

Router-Bit Matchup

We put 17 brands of straight bits to the test

by Anatole Burkin

Fishing lures and router bits have a lot in common: There are more varieties to choose from than I'll ever need. Dressed up in slick packaging with exotic names like Trout Teaser or Roman Orgy, new lures and bits ignite dreams of pride and passion. Bigger catches. Sexier moldings. I've amassed an embarrassingly rich collection of both. But when it comes time to attach one to the end of a rod or router, more often than not I pick the ordinary over the exotic.



For tried-and-true router tackle, nothing beats straight bits. These workhorses are good for a host of tasks, and I use them for rabbeting, dadoing, trimming, mortising and even tenoning. I've tried many brands of bits and have a few personal favorites, but I've never been sure if I was spending my money on the best. It's impossible to compare bits when you buy them at different times and use them for operations in dissimilar materials.

I set out to develop an objective test to compare router bits and to settle the question of which bits are best. Along the way I learned there are a lot of scientific ways of testing metal and carbide, but most of them require expensive equipment and an even more expensive education to operate. But with the help of a metallurgical engineer, a mill-shop operator and representatives from router manufacturing companies, I came up with a fairly simple test to measure what woodworkers really care about most: which bits last the longest and cut the cleanest.

To keep the size of the test manageable, I chose only 1/2-in.-dia., 1/2-in. shank, double-fluted carbide-tipped straight bits. This style of bit ought to be indicative of the kind of effort a manufacturer puts into the rest of its line. Most bits had 1-1/2-in.-long tips. I bought the bits through retail outlets and mail-order companies. I paid anywhere from a scant \$7.65 (Carb-Tech from Trendlines) to \$23.10 (Jesada), but the cost averaged out to about \$14 per bit. Right out of the box there were some notable differences. Many of the bits under \$10 had thinner carbide tips than the more expensive bits. The bits were manufactured in many locales, including Israel, Italy, Taiwan and the United States.

A CNC router put the bits to the test

I delivered the bits to Harris Enterprises, a mill shop and retail outlet in Manchester, Conn. There, a computer numerically controlled (CNC) router ran the bits through 248 lineal ft. of 3/4-in.-thick melamine-coated flakeboard at the same depth (1/4 in.) and speed and under the same load. The CNC router was set to run at 18,000 rpm, and the feed rate was 6 meters per minute (about 18 ft. per minute), a pretty comfortable rate if you were moving stock or a large router by hand.

The flakeboard was purchased from one manufacturer. Flakeboard from the same lot has a pretty consistent density, unlike solid wood, which can vary greatly because of irregularities. The melamine requires a very sharp bit to cut without chipping. As a bit dulls, chipout increases, and the missing chunks of melamine make it easy to see how well a bit is holding up. Depending on many factors, including type of wood, cutting technique and imperfections such as knots, you may get more or less life out of a bit when cutting solid wood.



The straight bits tested were all 1/2 in. dia., 1/2 in. shank and double fluted with carbide tips.

A note on melamine-coated flakeboard: The best bit for cutting grooves in this material, according to

some, is a down-cut spiral bit, which will minimize chipping of the thin melamine surface. But I wasn't trying to find the best bit for cutting melamine. In the end, some of these bits were right at home with the material and sliced away with surgical precision. Other bits tore away at the thin skin of melamine like old sharks with blunt teeth.

Results varied greatly among bits

After the bits were run, I took them and the sheet goods back to the *Fine Woodworking* shop and pored over the damage. To simplify the data and not turn this into a science-fair project, I counted the number of chips (chipout) per foot on the edges of the grooves. I focused on the first 25 ft., when the bits were fresh, and on the last 25 ft., when most of the bits were near the end of their lives. I relied on my eyes and index finger. If I could see or feel a chip, I counted it. The chips ranged in size from a grain of salt to a chunk of coarsely ground black pepper. To find out which bits fared best and worst in the test, see below.

I added the number of chips from the first 25 ft. to the number of chips from the last 25 ft. and came up with an average number. Comparing the overall averages gave me an idea of how a bit did both in quality of cut and in longevity. But a more important rating might be the first number -- the number of chips per foot that a bit produced at the beginning of the test run. Depending on the job or what bits are readily available, it might be more important to have extremely clean cuts and toss out the bit as soon as it shows signs of wear. Decide for yourself.

Using overall average as a measure, **the top four finishers were the Whiteside, with an average of 0.2 chips per ft.**; the Liberty, with an average of 0.3; the Oldham Viper, which averaged 0.5; and the Freud, which came in at 0.6. These bits cut cleanly at the start and at the end of the test. **It's important to note that both the Whiteside and Liberty bits cut chip-free for the first 25 ft.**

The next group of bits that stood out included the Amana (1.5 chips per ft.), the Carb-Tech (0.9), the MLCS (1.6) and the CMT (1.8). A third group of bits, including the Bosch, Eagle America, Porter-Cable and Woodworker's Choice, cut very cleanly when new but wore out sooner than the top four finishers.

There appears to be a relationship between the noise a bit makes and the quality of cut it produces. The CNC router operator noted that the cleanest-cutting bits were also the quietest. That means the bits were machined to tight tolerances, with very little runout and hence little vibration.

The Jesada bit snapped about halfway through the test. Problems, however, surfaced right at the start. The router operator noted that the bit was very noisy and cut poorly. I bought a second Jesada bit, and the same thing happened. I called Carlo Venditto, the president of Jesada, who acknowledged that the company's 1-1/2-in.-long bits were improperly engineered, and they were subsequently recalled. Venditto explained that the rake angle was insufficient (causing chipout), and too much material had been machined off the shank (resulting in a weak point). I bought a third bit, which had been reengineered, and although it didn't snap, it also performed relatively poorly. The bit was subsequently redesigned and retested.

It's not clear whether there's a relationship between price and quality. One of the cheapest bits, the Grizzly S-Y (\$7.95), performed poorly (7.4 chips per ft.). But The Woodworker's Choice bit, which also cost \$7.95, did quite well at the outset (0.5) but suffered heavy wear by the test's end. For small jobs, the Woodworker's Choice might be a good value. But better bits generally cost about \$15 or more. Ironically, the most expensive bit, the \$23.10 Jesada, performed poorly.



Some bits cut very cleanly. There's virtually no chipout on this panel.



Other bits wore down prematurely. This panel looks as if it were scraped by a claw.

The relationship between quality and country of origin is good news for the national pride: The Oldham, Whiteside and Liberty bits, which performed well, are made in the United States. But you can also find good bits imported from Italy (CMT and Freud) and Israel (Amana). Most of the Taiwanese bits (Carb-Tech, Grizzly S-Y, Rockler, Woodline, Woodtek, Woodworker's Choice) didn't perform as well. One exception was the MLCS bit, which did well.

There does seem to be a relationship between carbide thickness and performance. The Taiwanese bits generally use thinner (about 0.03 in. to 0.05 in. thick) carbide tips. The better-performing bits all have 0.06-in.-thick to 0.08-in.-thick carbide tips.

Is it fair to draw conclusions about a company's entire line of bits based on testing one randomly picked straight bit? Yes and no. Sure, every company runs into quality-control problems occasionally. But when I'm in the middle of a project using expensive materials, and the clock is ticking, I don't want excuses. I'll go with the manufacturer whose products worked well for me on the first try. For the time being I'll presume that if a manufacturer's straight bits are good, then I'll be more inclined to invest in its other products as well.

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Photos: Michael Pekovich