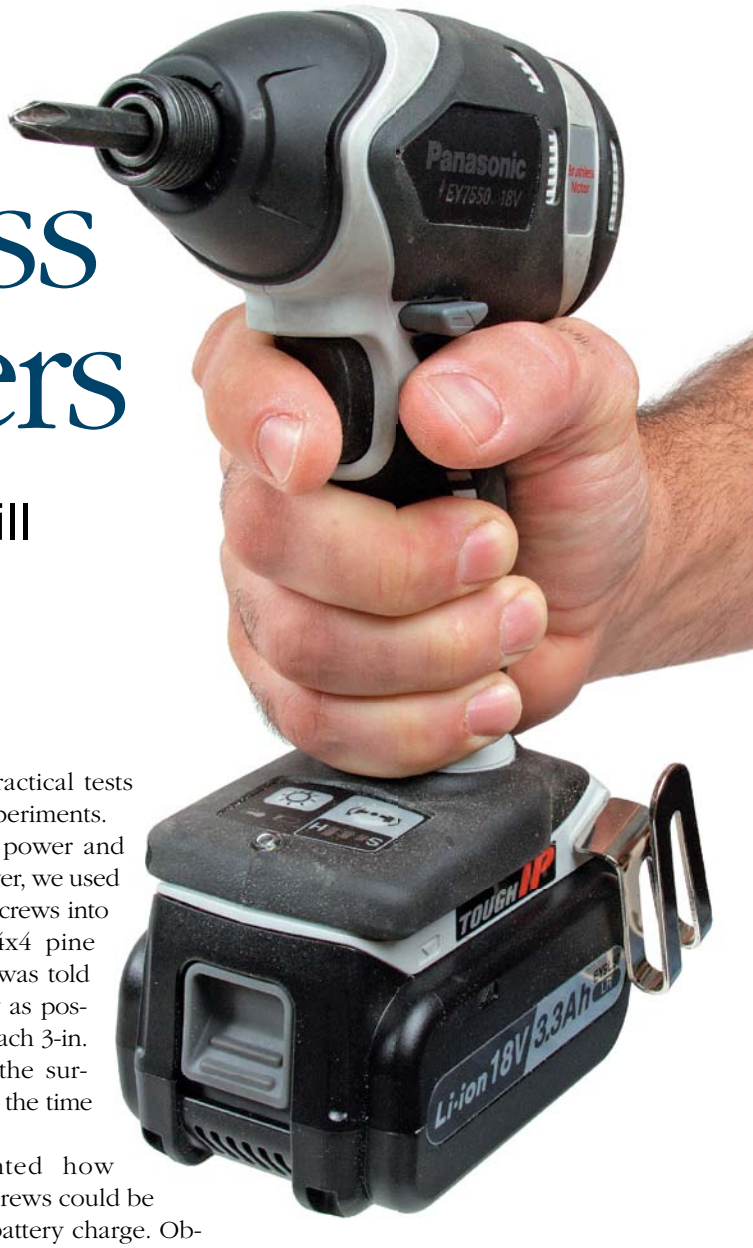
18v Brushless Impact Drivers

Pound for pound, no cordless drill packs more punch

BY ERIC CONSTANS



Impact drivers have been widely adopted by homebuilders and contractors, and more recently by woodworkers too. They have two major advantages over traditional drill/drivers: lighter weight and much higher torque. And the impact action makes big screws seem to melt into the wood, seldom stripping their heads in the process.

A new wave of impact drivers has taken those advantages to another level. Boasting brushless motors, the new tools promise even more power and battery life in the same compact package. *Fine Woodworking* asked me to test these claims in the laboratory to see if these high-tech drills are worth their higher prices.

