

Cindy Drozda

"The Fine Art of Woodturning"

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Negative Rake Scrapers

Welcome to the wonderful smooth cutting world of Negative Rake Scrapers!

The simple addition of a second bevel at the cutting edge has revolutionized scraping for me. Stuart Batty gets the credit for showing this tip to me, and many others. It is a traditional technique brought to us by the Old World Blackwood and Ivory trades of past centuries.

Negative Rake Scrapers cut cleaner, with less tear-out and far fewer catches. They excel in making a clean cut on burls and twisted grain, and offer a catch-resistant way to clean up endgrain. Negative Rake Scrapers (basically like all scrapers) work much better on hard dense wood than on very soft open grain wood. Some wood won't scrape well at all, such as punky wood. Cutting with the sharpening burr on a negative rake scraper, even fairly soft wood can usually be cleaned up nicely.

In most cases, Negative Rake Scrapers are for final finishing, not for rough heavy shaping. Anywhere that I can get a gouge into, such as an open bowl or box, I would rather use it for most of the work, finishing up with the negative rake for a clean smooth surface finish. When hollowing vessels, I do most of the work with a single bevel (not negative rake) scraping cutter, or with a Hunter Carbide cutter or hook tool. For a clean finish and smooth curves inside my vessels, I finish up with a negative rake teardrop-shaped scraper on my hollowing rig. Since the negative rake makes a scraper less aggressive, anywhere that I do want aggression, I don't use it.

The way that I use a Negative Rake Scraper is to hold it level on the tool rest, or maybe with the end of the handle a bit higher than the cutting edge. Like with any scraper, it is asking for trouble to contact the cutting edge to the wood with the end of the handle lower than the tip of the tool.

I use a negative rake on almost all of my scrapers. I still keep a single bevel on my trapezoidal bedan tool because of its profile. And my roughing cutter for hollowing. The bevel angles that I use vary between 65° on the hooked scraper and square recess scraper, to 50° on the Arc tool and sometimes as little as 40° for very fine finishing scrapers.

Basically, the negative rake (which refers to the scraper having both a top and bottom bevel) makes the scraper less "grabby". It is more controllable, less aggressive, and less likely to tear out the grain of the wood.

The more obtuse (larger) the included cutting bevel angle is, the less aggressive the tool will be. And the longer the edge will stay sharp. The more acute (smaller number) the angle is, the finer the finish will be, and the quicker it will get dull. If you are cutting with the burr (Arc Tool, Square Recess Scraper), you will need to resharpen as soon as the burr is gone (very frequently - as in less than a minute of use) in order to maintain the superior performance of the tool. The tools will continue to cut after the burr is worn off, but the finish will be much rougher and more cutting force will be required (sometimes causing other problems.....)

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The Hooked Scraper is usually used more aggressively, for hollowing boxes and such, and will cut well long after the burr is gone. It will, however, give a finer finish if it is sharpened, or honed, before the final cut. I also sometimes cut without using the burr (either turn the tool over, as in Arc, or hone the burr off, as in Hooked Scraper) to get an even less aggressive, and also smoother, cut (particularly on end grain)

When you turn your other regular scrapers into negative rake, you will need to pay attention to the included angle. That is the angle formed by the 2 bevels. If you add a top bevel to your bottom bevel scraper, you probably will need to change the bottom bevel angle to get the included angle that you want.

A scraper with an angle greater than 80° will not cut very easily (will require too much force to get it to cut). A scraper with a greater than 90° angle will not cut at all. I would stick with 75° or less. General Tools makes a nice, inexpensive protractor that you can use to measure these angles.

One thing that I have found is that the top and bottom bevels don't need to be the same angle. I often (Hooked Scraper, Square Recess Scraper) use just a 5° top bevel. That is all it seems to take to make the negative rake difference. On shaped scrapers, like the Hooked Scraper, the top bevel can be done freehand. On the Stuart-Batty-style negative rake scraper, I use a 25° top and 40° bottom to get a 65° included angle that can be resharpened on the same 40° platform that I use for gouges. For the Arc Tool, I use that platform set to 25° and grind both sides of the angle with the same setup.

When resharpening the negative rake scrapers, in general, only one of the bevels needs to be ground. I will typically grind the bottom bevel (depending on how I plan to orient the scraper in use) so there is a burr formed on the top by the grinder.

Negative Rake Scrapers are an excellent use for those high-tech "powder metal" alloy tools, such as the Thompson, Hamlet 2060, Glaser A-11, and Stuart Batty CPM-10V. These very hard steels will hold a burr many times longer than M2 HSS. Well worth the money, both in sharpening time and in tool life!