between the notch and the back cut. This uncut strip acts as a “hinge” to determine the line of fall.

Make the back cut at least 2 inches (51 mm) higher than the intersection of the notch.

Make the back cut parallel to the base of the notch, but don’t cut all the way through to the notch. Leave a “hinge” strip of approximately 2 inches (51mm) so the notch and back cut are of equal thickness.

⚠ **WARNING! DO NOT CUT THROUGH THE HINGE! THE TREE CAN FALL THE WRONG WAY AND CAUSE PROPERTY DAMAGE, SERIOUS OR FATAL INJURY.**

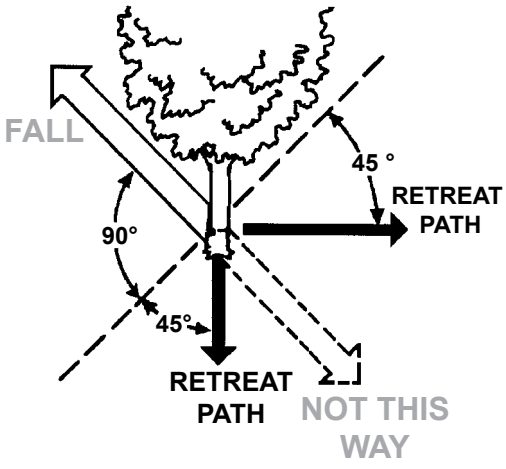


FELLING TREES

If the back cut is too low, or the “hinge” is cut through, the tree will not be under control of the “hinge” and may fall in any direction. Be ready to leave the chain saw and **GET AWAY FAST**, **away from the tree’s falling direction!**

When the tree does not lean in the desired felling direction, insert a plastic or wooden wedge into the back cut when there is room behind the saw blade. This will hold the cut open. Then complete cutting to the hinge (careful not to cut the wedge), and either continue cutting to fell the tree or hammer in the wedges to push the tree in the desired direction.

TETHERING - For good leverage, the tether line should be attached as high up the trunk as possible. Use a strong rope. (Do not use nylon rope because it stretches.) Run the rope in the planned direction of fall to a distance much greater than the height of the tree. Tugging or jerking on the tether line can cause the tree to sway, and fall backwards. Always maintain constant tension on the tree using a steady pull on the rope to prevent swaying.



DANGER! During felling, if a tree starts to lean and fall in an unintended direction, causing your saw to bind, **LEAVE THE SAW!** Be particularly careful as you get away from the tree’s precarious position. Beware of the direction it is going and do not cross the fall path. **Do Not try to save the saw! The saw is replaceable- You are not!**

DANGER! HUNG TREE- When a tree gets hung on another and will not fall, ask for help from a trained experienced woodsman or tree felling service. This can become an extremely dangerous condition.

WARNING! Check for broken or dead branches which can fall while cutting causing serious injury. Do not cut near buildings or electrical wires if you do not know the direction of tree fall, nor cut at night since you will not be able to see well, nor during bad weather such as rain, snow, or strong winds, etc. If the tree does make contact with any utility line, the utility company should be notified immediately. Carefully plan your sawing operation in advance. Clear the work area. You need a clear area all around the tree so you can have secure footing. The chain saw operator should keep on the uphill side of the terrain as the tree is likely to roll or slide down hill after it is felled.

Study the natural conditions that can cause the tree to fall in a particular direction, such as:

- The wind direction and speed.
- The lean of the tree. The lean of a tree might not be apparent due to uneven or sloping terrain. Use a plumb or level to determine the direction of tree lean.
- Weight and branches on one side.
- Surrounding trees and obstacles.
- Look for decay and rot. If the trunk is rotted, it can snap and fall toward the operator.
- Make sure there is enough room for the tree to fall.
- Maintain a distance of 2-1/2 tree lengths from the nearest person or other objects. Noise can drown out a warning call.
- Remove dirt, stones, loose bark, nails, staples, and wire from the tree where cuts are to be made.

