18v Cordless Drills:
Power to spare

It's no surprise that each sinks hundreds of screws on a charge, but you might be surprised by which tool drove the most

BY REX ALEXANDER

It was a friend's fast-approaching birthday that got me thinking about cordless drills. Keith runs a small chair-restoration business, and his wife, Sally, called me for advice on fulfilling her husband's birthday wish for an 18v cordless drill. Keith had dropped more than a few hints about these versatile tools (photo facing page), and Sally agreed that a little cordless technology around the shop could only help their business.

I've been using cordless drills in my shop since the mid-1980s, and I thought I knew what was available. However, when Sally dropped off the first few tool catalogs, I was confounded by the number of choices. With prices ranging from $80 to $270, which drill is the best buy? I was able to parlay this confusion into an opportunity to research and write this article. On job sites, I used ten 18v T-handle drills with ½-in. keyless chucks for several months. (Actually, the Porter-Cable is 19.2v, and the Panasonic is 15.6v.) In addition, I devised several tests to evaluate torque and battery endurance. Here's what I found out about these drills.

18v-drill batteries are compatible with more tools than ever

Cordless drills have a lot in common (photo right), but the most useful ones have batteries that can be used in other cordless tools. DeWalt's 18v cordless-drill battery, for example, works in 13 other DeWalt tools (sidebar p. 62), including a biscuit joiner, a laser level and a radio/battery charger. All the



Keyless chuck

A keyless chuck speeds bit-changing. To install a bit, hold on to the collar with the drill in forward and squeeze the trigger. An extra twist on the forward part of the chuck while holding the rear part secures the bit. Doing the opposite removes the bit.

Adjustable clutch

An adjustable clutch increases or decreases the maximum torque applied to the driver bit. Even though wood can be unpredictable, the adjustable clutch largely prevents the overdriving of screws. Most drills have anywhere from 16 to 24 settings.

Why I use an 18v cordless drill

by Gary M. Katz



There's no better tool for driving screws than a 12v impact driver (*FHB* #148, pp. 100-105), but for drilling holes, I rely on a DeWalt DW998 18v hammer/driver drill because it turns more rpm and has more torque than any 14.4v model. In fact, I'm looking at upgrading to DeWalt's DW988K because it delivers 450 in.-lb. of torque (that's compared with 400 in.-lb. for a 14.4v) and spins up to 2000 rpm (that's compared with 1800 rpm for a 14.4v). The extra torque and speed may not seem like that much, but I depend on both for a lot of jobs.

I've found that the higher rpm available on the 18v size are handy because paddle bits (spade bits) and hole saws are frequent fixtures in my life, and the drills work more efficiently at higher speeds, which means I'm putting less strain on the tool and the battery.

Bottom photo: Roe A. Osborn



COMMON CORDLESS-DRILL FEATURES

High/low torque

The high/low torque setting works like the gears in a car. You have more power in first gear but less speed (good for large-diameter holes). When you're in second gear, you have more drill speed (rpm) but not as much power (good for high-speed drilling with smaller bits).

Push-button forward/reverse switch

Six years ago, there were at least four competing versions of the forward/reverse switch. Although they work with varying degrees of success, all the drills reviewed have adopted the push-button style. The push button slides back and forth through the drill's body, with a center position that locks the drill off.

Variable speed

Starting screws or drilling holes would be more difficult without variable speed. Generally, there was finer speed control at lower rpm; as the drills neared the upper-rpm limit, they leapt to top speed. This trait was common to all the drills, but the Porter-Cable, Milwaukee, Bosch and Makita models were noticeably smoother.

Battery charger

All the drills came with battery chargers that have internal sensors to shut off the charger when the battery is fully charged. Some work by measuring the battery's temperature; others measure the voltage.

Higher torque is the other reason I put up with the additional weight of an 18v tool (and with another size of battery in my van); 18v drills have the extra torque I need for drilling large holes. They'll even bore 2⅛-in. holes for locksets using a Forstner-type bit. I don't depend on 18v drills, however, for boring more than a couple of doors.

I could probably drill these large-diameter holes with a 14.4v tool, but working it that hard drains the battery too fast, overheating it. Remember that cordless-tool batteries have two enemies: overheating and cell reversal. Cell reversal is caused by draining the battery completely. A job that might push an 18v battery a little bit could overtax a 14.4v battery.

