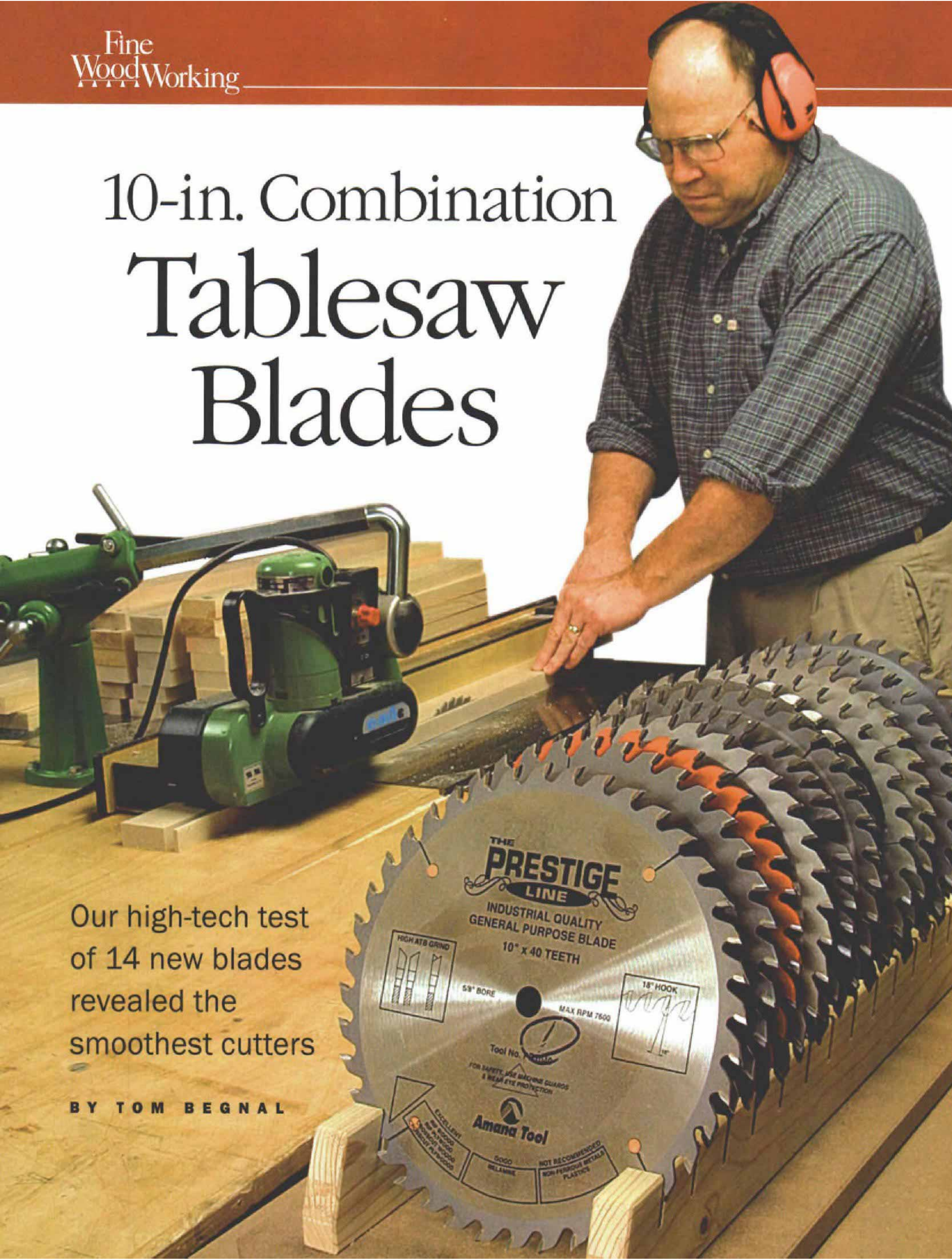
10-in. Combination Tablesaw Blades



Our high-tech test of 14 new blades revealed the smoothest cutters

BY TOM BEGNAL

A combination blade for the tablesaw makes good sense for many woodworkers. Although a combination blade, also called a general-purpose blade, might not rip as well as a rip blade or crosscut as well as a crosscut blade, it can come pretty close. And using one means you won't have to switch back and forth from rip to crosscut blade. That makes life a lot easier in the shop.