⚠ WARNING! Do not walk on the trunk or in a log pile, or cut while standing on it.

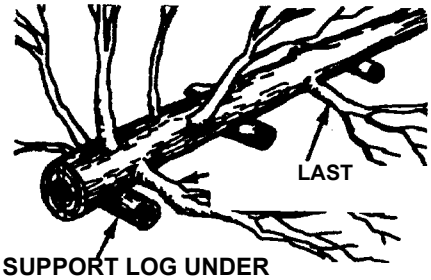
DON'T CUT WHAT YOU ARE STANDING ON

⚠ WARNING! Take extra care when walking around a log pile, especially if logs are debarked or wet and slippery.
Determine how the log or limb is tensioned. Apply the methods discussed to avoid entrapment of the saw. If the chain becomes pinched in a bind, **SHUT OFF THE ENGINE**. Free the bind by lifting the limb. Use levers, poles, etc. for lifting. Avoid back injuries.

Do all the limbing with the Kick Guard® device properly assembled on the guide bar nose. The only time bucking should be done without the Kick Guard® device is when the tree trunk diameter exceeds the cutting capacity of the saw. When the trunk is held off the ground by its limbs, determine which of these are needed for support. Leave these while you cut off all the other limbs and branches. You will lose support of the limbs as sections of the trunk are bucked into logs. Roll some short logs under the trunk so you can continue off-the-ground bucking, which is easier than when the trunk is flat on the ground. Go to the high groundside of the trunk to buck off logs.

KNOW HOW BRANCHES ARE STRESSED

It may be necessary to bore into the middle of a log before the top or bottom is cut. Boring is a dangerous procedure where the bar tip guard cannot be used for protection. Be sure you have read about kickback in this manual and know how to avoid it before attempting to bore.



USE SUPPORT LOG UNDER TRUNK
LEAVE SUPPORT LIMBS UNTIL

⚠ WARNING! Boring should only be performed by trained professionals. There is danger of kickback during boring. Be sure to maintain proper control of the saw and keep your body away from the kickback path.

Before starting the bore, use the bottom edge of the saw blade to cut into the side of the log at slow chain speed. When the bar has buried itself quite deeply into the log, gradually increase chain speed and shift cutting pressure to bore straight into the log. Once the bar is inside the log, you can cut downward to the bottom, and then finish by cutting upward through the holding wood at the top.

Avoid sawing inside windfalls. Windfalls are tangled branches, roots and trees. Clean these out only by cutting from the perimeter, or by dragging logs and limbs into the clear before bucking.

LIMBING AND BUCKING

⚠ WARNING! Be alert for spring poles and stay clear of them during cutting. A spring pole can spring back suddenly when cut, or when the wood holding it down is cut away. A spring pole can strike you or deflect the moving saw chain into your body.

BE ALERT FOR SPRING POLES

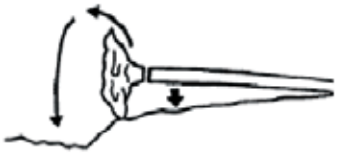
Do not cut a tree in order to drop a tree that has lodged against it. Have lodged trees pulled down with proper power equipment.

When a log diameter exceeding the bar length is flat on the ground with no room for an under buck, reach over the log and cut into the side. Then draw the saw over the top and over buck deeply enough to insert a wedge. Reinsert the saw and over-buck as far down as possible without letting the chain hit the dirt.

Logs that are flat on the ground, and that are within the saw's capacity to cut with one over-buck should be bucked as low to the ground as possible. Keep the Kick Guard® device on the bar and use a wedge when necessary to hold the cut open. Then roll the log with a cant hook or pole to expose the bottom for cutting.

⚠ DANGER!

Cutting the trunk of a large tree that has a large root ball can cause the root ball to fall back into the ground, causing severe or fatal injury. Never allow anyone to be positioned in or around the root ball or the root ball hole.



BEWARE OF ROOT PLATE SETTLING!!

