THE UNIVERSITY OF TENNESSEE
AGRICULTURAL EXTENSION SERVICE

SP 268-H

Small Engines

Maintaining and Troubleshooting Chain Saws

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The power source for the chain saw does not differ basically from that used to power automobiles, lawn mowers, garden tillers and other items of power equipment in use today. All are technically known as internal combustion and reciprocating engines.

Most chain saw engines today are basically of the two-stroke cycle type (except for electrically powered saws), which means that the engine does not have a crankcase for oil to lubricate the engine. The main reason for using this type engine on chain saws is to reduce the weight as much as practically possible and to eliminate oil leaks and fouling. Since chain saws are operated with the engine in various positions (right side up, sideways, upside down) and angles, four-stroke cycle engines would be heavier and lubrication of internal engine parts could be critical.

Lubricating oil for the engine is mixed with the gasoline in two-stroke cycle engines. Ordinary crankcase type oil should not be used. Several additives in this type oil will inhibit the lubrication process. An oil developed and recommended for two-stroke engines should be used. It should be mixed in the proper ratio with the gasoline to attain proper lubrication of the engine and combustion of the fuel oil mixture in the combustion chamber. Most chain saw manufacturers recommend one of the following mixture ratios:

Ratio Gas:Oil	Oil to Add To One Qt. Gas	Oil to Add To One Gallon Gas
16:1	2 ounces	8 ounces
20:1	1.6 ounces	6.5 ounces
50:1	0.64 ounces	2.5 ounces

Be sure to follow manufacturer's recommendations in choosing and mixing the gas-oil for your saw. The warranty on the engine may be voided by incorrect mixtures or type of oil.

CAUTION: Do not mix more gas-oil than will be used in a short time. It is better to have a fresh mix each time you use the saw to ensure proper performance. A gas-oil mixture left setting around for several weeks or months will go stale and may cause blockage of jets and passages in the carburetor as well as fouling of the spark plug.

For information on spark plugs, carburetors, and air cleaners for chain saws, refer to the publications in this series of fact sheets titled "Spark Plugs for Small Engines," "Servicing Air Cleaners on Small Engines," and "Carburetor Adjustment on Small Engines."

The following information is provided to assist in maintenance and care of saw chains. Manufacturer's instructions should be followed whenever available; otherwise, the following information may be helpful in servicing your saw chain.

LUBRICATION

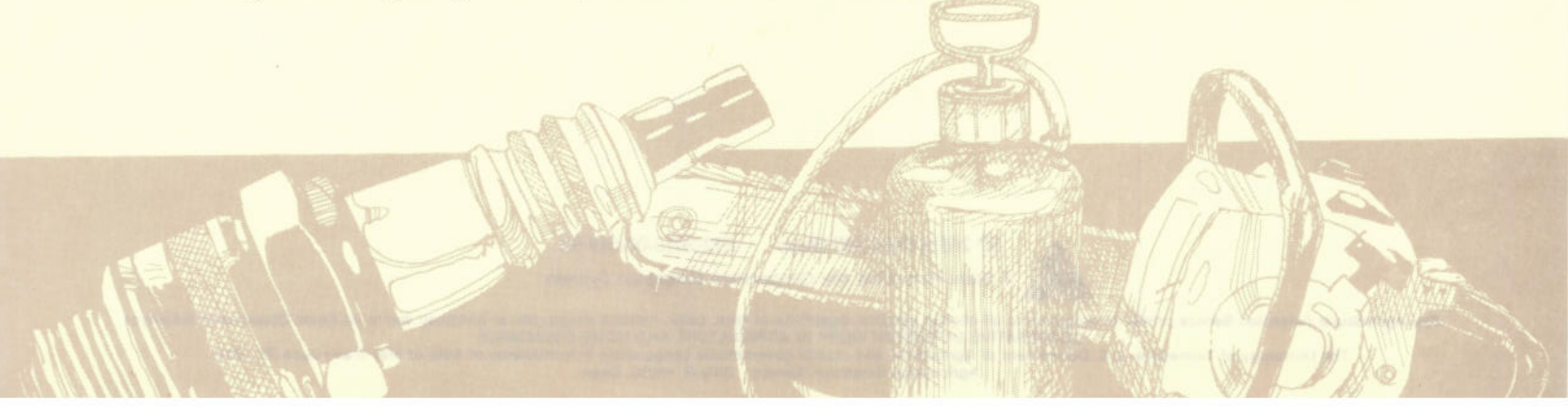
Chains should be kept lubricated at all times with a good quality lightweight oil or bar lubricant sold specifically for this purpose. For maximum life, remove and clean the chain after each day of use. Soak the chain overnight in a pan of oil. Use a stiff bristle brush, not wire, to clean the chain.