As anyone in the market for a combination blade soon discovers, there's no shortage of choices. That's true even in the top-of-the-line category I wanted to look at. Indeed, 14 of these blades are commonly available.

Curious to learn whether any of these blue bloods stood out from one another, I decided to test all 14 in the *Fine Woodworking* shop (for a complete list of the blades, see the chart on p. 37). But before doing that, I had to consider what exactly I was testing. After all, a combination blade has to do just two things well: make smooth cuts and go a reasonable length of time between sharpenings. So first I needed to figure out whether I wanted to focus on smoothness of cut, on wear or on both.

My ultimate choice was based on a couple of factors. In a preliminary test, using a tablesaw with a 10-in. carbide-tipped combination blade, I was able to cut 2,000 linear ft. of ⅜-in.-thick Baltic-birch plywood before the blade began to show even the slightest sign of wear. Then too, in my research on blades, I came across a test done several years ago at Pittsburg State University in Pittsburg, Kan., where four carbide-tipped tablesaw blades each cut between 4,000 and 6,000 linear ft. of ¾-in.-thick plywood. For most home shops, those kinds of numbers represent years of wear. So as a practical matter, it made sense simply to test for smoothness of cut.

To test each new blade, I first ripped and crosscut a ¾-in.-thick maple board to produce a 2-in.-square sample. After that, the ripped and crosscut edges on each sample were checked for smoothness on a high-tech machine. Then the general quality of each cut was categorized. To keep the test as controlled as possible, I didn't include thin-kerfed blades. Also, no stiffening collars were used. One other point: Blades

Why tablesaw blades get dull

Like any cutting tool, a tablesaw blade gets dull as it is used. And it can become dull for any of several reasons or some combination of them all.

Wear is certainly one reason why a blade gets dull. As each tooth slices through wood, the cutting edge slowly abrades until it no longer cuts as cleanly or easily as it once did.

That's why blades with carbide-tipped teeth are usually favored over high-speed steel (HSS) teeth. Carbide teeth are harder, so they don't wear as easily as blades with HSS teeth. Indeed, some manufacturers claim that teeth made from carbide can last 15 times longer than those made from HSS.

PITCH BUILDUP

Another culprit is pitch buildup. As a blade cuts through wood, some of the resins in the wood stick to the teeth. Those resins can build up to a point that the blade can't cut as smoothly.

Resin buildup also causes the cutting edge of each tooth to run hotter than normal. This is a particular concern for carbide-tipped blades, because each tooth is actually just a bunch of tiny grains of carbide held together by a material, called a binder, that acts like glue. When a blade runs hot, the binder begins to weaken, allowing some of the grains to break away.

Pitch is a problem. *A heavy buildup of pitch on sawblade teeth can lead to poor cutting and shorter blade life.*

Resins can cause problems in still another way. Chemicals in some resins can react with the binder and break it down, again causing grains of carbide to disappear.

NAILS AND OTHER METAL IN WOOD

Because of its hardness, carbide is a great material for tablesaw-blade teeth. But that hardness comes at the cost of brittleness. Granted, brittleness isn't usually a problem when cutting wood. But when carbide teeth have unintentional run-ins with steel, the teeth come away either cracked or chipped. So be sure to remove any nails or screws from a board before cutting.

A tablesaw blade doesn't have to be spinning to encounter a problem. Once, while changing a blade, I chipped a carbide tooth by accidentally hitting it with the arbor-nut wrench.

WHAT TO DO

Because pitch buildup has the potential to be a three-way problem, it makes good sense to regularly clean off any pitch that shows up on your sawblade.

Beyond that, it's mostly a matter of keeping the teeth away from nails, screws and free-swinging wrenches. In the end, your blade is going to enjoy a long time between visits to the resharpening shop.

