Adding a Bevel to a Screw, Version 1.0

By R. G. Sparber


After sawing off the end of a screw, I am left with the sharp end of the thread that might look like one of these examples. Screwing on a nut is tricky, and it is easy to cross-thread.

An excellent solution to this partial thread problem is to bevel the end of the screw. This is also called a Higbee cut in honor of its inventor, Clinton Higbee.[2] The fancy name for this is a convoluted thread.[3] The claim is that it is impossible to cross-thread a screw with a Higbee cut.

Although it is possible to freehand grind this bevel, it is often unsafe and imprecise. I offer the following fixture.

I cut a V into one side of a scrap 3/16-inch thick steel angle. Note that the right side of the V is vertical. The inside of the V should be smooth[4].

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[2] https://en.wikipedia.org/wiki/Higbee_cut

[3] *ASME B1.7-2006, Screw Threads: Nomenclature, Definitions, and Letter Symbols, The American Society of Mechanical Engineers, 2006-11-17, ISBN 0791830152*

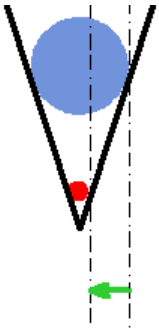
[4] If I made another copy of this fixture, I'd use ¼-inch steel angle and reduce the distance from the right side of the V to the right edge to 1/8th inch. This modification would let me bevel shorter screws.

I clamped the fixture to my 1-inch vertical belt sander table about 45° from the face of the belt. After verifying that the fixture was not touching the belt, I turned on the sander.

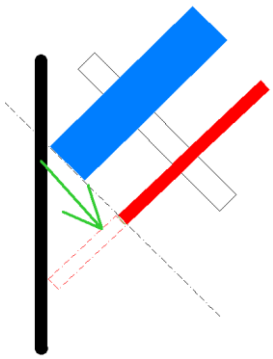
To cut a bevel, I rest a screw in the V, with the end almost touching the moving belt. Then I gently push while turning the screw one complete revolution counter-clockwise. The goal is to grind off only the thread.

The steel plate protects my fingers from the moving belt. By turning the screw counter-clockwise[5] while pushing in, I avoid having the threads feed the screw into the belt. Instead, the threads slide inside the V.

With the right side of the V vertical, I get the same distance from the plate to the belt regardless of the screw's diameter. Any screw fed in the same amount will get the same bevel.



If I used a symmetric V, as the diameter of the screw decreases, the right "side[6]" of the screw shifts left.



In this exaggerated top view, shifting to the left puts the screw's end further from the belt. That moves the right "side" of the screw further away from the belt. The user must push the screw in before contacting the belt, a problem for small-diameter, short screws.

[5] I am assuming the screw has a right-hand thread.
[6] If 0° is at the top and I measure clockwise, this point is near 90°.

The shorter the screw, the harder it is for me to hold and turn it in the fixture, but at least my fingers are protected. Here is a pin vise that would make performing this operation far easier.

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