Recreation
Tech Tips

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Crosscut Saw Underbucking Tool

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Underbucking tools (underbucks) enable crosscut saws to cut up from the bottom side of felled logs. Normally, logs are bucked (cut to length) from the top as they lie on the ground. Gravity feeds the saw down through the wood. Sometimes a log that is suspended off the ground needs to be cut from the bottom up. Usually, this is because the log has fallen in such a way that a cut from the top closes on the saw (binds), while a cut from the bottom may open, allowing the saw to operate freely. An underbuck supports the saw and allows a sawyer to cut upward, against gravity.

An underbuck supports the back of the crosscut saw (figure 1). When the sawyer applies slight downward pressure on the saw handle, the underbuck applies upward pressure on the other end of the saw, moving the saw teeth upward to saw the log.

Grooved ax handles and mechanical underbucks have been used for underbucking for many years. Underbucks created by blacksmiths serving oldtime logging camps were large and heavy. No company manufactures underbucks today. The Missoula Technology and Development Center (MTDC) was asked to design a simple, lightweight underbuck for use by wilderness and backcountry crosscut sawyers.

MTDC's Underbuck

Using an antique underbuck as an example, MTDC recreated an underbuck that is inexpensive, lightweight, and easily fabricated. It features a 2-inch clamp weighing 8 ounces with a shielded steel pulley that can attach to an ax handle (figure 2). There is no manufacturer for the new underbucks. Assembly is simple following the directions included in this tech tip.

The parts were purchased from Reid Tool Supply Co.; P.O. Box 179; Muskegon, MI 49443; Phone: 800–253–0421.

Figure 1—The underbuck supports the back of the crosscut saw and provides leverage for making cuts from the bottom of a log.

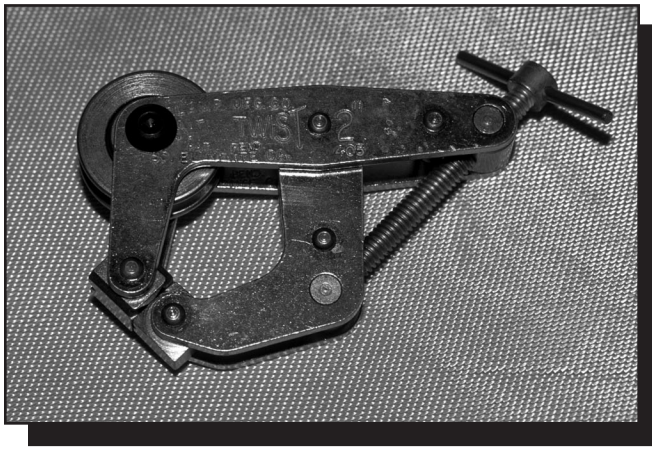

Figure 2—The underbuck, which attaches to the ax handle, features a 2-inch clamp with a shielded steel pulley.

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The components cost about $25, including shipping and handling (figure 3). We were not able to find another supplier that had all the parts and would sell them in small quantities.

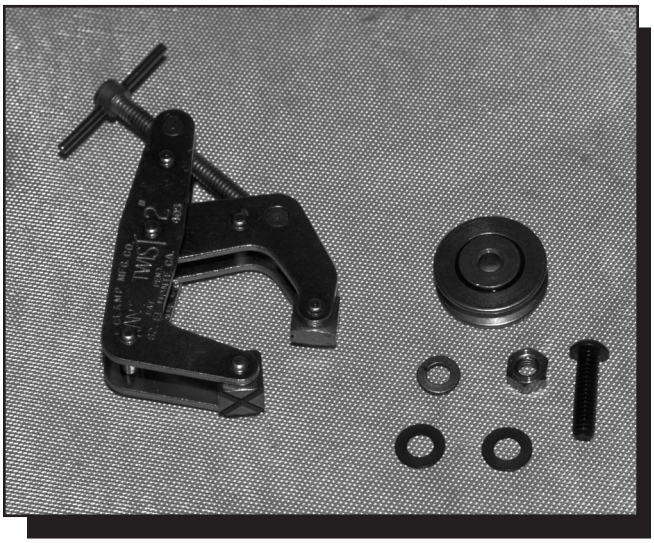

Figure 3—Parts that are needed to build an underbuck.

- CBL-990 steel pulley, $1\frac{1}{4}$-inch diameter, shielded
- KT-405 No. 2 Kant-Twist clamp
- HHW-0550 split washer, $\frac{1}{4}$-inch internal diameter by 0.487-inch outside diameter
- HN-050 hex nut, $\frac{1}{4}$–20, $\frac{7}{32}$-inch thick
- HK-64050 button-head cap screw, $\frac{1}{4}$–20, 1-inch long
- Two BDA-30 disc springs, 0.551 by 0.283 by 0.0315 inches

Basic tools (figure 4) and the ability to use the tools safely are required for underbuck assembly.