Photos, except where noted: Michael Pekovich; this page: Erika Marks

PREPARING THE SAMPLE BLOCKS

Tablesaw setup

Sample blocks (left) had to be cut before any test for smoothness could be done. To create them, each blade cut a 2-in. square block from ¾-in.-thick straight-grained soft maple. To ensure consistent tablesaw cuts, a dial indicator helped align the blade and rip fence with the miter-gauge slot (right). A power feeder (below) maintained the same feed rate during rip cuts.

sometimes dull faster than they ought to. Chances are, factors other than pure tooth-to-wood wear are responsible. For more about premature wear, plus some tips on keeping blades sharper longer, see the story on p. 33.

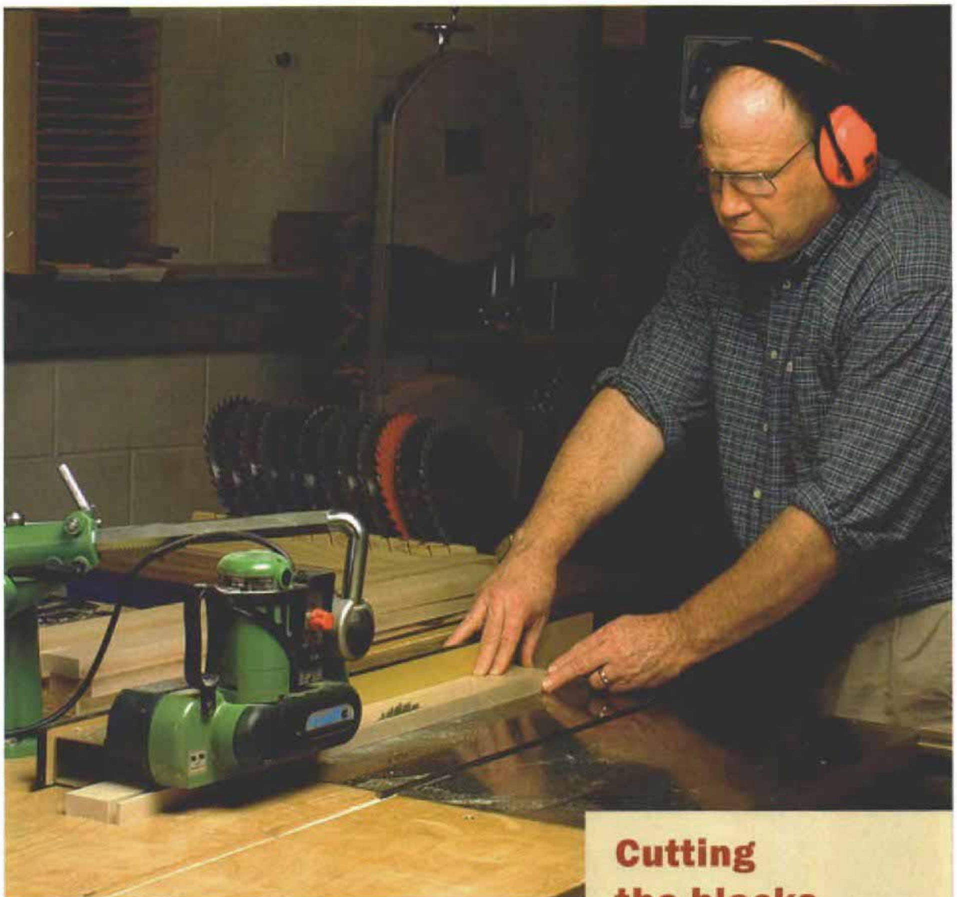
Cutting the sample pieces

For consistency and accuracy, the tablesaw setup was critical (see the photos above). The blade and the rip fence had to be perfectly parallel to the miter-gauge slot. That meant doing some measuring with a dial indicator, with the final check made as the rip fence was positioned for the required 2-in. rip cut.

Also, I added a power feeder to the tablesaw to ensure that all of the test rip cuts were made at the same speed. The power feeder was positioned behind the tablesaw insert so that the blades could be changed and the crosscuts made without having to reposition the feeder. That proved helpful, because it's difficult to reset a power feeder without affecting the cut to some degree.