FELLING VERY LARGE TREES

Pertains to gasoline-powered saws only. Small gas powered saws and electric powered saws should not be used to fell very large trees. Only those that have been trained to cut very large trees should attempt these techniques.

⚠ WARNING! Call a professional tree-felling service to handle jobs that are beyond your abilities and knowledge. This includes large trees, trees that are near power lines, homes, buildings and public roads.

Timber of a diameter exceeding the length of the saw blade can be felled by using one of the following methods. To fell a leaning tree, see “Felling Extreme Leaners” below.

DRAW-ACROSS METHOD - Standard procedures are used here, except that the cuts have to be extended from one side to the other when the blade doesn’t fit across the trunk.

Start the lower cut of the notch by pivoting in from one corner to a depth of 1/3 trunk diameter. Then reverse the saw direction, reinsert saw in cut, and draw it across to the other corner. Complete the cut on that side. Do the same thing to make the intersecting top cut. Be careful to keep your body out of the kickback path when making this angled top cut. Remove the cut wood wedge.

For the back cut, start at the corner at least 2 inches (51 mm) above the intersection of the notch. Plan to leave 10 to 12 percent of the trunk diameter uncut as a hinge. Pivot the saw from the back towards the hinge. Reverse saw direction, reinsert saw into the cut, and draw it across the back of the tree. Cut the other side to complete the felling cut and the hinge. Follow standard felling procedures from this point.

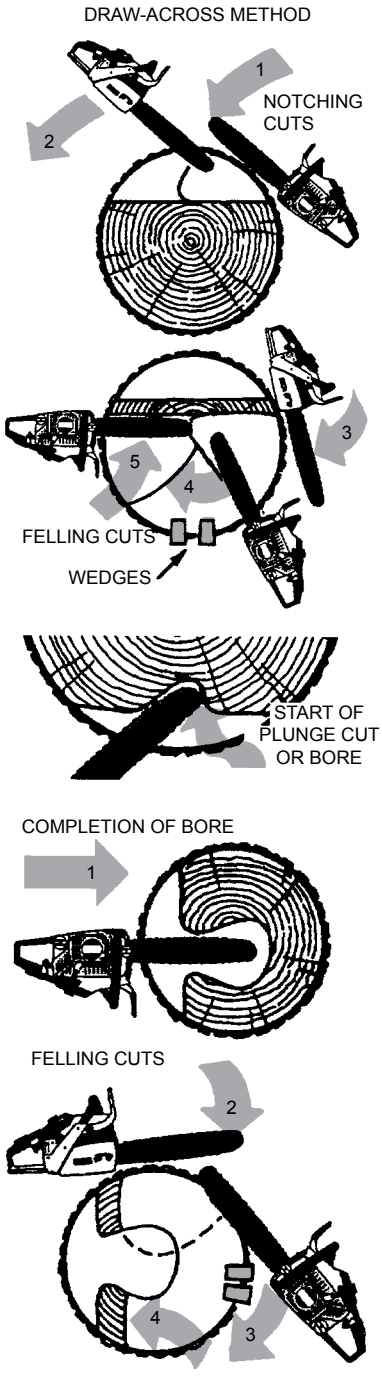
PLUNGE CUTTING METHOD - This method uses the same steps for notching and felling cuts as described in the “Draw-Across Method.”

⚠ WARNING! Plunge cutting entails boring inside the tree. Be aware that there is always a chance of kickback even when the plunge cut is expertly done.

After notching the trunk, stand at the left and aim the saw at the middle of the notch intersection. Throttle up to a slow chain speed. Make contact at the middle with the bottom edge of the bar, NOT THE BAR NOSE!

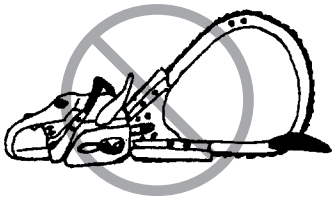
Pivot the saw in to a depth of at least 6 inches (15 cm) before smoothly increasing speed to full throttle. Then gradually shift cutting angle and pressure to bore straight into the trunk. When all the way inside, hollow out the trunk. **But do not cut away any more of the hinge wood than necessary.** Now make the back cut to fell the tree.