- Drill press
- Drill press vise
- Ball peen hammer
- Center punch
- Small metal file
- Drill bit, $\frac{1}{8}$ inch
- Drill bit, $\frac{1}{4}$ inch
- Hex key, $\frac{5}{32}$ inch
- Wrench, $\frac{7}{16}$ inch

Assembly Instructions

Figures 5 to 12 show how to assemble the underbuck tool.

Figure 4—Tools that are needed to build an underbuck.

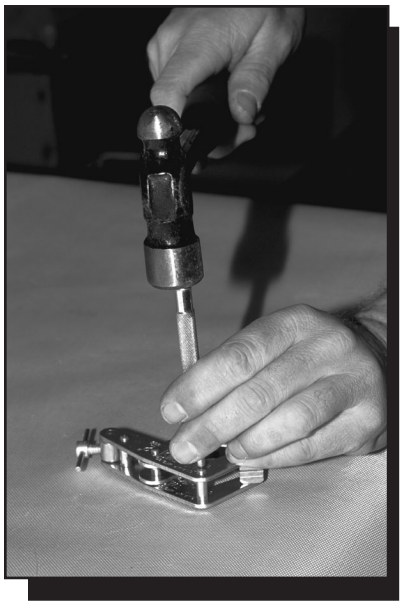

Figure 5—Center punch the clamp pin on both sides.

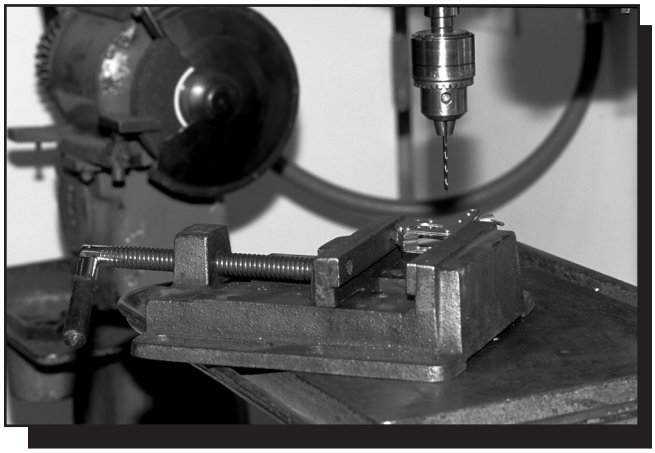

Figure 6—Secure the clamp in a vise to prevent it from moving.

Figure 7—Using a ⅛-inch drill bit, drill into the clamp pin to a depth of ¼ inch. Turn the clamp over, secure it in the vise, and repeat the process. This provides a guide hole for the next step.

Figure 8—Drill both sides of the clamp pin with a ¼-inch drill bit to a depth of ¼ inch, just clearing the side plate of the clamp. Remove the clamp pin.

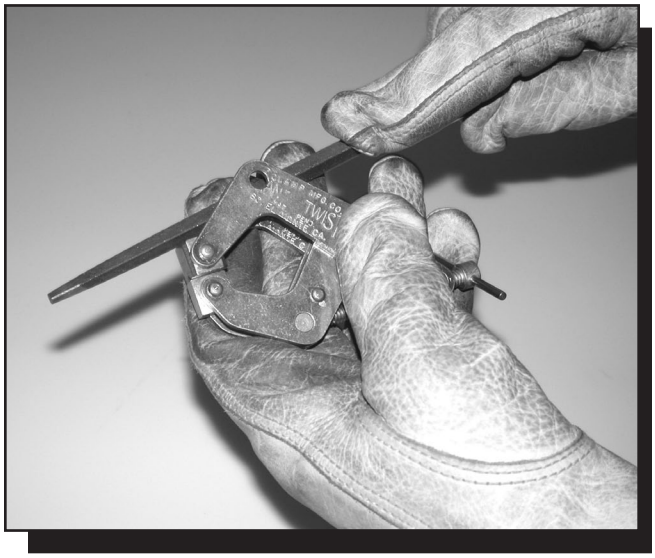

Figure 9—File all rough edges of the drilled holes smooth with a metal file.

Figure 10—Insert the steel pulley and the two disc springs between the side plates of the clamp.

Figure 11—Push the button-head cap screw through the drilled holes.

Figure 12—Place a lock washer and nut on the button-head cap screw and tighten the nut, using a $\frac{5}{32}$-inch hex key to secure the cap screw and a $\frac{7}{16}$-inch wrench to turn the nut.

Using the Underbuck

Determine which side of the log is least likely to move once the log is bucked. Drive an ax in that side of the log in a position so the ax handle can serve as the support for the underbuck. An ax blade ground to a thin taper is more likely to stay in the log than an ax with a standard blade (figure 13). Place the blade of the ax so the last 6 to 9 inches of the ax handle are below the centerline of the log, directly below the top cut. The blade of the ax needs to be parallel to the log with the handle at a 30- to 45-degree angle to the log (figure 14). Getting this angle right takes practice, but the angle needs to allow room for the underbuck to be clamped onto the ax handle, the saw to be placed onto the underbuck, and the bottom cut to be started. If the ax is positioned correctly at the beginning of the cut, it will not need to be moved once the cut is started. Clamp the underbuck on the handle (figure 15) so the grooved sheave lines up with the top of the saw kerf.