Four torture tests

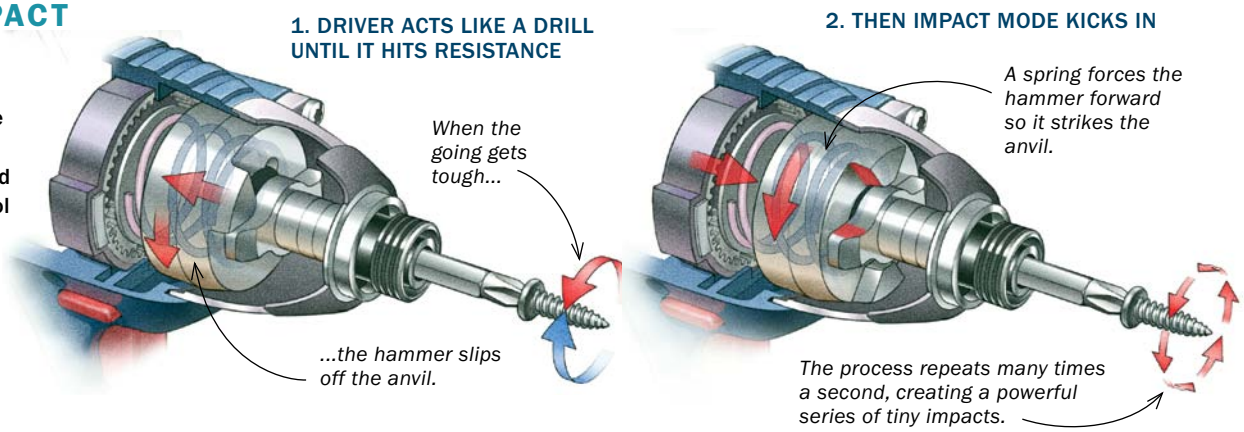
As the head of a college mechanical engineering department, I'm always looking for ways that my students and I can apply our skills to real-world tasks. In conjunction with *FWW*, we came up with a good combination of practical tests and laboratory experiments.

First, to test the power and control of each driver, we used it to sink 50 deck screws into pressure-treated 4x4 pine posts. Each tester was told to work as quickly as possible but to leave each 3-in. screw flush with the surface. We measured the time required.

Next we counted how many 3-in. deck screws could be sunk on a single battery charge. Obviously the longer between battery charges the better, but what this really tests is the drill's efficiency—how much power is used per screw. For the final real-world test, we measured the time it took to drill ten 1-in.-dia. holes through the same

BEHIND THE IMPACT

With its internal hammer striking an anvil up to 3,000 times per minute, the impact driver creates much more torque than a standard driver, yet is easier to control and won't strip the head of a screw (it can break it though). It's much noisier than a standard drill, so ear protection is a good idea.



Photos, except where noted: Mark Schofield; drawings: John Hartman

THE ULTIMATE DRIVING EXPERIENCE

An 18-volt impact driver can handle any driving task you throw at it. It has fine control for driving smaller screws into a shop jig (far left), enough punch to drive big lag bolts deep into wall studs when hanging a lumber rack (left), and enough run time to drive scores of screws in a major remodeling job (below).

pressure-treated posts. We used self-feeding spade bits (a new one for each driver) to ensure an equal feed rate for each test.

Mechanical power is the product of torque and speed. We measured each drill's steady torque by constructing a winch apparatus and using the drivers to raise an adjustable load to a height of 10 ft. The apparatus has a built-in tachometer, which we used to measure speed. It bore a slight resemblance to a guillotine and generated quite a few comments from students and faculty. In fact, it is a primitive dynamometer—a device used for measuring the power output of a motor.

As a final test, we measured the peak torque of the drivers by tightening a ½-in.-13 nut onto a bolt through a steel plate and observing the setting on a torque wrench

IT DRILLS HOLES BIG AND SMALL

An impact driver's quick-change chuck only works with hex-shank drill bits (right), but adapter chucks (below right) will handle the rest of your bit collection. We recommend the type designed for impact drivers. They held all types of bits securely in our tests, even huge Forstners in hardwood. Big bits activated the impact mode, which was a little rough but very powerful.