FELLING EXTREME “LEANERS” - Do not assume that the lean makes notching for directional control unnecessary. The notch is needed, but should not be as deep as the standard 1/3 diameter notch. Before back cutting, make some notches through the sapwood on both sides of the trunk to relieve some of the stress, which causes splitting. Stay on the alert for possible splitting, because a splitting tree is dangerous.



BOW SAW WARNING

WARNING! ECHO Inc. does not recommend the use of bow saws. If you choose to attach a bow guide to an chain saw, and thus create a bow saw, you do so at your own risk. A bow guide attachment increases the risk of severe kickback and serious injury. Do not use a bow guide unless you have experience or specialized training. Do not remove guard(s) or spur(s) on the bow guide provided by the manufacturer. Do not rely on a chain brake to prevent or reduce an injury associated with the severity of a kickback from a bow saw.



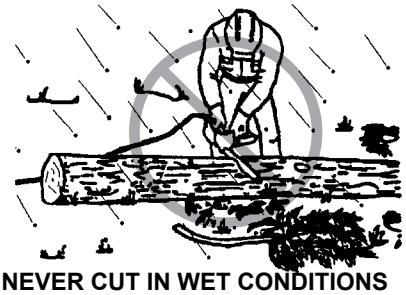
AVOID USING BOWSAWS

Proper use of the bow guide's spurs can prevent bow saw kickback. Do not rely on low kickback chain to reduce kickback when used with a bow saw, even though it may have qualified under ANSI B175.1 Low kickback chain is not effective in reducing the likelihood of a bow saw kick back.

ELECTRIC CHAIN SAW SAFETY

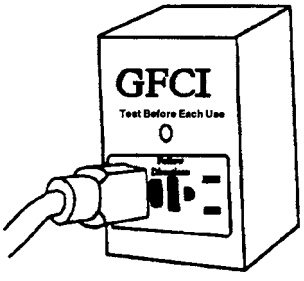
SAFETY PRECAUTIONS - There are added safety precautions that must be taken regarding electric chain saws:

DANGER! To reduce the risk of electric shock or electrocution, **never** use an electric chain saw, or any other electrical device in rain, or in wet locations. Serious injury can occur due to electric shock or death by electrocution.



NEVER CUT IN WET CONDITIONS

WARNING! Do not use damaged extension cords with cuts. Inspect the electric cords before each use and replace them if damaged. Cord insulation must be intact with no cracks or deterioration. Use only polarized extension cords marked as suitable for outdoor appliances and in conjunction with qualified, tested Ground Fault Circuit Interrupter (GFCI) protected circuits. Do not use multiple cords. Plug connectors must be undamaged.



USE TESTED GFCI CIRCUITS

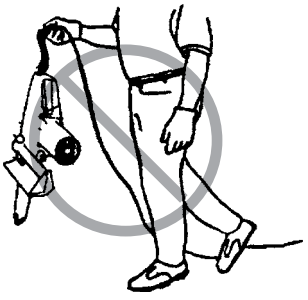
WARNING! Always use qualified GFCI protected circuits when using electrical equipment outdoors. A ground fault interrupter in the power supply line will help prevent fatal shocks.

WARNING! Avoid unintentional starting of the chain saw by making sure the switch is off before plugging in the unit. Never tie the switch down in any fashion so as to lock the switch in position.

AVOID USING DAMAGED CORD

WARNING! Never leave a plugged in unit unattended. It is always possible for a child or inexperienced user to wander up to the unit for experimentation or play.

WARNING! Do not abuse the electric cord. Never carry the chain saw by the cord. Do not yank the cord when disconnecting the unit or extension cord from power receptacles.



DON'T CARRY BY CORD

WARNING! Keep electric cords away from heat, sharp edges, or any area that can increase the possibility of cutting the cord, and exposing operator or others to shock or electrocution.