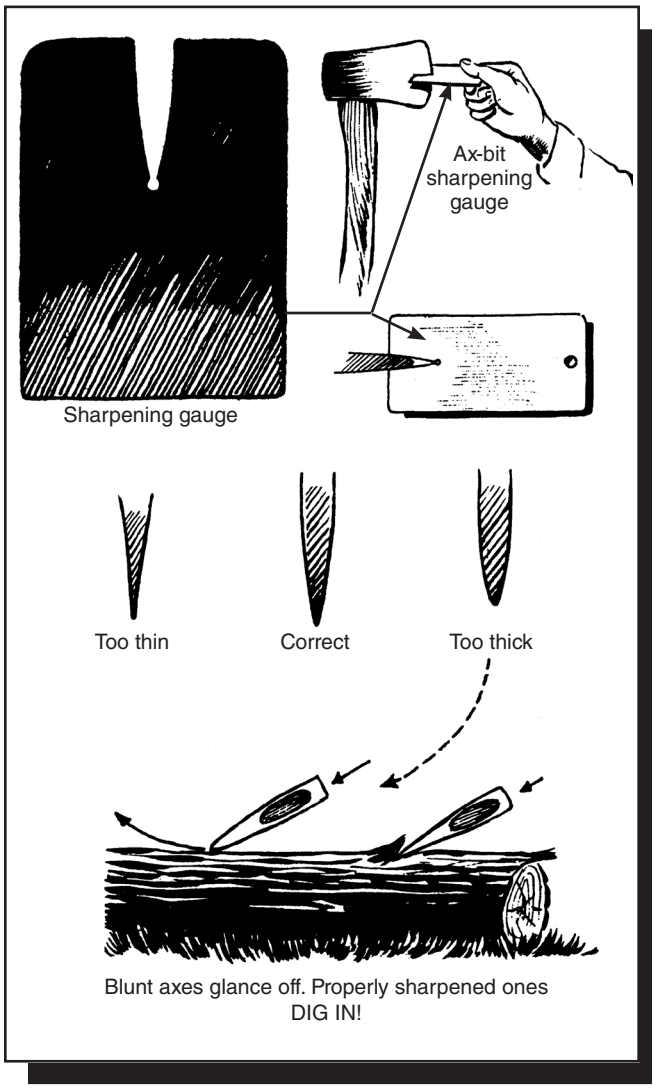

Figure 13—A template for a sharpening gauge (reproduced to exact size) and illustrations showing its use. *—Drawings by Frederic H. Kock*

Figure 14—Insert the blade of the ax parallel to the log with the handle between 30 and 45 degrees to the log.

Figure 15—Clamp the underbuck on the handle so the grooved sheave lines up with the top of the saw kerf.

Acknowledgments

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Additional Information

Additional information on crosscut saws is available from MTDC:

- *An Ax to Grind: A Practical Ax Manual* (9923–2823–MTDC)
- *An Ax to Grind* (99–01–MTDC, video)
- *Crosscut Saw Tooth-Setting Tool* (0223–2324–MTDC)
- *Crosscut Saw Manual* (7771–2508–MTDC)
- *Handtools for Trail Work* (8823–2601–MTDC)
- *Handtools for Trail Work* (98–04–MTDC, video)
- *Crosscut Saw Guards* (9723–2341–MTDC)

MTDC plans to publish a comprehensive user's manual for crosscut saws, written by David Michael, in 2003.

About the Authors

Chuck Whitlock (retired) has been a project leader at MTDC since 1998, specializing in safety and health and fire management safety projects. He has served as a type I safety officer on national incident management teams and a zone fire management officer on the Wallowa-Whitman National Forest. Whitlock has also worked on the Cleveland, Plumas, and Fremont National Forests before coming to the center.

Chuck Harding is a mechanical engineering technician in MTDC's equipment fabrication shop. He came to the center from the U.S. Air Force Reserve where he worked as a metals technology technician. He has been with the center since 2000.

Library Card

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Describes a tool used to allow a crosscut saw to cut up from below a log. A log may have fallen in such a way that a cut from the top closes on the saw (binds), while a cut from the bottom may open, allowing the saw to operate freely. Underbucking tools are no longer commercially available. Traditional underbucking tools were large and heavy, making them unsuitable for use by wilderness and backcountry crosscut sawyers. The USDA Forest Service's Missoula Technology and Development Center has developed an underbucking tool that is inexpensive, lightweight, and easily fabricated. This Tech Tip includes a parts list, instructions, and a mechanical drawing that will allow someone to build the underbucking tool. Parts cost less than $25.

Keywords: bucking, drawings, lightweight, traditional tools, wilderness management

Additional single copies of this document may be ordered from:

USDA Forest Service, MTDC
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Electronic copies of MTDC'S documents are available on the Forest Service's FSWeb intranet at:

http://fsweb.mtdc.wo.fs.fed.us

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