

Lesson 1: Sharpening and Reconditioning a Twist Drill, Lawn Mower Blade, and Chain Saw Chain

Maintaining a Chain Saw Chain

Objective: Students will observe how to sharpen the chain, adjust the depth gauges, and adjust the chain tension on a chain saw.

Directions: Use the appropriate tools to sharpen the chain, adjust the depth gauges, and adjust the chain tension of a chain saw.

Materials and Equipment:

Appropriate round file and file guide

Flat file

Appropriate depth gauge tool

Safety goggles*

Gloves

Any other protective clothing recommended by instructor

Combination wrench set

Standard or Phillips screwdriver

Chain saw with a chain that needs sharpening

Recommended chain oil

Chain saw with a properly sharpened blade (optional)

A log or piece of scrap wood of a size that could be safely cut with the type of saw(s) being used (optional)

* Everyone participating in or observing the demonstration should wear appropriate protective eyewear and any other protective clothing as needed.

Procedure:

1. Wear appropriate safety equipment.
2. (Optional) Before beginning the demonstration, secure the log or scrap wood and make a cut, first using the saw with the dull chain and then with the saw with the sharpened chain. Observe all safety and correct use procedures for working with a chain saw. Discuss differences in the ways the saws worked and in the chips they produced. Discuss why the saw with the sharpened chain is safer to use and produces better results.
3. Demonstrate the correct procedure for preparing to sharpen the chain and make adjustments to the saw.

- a. Consult the owner's manual for instructions on sharpening the chain or any other relevant information. Be sure to use only manufacturer-recommended sharpening equipment in order to maintain the correct angles, shape, and proportions of the cutters.
 - b. Inspect equipment, materials, and work area to ensure safe and correct operation.
4. Disconnect the spark plug wire and secure it away from the spark plug. Disconnect an electric chain saw from its power source.
5. Demonstrate the proper procedure for sharpening a chain saw chain, including the following steps and any others as needed.
 - a. Start by finding the most damaged cutter. Using a gloved hand, rotate the chain, if needed, to bring this cutter to the top of the saw and into a comfortable work position.
 - b. Put the file guide and round file in position on the cutter. Keep the sharpening angle mark on the file guide parallel to the bar.
 - c. File from the inside out, keeping the file level. Apply pressure only on the forward stroke and lift the file for the return stroke.
 - d. Move to the next cutter on the same side and repeat the process.
 - e. File each cutter as needed to sharpen them and keep them equal to one another.
 - f. Rotate the chain as needed until all of the cutters on one side are sharpened.
 - g. Turn the saw around and repeat the process on the other side.
6. Demonstrate the correct procedure for adjusting the depth gauges, including the following steps and any others as needed.
 - a. Put the depth gauge tool in position on the chain so that a depth gauge is in the opening on the tool.
 - b. If the depth gauge sticks up above the tool, file off the part that extends above the tool with the flat file.
 - c. File from the inside out, keeping the file level. Apply pressure only on the forward stroke and lift the file for the return stroke.
 - d. Once the depth gauge has been filed down flat, use the flat file to restore the gauge to its original shape. This generally means rounding off the front edge of the gauge. Tilt the depth gauge tool up for this operation to expose the front of the depth gauge and to protect the sharpened cutter while filing.
7. Move to the next cutter on the same side and repeat the process.
8. File each gauge as needed.
9. Rotate the chain as needed until all the gauges on one side are sharpened.
10. Turn the saw around and repeat the process on the other side.
11. Demonstrate the correct procedure for adjusting the chain tension, including the following steps and any others as needed. Tension the chain saw when it is cold.
 - a. Use the wrench to loosen the bar nuts.
 - b. Use the screwdriver to adjust the chain tension screw until the chain just touches the bottom of the bar.

- c. Oil the chain, then pull it around the bar by hand. The chain should fit snugly but still move freely when pulled.
 - d. Hold the tip of the bar up and tighten the bar nuts.
 - e. Pull the chain around the bar again to be sure it is still moving freely.
12. When all repairs and adjustments are complete, reattach the spark plug wire.
13. Perform cleanup procedures.
14. Assign the student version of AS 4 to be performed by the students.