ELECTRIC CHAIN SAW SAFETY

The electric chain saw unit is made of a molded dielectric material that reduces the risk of electric shock to the operator. Broken or cracked housings or guards may not protect you.

⚠ Do not operate the unit if housings or guards are damaged. Use only identical replacement parts when service is required. Use of non-identical parts may create an electrical hazard resulting in serious injury or death from electrocution.

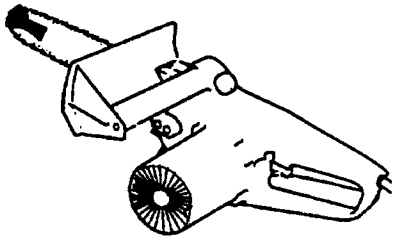
Be sure to use the correct size extension cord which is rated to carry current a specific distance. The electrical rating of the cord must not be less than the rating of the saw. A longer extension cord will require a heavier gauge wire. An undersized extension cord will result in a drop in line voltage resulting in loss of power and overheating. Read your Instruction Manual to find the recommended size of extension cord. The smaller the cord gauge number is (AWG - American Wire Gauge), the heavier the wire gauge will be. If in doubt, use the next heavier gauge.

MINIMUM WIRE GAUGE RECOMMENDATIONS			
VOLTS	**7.67 m (25 ft.)**	**15.24 m (50 ft.)**	**30.48 m (100 ft.)**
120	**16 A.W.G.***	**16 A.W.G.***	**14 A.W.G.***

***American Wire Gauge**

⚠ **WARNING! Never drape the extension cord over the wood or log being cut. Keep the extension cord behind you to avoid the possibility of dangerous electric shock or electrocution. Keep the cord away from the chain. Work away from the power source allowing the cord to follow behind you. Do not touch the metal bar or chain if the chain saw blade has cut into the extension cord.**

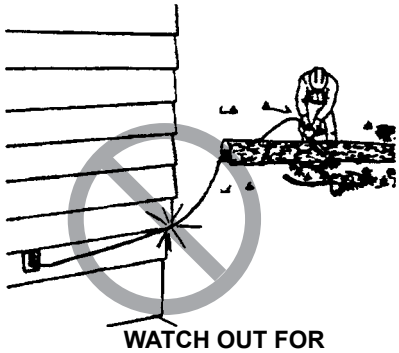
To avoid motor overheating, remove all debris from the air vents located on the side of the motor housing. Always disconnect the plug before any servicing is performed on the unit, and when the unit is not in use. Do not leave a plugged in unit unattended.



KEEP VENT CLEAR

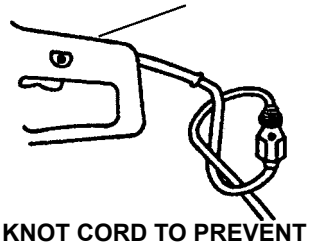
⚠ **WARNING! Avoid dangerous situations. Do not use in the presence of flammable liquids or gases to avoid creating a fire or explosion and/ or causing damage to unit.**

⚠ **WARNING! When using a gasoline powered generator as a power source for the chain saw, always read the generator Operator's Manual to learn proper grounding techniques. An improperly grounded generator could cause serious injury from electric shock, or death by electrocution. Never use a generator indoors. Use only in outdoor areas with adequate ventilation.**



WATCH OUT FOR SHARP EDGES

Avoid accidental pullout of plug from extension cord. Tie a loose knot with the chain saw power cord and the extension cord. The loop in the knot will reduce the likelihood of plug disconnection.



KNOT CORD TO PREVENT UNPLUGGING

GLOSSARY OF CHAIN SAW TERMS

GASOLINE POWERED UNIT TERMS

THROTTLE TRIGGER - Located in the rear handle, it is used to control the speed of the engine.

THROTTLE TRIGGER LATCH BUTTON - The control used to set the throttle for a fast idle speed, required to start a cold engine. The throttle can be unlatched by squeezing the throttle trigger.

