Photos: Josh Giumelli

How to sharpen a chainsaw

All too often a chainsaw will refuse to cut correctly due to a poorly sharpened chain but the problem can be overcome with some simple preventative maintenance.

Chainsaws do not need to be sharpened by an expert but practice is required to sharpen the saw to prevent slow or off-line cutting.

Maintaining a sharp chain also helps prevent other problems such as accelerated wear.

A sharp chain will reduce the pressure on the chainsaw bar and extend the machine's operating life.

To ensure a chainsaw is sharpened correctly, there are several aspects that need careful attention.

The following will help to remember the main points, including:

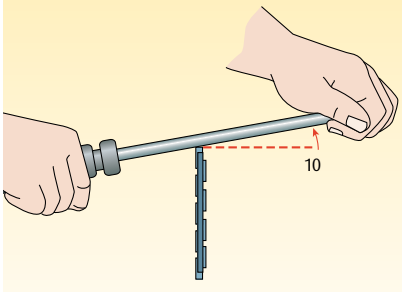
- Length of teeth
- Angle of teeth
- Depth of file
- Dressing the bar
- Elbow height
- Rakers or depth gauges
- Size of file

1 The easiest way to sharpen a chainsaw is to file the teeth by hand with a file and guide. With practice, only the bare file needs to be used. For this article, the guide has been removed for clarity. For a typical 3/8 chain, use a 7/32 file but check with the manufacturer or a product handbook to select the correct file for other chains.

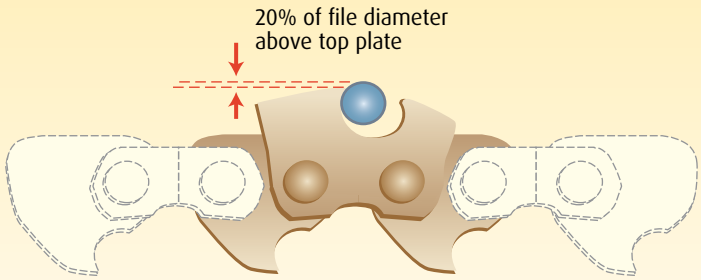
2 Clamp the chainsaw firmly by the bar in a bench vice. If the chainsaw is sharpened away from the workshop, use a log vice to secure the saw. Sharpen all teeth on one side of the chain before turning the saw around to sharpen the other teeth.

3 Most chains have a line marked on the top surface of the tooth to help gauge the correct tooth angle. File guides, as shown in photo 1, will have tooth angle guide lines on the tool but check these are correct with the line on the teeth before sharpening. Sharpen full-chisel chains at 25 degrees and semi-chisel chains at 30 degrees.

4 Keep the elbow straight so the file is held perfectly horizontal for a full-chisel (square-cornered teeth) chain. Some semi-chisel (rounded corner teeth) chain may require the file to be angled at 10 degrees above or below the horizontal as shown.

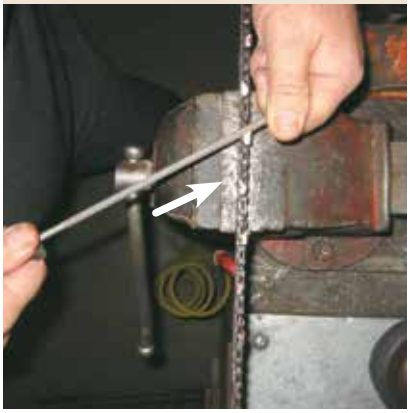


5 Ensure about 20 per cent of the file diameter is above the top edge of the tooth as shown. If the depth is incorrect, the tooth will not have the correct profile.



6 Stand with the feet at a 45-degree angle to the bar as pictured. In this position, the teeth on the outer side of the bar will be sharpened (right side teeth, as viewed by the operator).

7 Grip the file with the left hand and the handle with the right hand as shown. Apply pressure toward the chainsaw engine with the left hand while pushing the file through with the right hand. Do not drag the file back through the tooth. Lift it clear to avoid blunting the sharpened edge. A blunt chain in good condition will require two strokes of the file for each tooth. When all teeth on one side are sharpened, turn the saw and repeat the process. The best way to sharpen the saw evenly is to swap hands on the file but this takes practice.



8 If the chainsaw is cutting skewed, the teeth are likely to be longer on one side of the bar than the other. This needs to be rectified quickly, as the links and the bar will wear unevenly, causing skewed cutting despite a correctly sharpened chain. Use a vernier calliper (pictured) to compare teeth lengths. A crescent spanner also can be used. To align tooth lengths, give the longer teeth a few more strokes with the file than the shorter teeth.

9 As the chainsaw teeth are filed back, their height decreases, which will reduce their cutting performance. Every so often it will be necessary to lower the rakers or depth gauges. These are the rounded forms in front of the teeth that control the depth of tooth engagement in the wood. Pictured are a flat depth-gauge file and a height gauge.

Set depth gauges to 0.63–0.76 millimetres (25–30 thousandths of an inch), depending on chain type.

10 File the gauges in the same direction as the teeth are sharpened. Only a few strokes will be needed to file the depth gauges to the required height.

11 After lowering the depth gauges to the required height, round the leading edge of the raker with the file as pictured.

12 Even after a period of normal use, a burr will form on the guide bar's outer edge. The burr will develop more quickly if the chain is run blunt or sharpened incorrectly. The bar pictured is beyond repair and needs to be replaced.

13 The best way to repair a worn bar is to have it dressed professionally by a chainsaw service shop on a belt linisher. Light burrs are easily filed off by hand with the depth gauge file.

14 When reinstalling the chain and guide bar, adjust the tension correctly. If the chain is too tight the saw will perform poorly, the chain and bar will overheat and the chain will stretch. If the chain is too loose it will wear out the grooves in the guide bar and may even come off. As the tension is adjusted, apply upward pressure to the bar as pictured. Adjust the pressure until the chain just touches the bottom of the bar when the saw is hot. When the chain is cold, turn a further 1/8 of a turn on the adjuster screw.

15 Another method of sharpening the chain is to use a 12-volt electric sharpener such as the one pictured. These cost about $60 and work well provided most of the above steps applying to hand filing are followed. Use the correct diameter stone, ensure all angles are correct and the same time is spent on each tooth (only a few seconds).

16 When using an electric sharpener, apply a grinding compound to the grindstone every few teeth to reduce the heat generated in the tooth. This will also extend the grinding stone's life. Use the whole length of the stone and do not concentrate the grinding in one area. Replace the stone after its diameter has been reduced.

17 Occasionally, have the chain bench-sharpened by a specialist, as this will correct any errors that have occurred during hand sharpening. A specialist will use a specially shaped grinding wheel set on an angle to correct the tooth profile.

18 Sharpen the chain lightly and often as this will extend bar and chain life and lead to frustration-free cutting.