Another concern is battery-charging cycles or life cycles. Part-time users may never have to worry about long-term battery life, but full-time users are learning what it means. Batteries can be charged only a limited number of times, and battery replacement is expensive—sometimes half the cost of a new tool.

Even though an 18v drill might do the job, I don't use one when a corded drill is more appropriate. If one of my workers uses a cordless tool when a corded model is a better choice, I remind him that laziness can be expensive.

—Gary M. Katz is a carpenter and writer living in Reseda, CA. He is the author of The Doorhanger's Handbook *(The Taunton Press, 1998).*

other 18v drills in the survey have batteries that can be used in at least one other tool, and more than half of the drills have batteries compatible with six or more other tools.

More power in a smaller package

I see more and more 18v drills on the job, and I think that's because they outmuscle their 12v and 14.4v predecessors. With additional power, however, comes additional weight, both in the power train and battery. DeWalt is the heaviest at 6 lb., with Milwaukee, Porter-Cable and Bosch close behind. And even though 18v drills are heavier than their 12v and 14.4v counterparts, drill manufacturers are constantly trimming their fat. (For information on the advantages 18v drills have over smaller sizes, see Gary M. Katz's sidebar on pp. 58-59.) While manufacturers of 18v drills are not really leaning toward more power per se, they are attempting to pack "more power in a smaller package," says Steve Cole, cordless product manager with Bosch Power Tools.

The aforementioned trend was made plain to me by the outstanding performance of the Panasonic cordless drill, which is the smallest tool of the bunch. In a test designed to compare battery endurance, the smaller 4½-lb., 15.6v drill by Panasonic, a leading battery manufacturer, outperformed all the 18v tools (sidebar p. 62).

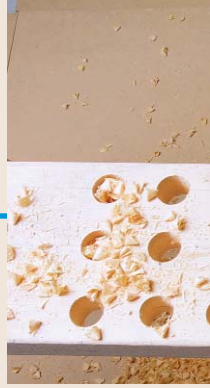
A few simple tests

Cordless drills will handle ordinary tasks such as driving a few screws and light-duty high-speed drilling with relative ease. The real question is how these drills stack up when they're doing bigger jobs that involve sinking hundreds of screws or drilling with hole saws or large-diameter spade bits.

First, my helper and I did a one-shot torque test. Although running the test wasn't an exact science, I drilled a 32mm cup-hinge hole, using each drill with a portable drilling jig. I charged all their batteries and drilled one ½-in. deep hole into white oak with each tool, applying the most constant pressure possible. With the exception of the Grizzly, which bogged down during the test, the drills zipped right into the hard oak.

To determine battery endurance, again we installed fresh batteries and drove coarse-thread drywall screws into a 2¼-in. thick slab of medium-density fiberboard (three ¾-in. thick pieces of MDF glued together) until the drills quit. As I mentioned above, the clear

18v drills tested for speed, power and endurance



On one charge, each drill was asked to bore nine 1¼-in. holes through a spruce 2x10. A test for torque consisted of boring a 32mm hole in white oak with a Forstner-style bit housed in a Blum portable drilling jig. A third test was to screw as many 2-in. drywall screws as possible into a 2¼-in. slab of medium-density fiberboard on a single battery.



Bosch
33618
(877) 267-2499

www.boschtools.com

This comfortable, well-balanced drill has a rubber grip and changes easily from forward to reverse. The battery is easy to install and remove and has a protective cap to guard against short circuits. The side handle attaches with a strap that wraps around the barrel of the drill, which is more difficult to install than that of the Makita or the DeWalt. The Bosch performed well in both of the large hole-boring tests.

Street price $240
Battery . . . . . Two NiCd
Screw test 275
Weight . . . . . .5 lb. 14 oz.
Auxiliary side handle . . . . . .Yes
Battery combines with six other tools.



DeWalt
DW 987
(800) 433-9258

www.dewalt.com

The DeWalt drill is a workhorse with nice features. The contoured rubber grip on the end of the drill's body cushions your hand if extra pressure is needed. It's well-balanced but heavy (6 lb.). The forward and reverse switch can be operated easily with one hand. This model is the only drill that offers three torque settings. The drill was louder and its gear adjustment more difficult to engage than the others.