THROTTLE TRIGGER LOCKOUT LEVER - A safety lever on the top of the rear handle which must be depressed before the throttle trigger can be activated. When the operator lets go of the rear handle, the throttle will be locked in idle position.

THROTTLING BACK - Releasing the throttle trigger to allow a decrease in engine speed (rpm).

THROTTLING UP - Depressing the throttle trigger to allow an increase in engine speed (rpm).

ELECTRIC POWERED UNIT TERMS

DIELECTRIC MATERIAL - A material that reduces the likelihood of shock or electrocution by providing protection against current flow through the chain saw housing to the operator.

GAUGE - a term that is used to describe the size of wire required when using extension cord with electric units over specific distances.

GFCI - Ground Fault Circuit Interrupter. An electrical circuit breaking device which provides protection against electrical shock hazards.

THROTTLE TRIGGER/STOP SWITCH - An electrical switch, which allows the motor to start and run, prevents the motor from running, and turns the motor off. Refer to Operator's Manual to learn and understand the stop and start Procedure.

GASOLINE AND ELECTRIC UNIT TERMS

BALLISTIC - A special material used in protection devices designed to reduce the risk of penetration from chain contact.

BINDING - Closing of the cut or shifting of the wood, possibly trapping the saw blade in the cut. Binding includes pinching. (Also, see PINCH.)

BORING - A process of using the lower part of the bar nose and chain to penetrate the middle of a log or tree. Boring can keep the wood from splitting and the guide bar from binding as the cut is continued either up or down from the middle. But this is an extremely dangerous operation with a high kickback potential, and should not be attempted by untrained or inexperienced operators.

BOW GUIDE - A guide bar (see definition below) with a large open center used by some professional pulpwood loggers.

DANGER! ECHO Inc. warns against the use of a bow guide on your chain saw. A bow guide increases the risk of severe kickback and serious injury. Do not use a bow guide unless you have experience or specialized training.

BRUSHING OUT - Cutting or otherwise removing undergrowth and brush in the cutting area and along the planned path of retreat.

BUCKING - Generally the standard cross cuts made to section a log or felled tree. Variations include over bucking (cutting from top down) and under bucking (from underside).

BUMPER - The front of the power head and guide bar cover used as a work stop and/or pivot point when pivoting the saw blade into the wood.

BUMPER SPIKE - An optional spiked stop plate for holding the chain saw steady against the wood, preferred by some chain saw users during felling operations.

CANT HOOK - A combination hook and lever tool for rolling and positioning logs.

CHAIN CATCHER - A projection designed to reduce the risk of the operator's right hand from being hit by a chain, which has broken or derailed from the guide bar during cutting.

CHAIN TENSIONER - The device which permits precise adjustment of the chain tension.

CHAPS - Specially designed leg protection, which can reduce the risk of injury due to contact with a moving saw chain.

CHOKE - The engine control used to enrich the fuel mixture for cold starting.

CLEARING - Removing undergrowth and saplings from an area with a chain saw.

COMPUTED KICKBACK ANGLE (CKA) - The angle that is computed from testing on a kickback-test machine in conformance with ANSI B175.1 Standard testing procedures.

FAN COVER - The air intake grille. It covers the cooling fan and also contains part of the starter assembly.

FELLING BACK CUT - The final cut or series of cuts made to complete the hinge and fell the tree.

FOLLOW THROUGH - After the chain saw completes a cut and is no longer supported by the wood, an uncontrolled chain saw can continue on its path and strike the legs, feet or body of the operator.

FRONT HAND GUARD - This required device is intended to reduce the operator's risk of injury from projecting branches and saw-chain contact with the left hand in the event the operator loses his grip from the upper part of the handle. Do not operate a chain saw with a loose or broken hand guard.

GUIDE BAR - The railed structure that supports and guides the saw chain.