Because there was no practical way to crosscut the samples using the power feeder, those cuts were made using hand power and a miter gauge (see the bottom photo on the facing page). And although it's pretty much impossible to cut by hand and get the same feed rate every single time, I

Photo, this page (left): Erika Marks



The edge opposite the sawn edge of each block was handplaned flat. *Both surfaces were measured to help account for any differences in the grain of each sample block.*

Cutting the blocks

Positioning the power feeder behind the tablesaw insert (above) allowed Begnal to change blades without having to reposition the feeder each time. Once ripped, it took just a couple of crosscuts (left), sans power feeder, to produce each sample block. Handplaning the edge opposite the sawn edge (top right) allowed Begnal to measure and compare the relative smoothness of both edges.

made a conscious effort to keep them as close as possible.

I used soft maple for the test samples, and it took some serious searching through several stacks of lumber to find a few boards with grain that was reasonably straight. But it was worth the effort, because using straight-grained wood for all of the cuts helped add consistency to the test.

Next, to prepare the samples for the test, I planed each one to the same ¾-in. thickness. Then I jointed the long edges before cutting the samples to 4-ft. lengths.

At this point, a new combination blade was installed in the tablesaw, with the height of the blade set so the gullet cleared the top face of the board by ¼ in. To avoid confusing the test edge with the edge placed against the rip fence, I ran a marker down the entire length of the edge that registered against the fence. Then, with the power feeder adjusted for a cutting rate of 15 ft. per minute, the board was ripped to a 2-in. width.

Next, at a point 1 ft. from the back end (the end that last went through the power feeder), the ripped piece was crosscut twice. The first cut was a trimming cut; the second one created the 2-in. test square. On the top of the sample I marked both the rip and crosscut edges to be analyzed.

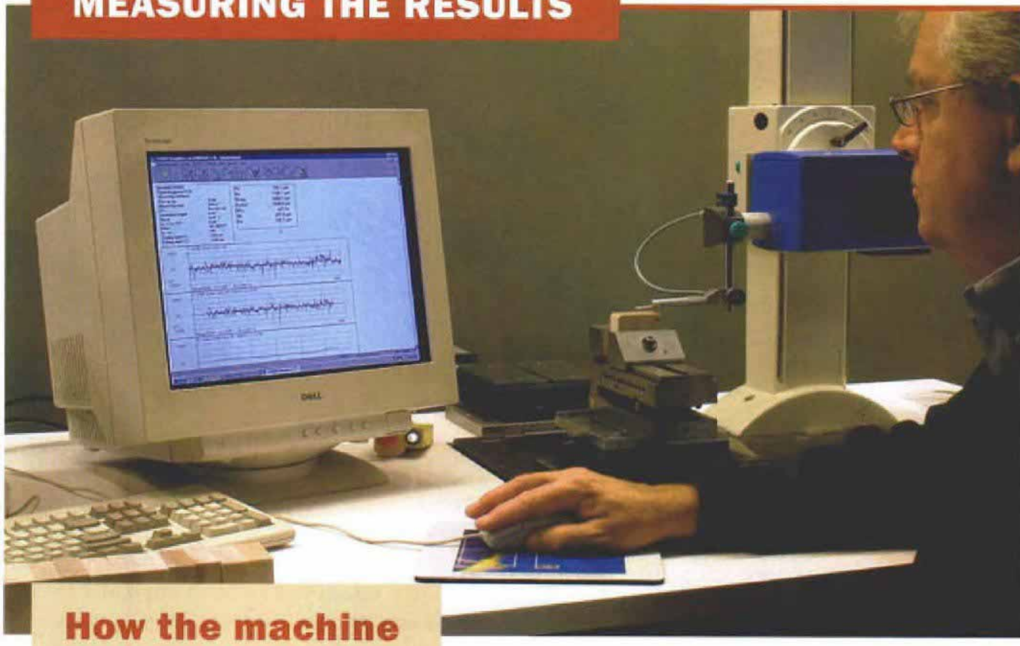
After crosscutting the sample, I used a sharp handplane to smooth the opposite edges of each sample (see the photo above). I'll explain why a bit later.