CHAIN ADJUSTMENT

The saw chain tension should be adjusted while the chain is cool. The chain should move freely, but with no slack (see illustration).

SHARPENING CHAINS

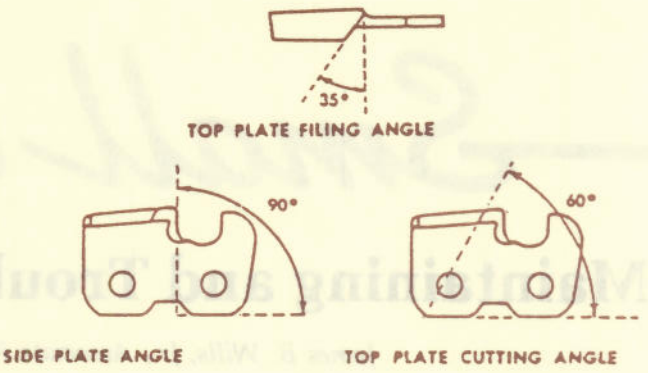
The first step in sharpening a saw chain is to deter-



mine what type chain is on the saw. Many saws currently use the "chipper" or "chisel" type chain (see illustration). A full round file of the correct diameter is used to file the chipper tooth chains. The following table will assist in selecting the proper file size.

Chain Pitch	Round File Size
1/4"	1/8"
.325"	5/32"
3/8"	3/16"
7/16"	7/32"
1/2"	1/4"
9/16", 5/8"	9/32"

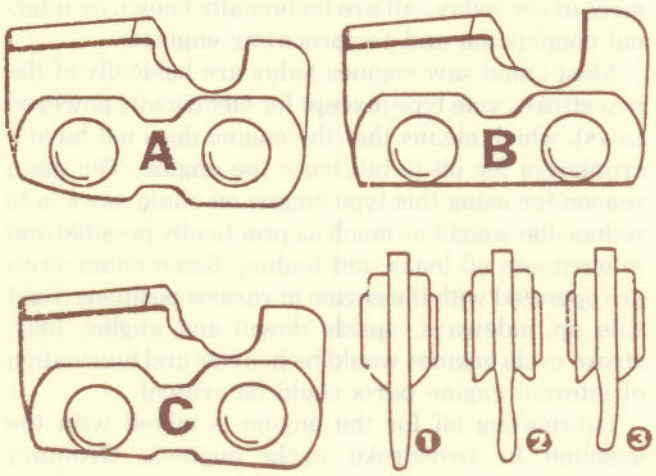
When cutters are about one-half worn away, you may have to change to one smaller size file to prevent cutting into the top of the drive link. Use angles shown in the illustration for filing. Inexpensive file guides can be purchased that will help the novice filer maintain the correct angle. Rotate the file occasionally to increase file life.



FILING ANGLES FOR CHIPPER CHAIN IN AVERAGE USE.

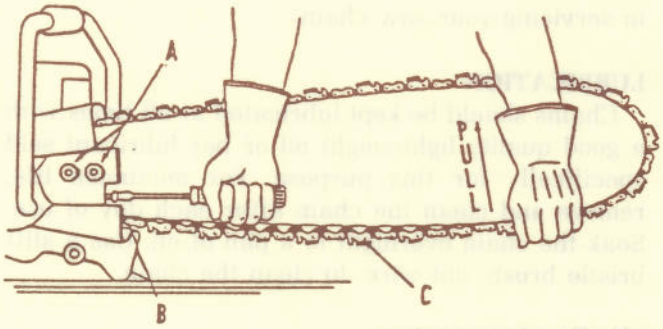
CHAIN WEAR AND BREAKAGE PROBLEMS

If unusual chain wear or breakage occurs, compare a section of the chain with the following illustrations to determine possible cause.



SIGNS OF ABNORMAL CHAIN WEAR

Bottom of cutters or side links worn (A). Wear caused by heavy pressure on the bar (B). Wear due to low depth gauges, tight chain (C). Bent or unevenly worn drive tangs caused by uneven filing of cutters (1,2,3).



ADJUSTING CHAIN TENSION

Have bolts at A finger tight; adjust tension, B, while holding up outer end of bar. All slack must be out of the chain.

SP 268H-5M-5/90 (Rep) E12-2015-00-049-90

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