HINGE - Uncut wood which holds the tree from twisting off the stump and guides or "hinges" its fall. The hinge is formed by making the back cut towards the directional control notch, coming approximately parallel to the notch but no closer than about 2 inches (about 51 mm) away.

KERF- The groove opening produced by the chain saw.

KICKBACK - The general term describing two highly dangerous reactions which can occur. When used alone in this manual, the term "kickback" refers to rotational kickback. To prevent kickback, keep the bar nose properly covered with the Kick Guard® device. If the Kick Guard® device is absent, kickback can occur if the unshielded bar nose touches an object or the ground.

ROTATIONAL KICKBACK - The violent reaction which can occur when the chain at the upper section of the nose is suddenly stopped or impeded, thereby dangerously driving the bar nose in an upward arc toward the operator.

LINEAR KICKBACK - A push reaction, which can occur under certain conditions with the guide bar buried in the cut when the cut closes, pinching the chain along the top rails of the guide bar and propelling the chain saw
straight back toward the operator.

KICK GUARD® DEVICE - Anti-kickback device attached to the bar nose.

LIMBING - The process employing cuts to remove limbs from a tree.

LOW-KICKBACK SAW CHAIN - A saw chain which has been demonstrated to meet the kickback requirements of ANSI Standard B 175.1 on a representative sample of chain saws.

FELLING NOTCH - A vee or other shape cutout made at right angles to the desired line of fall on the side the tree is to fall.
SIDE NOTCH - A cut made on one or both sides of the trunk either to reduce the chance of splitting, or as part of the Apple Core Method.

PINCH - Specifically the closing-in of the wood which
pinches and stops the chain along the top rails of the guide bar during a cut. This can result in the chain saw being propelled straight back toward the operator (called a Linear Kickback). Pinch can also occur on the lower rails of the bar, resulting in the chain saw being pulled away from the operator.

PLUNGE CUTTING - Another term for Boring with a chain saw. See definition of Boring.

PRUNING - The process of trimming branches on a living tree.

PUSH AND PULL - When cutting is done along the bottom rails of the guide bar, the reaction on the saw is a pull away from the operator. When the top of the guide bar is used, the reaction pushes the saw towards the operator. Both are normal reactions which must be controlled by the operator.

REDUCED-KICKBACK GUIDE BAR - Guide bars which are recognized by the ANSI Standard B175.1 as having as small or reduced radius nose to reduce the potential kickback area.

REDUCED-KICKBACK SAW CHAIN - Saw chain which has been demonstrated to reduce kickback on a selected group of chain saw models during ANSI testing. Before using "reduced kickback" chain, ask your dealer to determine if your chain saw can accommodate "reduced-kickback" chain and still meet the 45-degree CKA requirement.

SCABBARD - A sheath to cover the chain and bar during transport and at other times when the saw is not in use.

SCYTHING - A sweeping, close-to-ground action with the saw blade to remove brush and weeds. Scything must not be done without the protection provided by the Kick Guard™ device.

SIDE LINE - Attached to a tether line, it is pulled at a 90 degree angle to the tether line.

SKATING - When the chain saw fails to dig in during a cut, the guide bar can begin hopping or dangerously skidding along the surface of the log or branch, possibly resulting in the loss of control of the chain saw. To prevent or reduce skating, properly hold the chain saw with two hands and make sure the saw chain has established a groove for cutting.

TETHER LINE - A rope, chain or cable tied high up on a tree trunk for leverage, and used to tether the tree against a backward fall and to exert a steady pull to ensure the tree's proper fall. Tethering can be dangerous if improperly executed, such as if a tether line is not strong enough to withstand the pull, or the available pulling force is inadequate.

If you need a copy of a chain saw safety or instruction manual, have product questions, are unsure about the safe use or maintenance of your saw, or would like to obtain a chain saw safety video, please visit our website at http://www.echo-usa.com. You may also contact your local ECHO dealer, or contact ECHO directly at (800) 432-3246. The chain saw safety video provides operational safety information and cutting demonstrations.

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