Up she rises. *To gauge each drill's sustained torque, Constans and his students built the "guillotine" and used it to see how much weight the tool could lift.*

HOW ENGINEERS HAVE FUN

Working with his mechanical-engineering students, the author devised a brutal series of tests. Not shown here is the test for peak torque, which involved driving large bolts into steel and then loosening them with a torque wrench.

Drive till you drop. *To gauge battery life, students measured how many 3-in. screws each driver could sink into pressure-treated pine on a single charge.*

Speed drills. *In two other tests, they recorded how fast each tool could drill 10 1-in.-dia. holes through a 4x4 post, and drive 50 more of the 3-in. screws.*

required to loosen the nut, which adjusts in 60-in./lb. increments.

Amazing stamina and strength

Our testing revealed just how powerful impact drivers can be. When we started the nut/bolt tightening torque tests, we used an aluminum plate instead of steel. After a few tests, we found that the heads of the bolts had been pulled into the plate, creating their own hexagonal holes in the process. When we used a washer under the bolt heads, the plate itself began mushrooming out around the washers. Maybe that's why my gearhead friends told me that good mechanics never tighten nuts with an impact driver—only loosen them.

In the stamina test of screws driven on a single battery charge (which also tests efficiency), the Panasonic was the most efficient, sinking 129.4 screws per amp-hour. It also sank 50 screws in the shortest time.

All of the impact drivers took approximately the same time to drill ten 1-in.-dia. holes. This is perhaps to be expected, since the torque requirement was relatively low and all of the drivers spin at similar speeds.

In terms of sustained torque, the Panasonic was able to lift the heaviest weight on the "guillotine." When tightening the nut onto a bolt through a steel plate, the Makita produced the most peak torque—a jaw-dropping 1,260 in.-lb. In reality, each driver generated more than enough torque to overtighten the nuts, more than enough for any woodworking or carpentry task.

Which impact driver is best?

We choose the Panasonic EY7550 as Best Overall. It sank enough screws on a single charge to build a very large deck, or to assemble an absurd number of cabinets using pocket screws. It had the highest sustained torque of any of the drivers, and was also the quickest at driving screws.

Individual product photos: John Tetreault

Dewalt
DCF895L2

AUTHOR'S BEST VALUE CHOICE

Dewalt
DCF895C2

Makita
LXDT08

Hitachi
WH18DBDL

AUTHOR'S BEST OVERALL CHOICE

Panasonic
EY7550

Model	Street price	Battery amp-hours	Screws driven	Time for 50 screws (min.)	Time for 10 holes (min.)	Sustained torque (in.-lb.)*	Peak torque (in.-lb.)
AUTHOR'S BEST VALUE CHOICE DEWALT DCF895C2	$250	1.5	185.5	5:27	2:23	68.04	1,140
DEWALT DCF895L2 (Same except battery)	$320	3.0	375	3:43	2:17	68.04	1,020
HITACHI WH18DBDL	$300	3.0	291	6:25	2:20	68.04	1,080
MAKITA LXDT08	$285	3.0	290	5:36	2:29	45.78	1,260
AUTHOR'S BEST OVERALL CHOICE PANASONIC EY7550	$390	3.3	427	4:14	2:06	73.60	1,080

*The only way to measure was in broad increments, hence the identical numbers in some cases.

The DeWalt DCF895 is actually a 20-volt tool, and had the second-highest efficiency of the bunch, right behind the Panasonic. Also, it is the only driver offered with a 1.5 amp-hour battery. The DCF895C2 has almost all the power of its 3.0-amp-hour brother, in a more compact, lower-priced package, and plenty of run-time for woodworking, making it our Best Value choice.

Also worth mentioning is the Makita LXDT08. Its fit and finish were superb, and it generated the highest peak torque. □

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THE BRUSHLESS ADVANTAGE

To see whether brushless impact drivers are really stronger and run longer, we tested brushed impact drivers from DeWalt and Makita that were nearly identical to their brushless cousins. The DeWalt brushed drill's run time was 12% shorter, its sustained torque 33% less, and its peak torque was the same. The figures for the Makita were 24%, the same, and 10%.