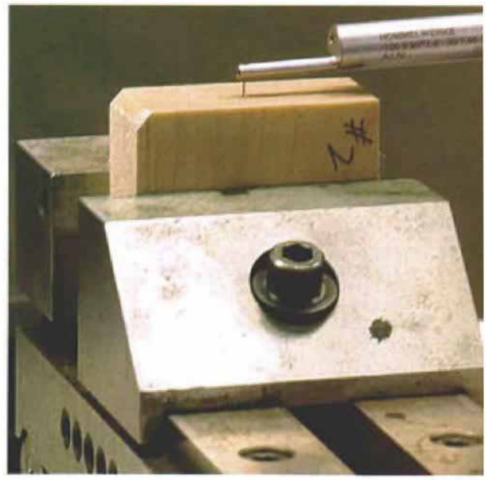
To complete the preparation, the sample was placed in a resealable plastic bag. The bag added some abrasion protection, but more importantly, it kept ambient moisture away from the wood. Any drying or dampening of the wood could have affected the surface quality before the tests were complete. This entire procedure was repeated for each of the 14 blades.

Measuring the surface smoothness

To get an objective measure of how smooth a cut each blade made, I enlisted the help of Hommel America, a company in New Britain, Conn., specializing in sophisticated equipment for checking smoothness. The machine used, called a surface roughness and profiling system, can measure remarkably small surface

MEASURING THE RESULTS

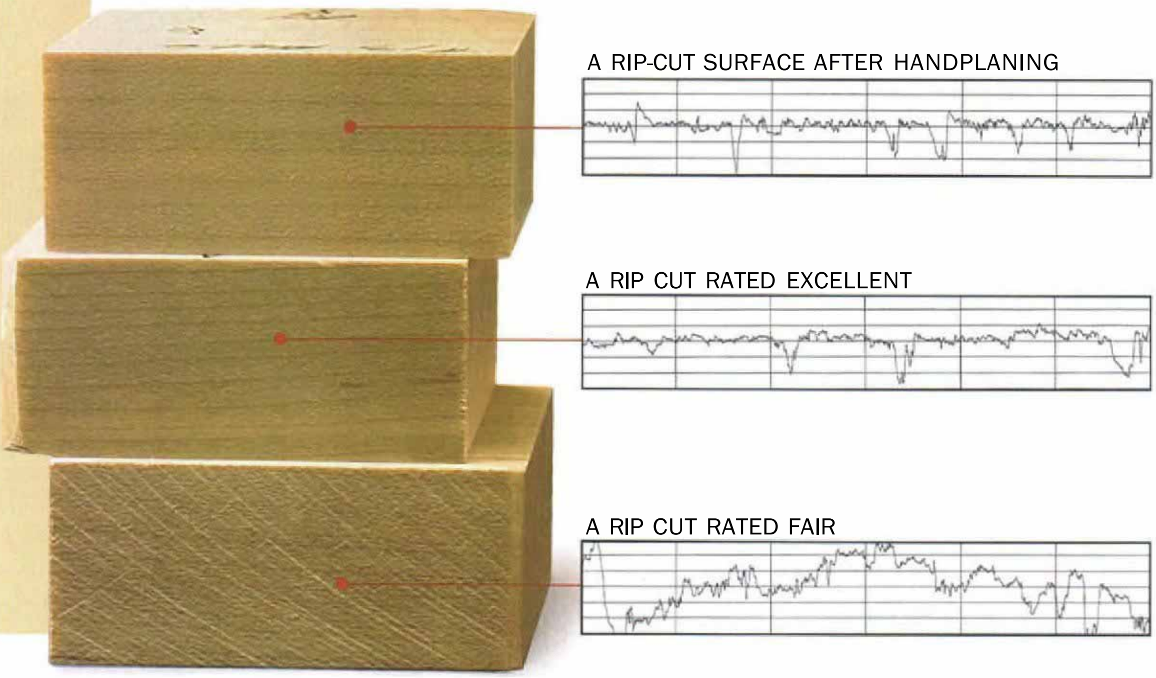




Machine and wood meet at the stylus. *The machine slowly dragged a stylus across the cut edge, measuring smoothness as it went along.*

