

# 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.

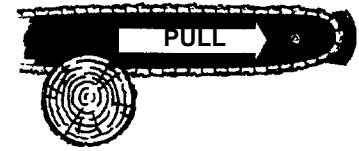
**PUSH** - Cutting on the underside of a log pushes the chain saw toward you.

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

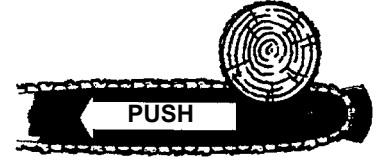
**ROTATIONAL KICKBACK** - When the chain is moving downward around the upper nose of the bar, solid contact there may drive the bar tip upward in an arc toward you. This is an extremely dangerous reaction called Rotational Kickback. When used alone in this manual, the term kickback will always refer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

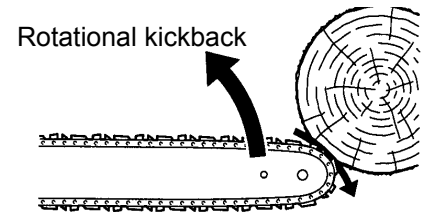
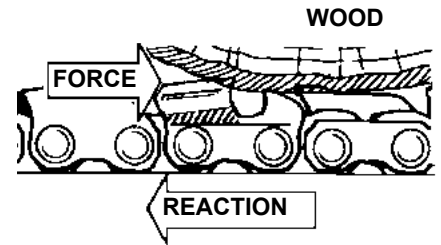
**LINEAR KICKBACK** - A sudden **PUSH** reaction that occurs when the chain along the top rails of the bar gets pinched in a cut. This type of reaction pushes the chain saw straight back toward the operator. The Kick Guard<sup>®</sup> device on your bar nose acts as a stop against this type of kickback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



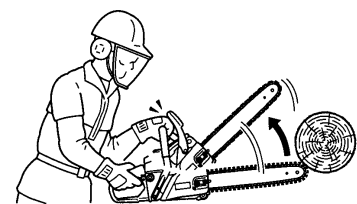
CUTTING ON BOTTOM OF GUIDE-BAR PULLS SAW AWAY FROM YOU



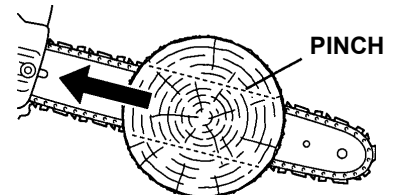
CUTTING ON TOP OF GUIDE-BAR PUSHES SAW TOWARD YOU



Chain moving downward at impact



ROTATIONAL KICKBACK

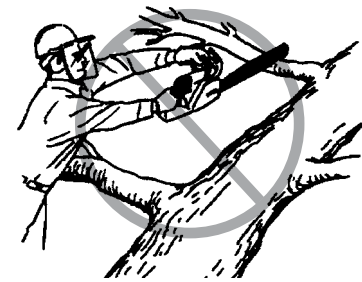


PINCHING TOP OF GUIDE BAR CAUSES LINEAR PUSH OR KICKBACK

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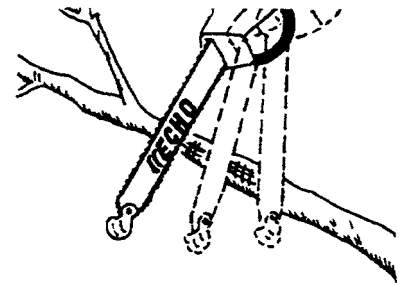
**FORCE OF GRAVITY & “FOLLOW THROUGH”** – Gravity is always present and you must be prepared for it when you are operating a chain saw. During the cutting operation, the weight of the chain saw is supported by the material being cut. When the saw completes the cut, the saw is no longer supported, and 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**