How the machine scored the cuts

To measure deviations in the cut surfaces of the sample blocks, we used a surface roughness and profiling system. The machine can measure remarkably small surface deviations. As the stylus slid along the surface of a sample block, a digital readout of the ups and downs appeared on a computer screen. The readouts at right represent the average of at least three passes by the stylus. Each horizontal line on each readout represents just over 0.0004 in.



deviations (see the photos above). For example, on a highly polished surface, such as an automotive crankshaft journal, the machine can measure deviations as tiny as plus or minus one-hundredth of a micro-inch. (A micro-inch, by the way, is one millionth of an inch.) But for a relatively rough material, like the wood samples, the machine was scaled back to measure plus or minus 1,250 micro-inches, or 0.00125 in.

To do the test, each wood sample was clamped to a special fixture on the machine, then a delicate measuring device called a stylus was pulled across the surface. And, as the cone-shaped, diamond-tipped stylus moved, it followed every little hill and valley on the surface. It also generated on a computer screen a digital readout that showed the up-and-down travel of the stylus. At the same time, it computed a number that represents the average roughness of the surface. The lower the number, the smoother the surface.

At that point, it might have been tempting just to measure each sawn edge and compare the results. But the test needed to go one step further, because wood is a natural material, which means no two pieces are exactly alike. Concerned that this could skew the results, we measured each sawn surface against the surface on the opposite edge that was handplaned earlier.

Photos, this page (top right and left): Tom Begnal

Rating the blades

Based on the machine measurements, the smoothness of each rip and crosscut were rated as excellent, very good, good or fair. Forrest graduated magna cum laude here, capturing an excellent score for both ripping and crosscutting. Everlast, Jesada and U.S. Saw also garnered high honors.

BLADE	PRICE	RIP CUT	CROSSCUT
AMANA PR1040 (800) 445-0077	$85	Very good	Good
CMT 213.040.10 (888) 268-2487	$55	Good	Good
CRAFTSMAN 26789 (800) 697-3277	$35	Fair	Very good
DEWALT DW7615 (800) 433-9258	$69	Good	Very good
DML 74010 (800) 242-7003	$66	Good	Very good
EVERLAST AGP1040 (800) 387-5278	$70	Excellent	Very good
FORREST WOODWORKER II WW10407125 (800) 733-7111	$119	Excellent	Excellent
FREUD F410 (800) 334-4107	$95	Good	Very good
JESADA 110-440 (800) 531-5559	$90	Excellent	Very good
RIDGE TS2000 (800) 443-0992	$119	Good	Very good
SYSTIMATIC 1030 (800) 426-0035	$50	Fair	Good
TENRYU GM-25540 (800) 951-7297	$95	Very good	Good
U.S. SAW (OLDHAM) 100W40 (800) 828-9000	$60	Excellent	Very good
VERMONT AMERICAN 27656 (800) 742-3869	$75	Very good	Very good

Effectively, then, for each sample, we measured the smoothest possible surface for a particular sample (the handplaned edge) against the actual sawn cut. Therefore, as much as possible, this approach eliminated the natural differences in the various samples of wood. And as a result, I had a much fairer set of numbers to use when making an evaluation.

One more point. When crosscutting, it's not unusual to get some splintering on the edges of the wood. It's called tearout, and good tablesaw blades keep it to a minimum. Although the tests didn't directly measure tearout, we found that sawblades that made smoother crosscuts tended to produce less tearout.

The smoothest performers

After looking at the test results, it was clear that some blades were smoother cutters than others (see the chart at right). Of the 14 blades, the Forrest proved to be the smoothest of the bunch. It was the only one to earn an excellent rating in both the rip and crosscut categories. At $119, it's one of the pricier models, but the test suggests that it's money well spent.

The sawblades from Everlast, Jesada and U.S. Saw (the newest blade from Oldham) cut almost as well as the Forrest, getting ratings of very good and excellent. When price is factored in, Everlast enjoys some added appeal in that it sells for about 40% less than the Forrest blade.

Vermont American's blade also received honor marks, scoring a very good rating in both categories. It's about the same price as the Everlast blade. □

Tom Begnal is an associate editor.