Street price $270
Battery . . . . . Two NiCd
Screw test 264
Weight . . . . . .6 lb.
Auxiliary side handle . . . . . .Yes
Battery combines with 13 other tools.



Metabo
BST 18 Plus
(800) 638-2264

www.metabousa.com

This well-made tool has a keyless chuck that's comfortable and easy to use. The forward/reverse switch works in the opposite direction from the rest and is a little difficult to engage. It performed well in both of the large hole-boring tests and was second only to the Panasonic in the screw-driving test.

Street price $219
Battery . . . . . Two NiCd
Screw test 353
Weight . . . . . .5 lb. 5 oz.
Auxiliary side handle . . . . . .No
Battery combines with two other tools.



Milwaukee
0622-24
(800) 729-3878

www.milwaukeetools.com

Smooth-running and comfortable, this drill has a battery position that can be reversed to optimize the balance of the tool, possibly reducing fatigue. The metal keyless chuck works well but is not as comfortable as the molded plastic chucks. It performed well in both of the large hole-boring tests.

Street price $219
Battery . . . . . Two NiCd
Screw test 333
Weight . . . . . .5 lb. 15 oz.
Auxiliary side handle . . . . . .No
Battery combines with 11 other tools.







Grizzly
G8597
(800) 523-4777



www.grizzly.com

This light drill has a comfortable molded rubber grip and comes with a full complement of slotted and Phillips hex-shank driver bits. It lacks an electric brake and comes with only one battery. The Grizzly is the only drill that bogged down in the 32mm hole test and drilled only six of the nine holes in the 1¼-in. hole-boring test.

Street price $80
Battery . . . . . One 18v NiCd
Screw test 196
Weight . . . . . .4 lb. 4 oz.
Auxiliary side handle . . . . . .No
Battery combines with five other tools.

Hitachi
DS18DVB
(800) 829-4752



www.hitachi.com

The Hitachi's molded rubber handle has an unusual shape that some found uncomfortable. The instruction booklet has a table for the appropriate torque settings of different screws. The battery is taller than most, making it a little less stable when standing. The Hitachi battery showed signs of weakening near the end of the 1¼-in. hole-boring test.

Street price $180
Battery . . . . . Two NiCd
Screw test 203
Weight . . . . . .5 lb. 2 oz.
Auxiliary side handle . . . . . .No
Battery combines with two other tools.

Makita
6343D
(800) 462-5482



www.makita.com

Smooth and quiet, this drill is comfortable and well-balanced. The Makita's Cadillac-quality side handle comes with a depth gauge and is easy to attach. The batteries come with a protective cap. It performed well in both of the large hole-boring tests.

Street price $250
Battery . . . . . Two Ni-MH
Screw test 294
Weight . . . . . .5 lb. 12 oz.
Auxiliary side handle . . . . . .Yes
Battery combines with 12 other tools.

Panasonic
EY6432 (15.6v)
(800) 338-0552



www.panasonic.com

Measuring only 8½ in. long without a bit, this drill is lightweight and capable of getting into tight places. The drill's keyless chuck, which was a little more difficult to use than others, made an annoying buzzing sound when bits were changed. Even though it's a smaller drill, it performed well in large hole-boring tests and was the top performer in the endurance test.

Street price $195
Battery . . . . . Two Ni-MH
Screw test 463
Weight . . . . . .4 lb. 8 oz.
Auxiliary side handle . . . . . .No
Battery combines with seven other tools.

Porter-Cable
9884 (19.2v)
(888) 487-8665



www.porter-cable.com

The Porter-Cable is an above-average tool with a stylish, comfortable grip. The chuck is easy to engage, and the drill is relatively quiet. It has storage for two bits at the base of the tool. It performed well in both of the large hole-boring tests.

Street price $200
Battery . . . . . Two NiCd
Screw test 287
Weight . . . . . .5 lb. 14 oz.
Auxiliary side handle . . . . . .No
Battery combines with seven other tools.

Ryobi
HP 1802 M
(800) 525-2579



www.ryobitools.com

Comparatively small with a compact case, this drill has built-in levels for both horizontal and vertical drilling and a magnet on top of the battery for holding screws or bits. The Ryobi weakened as it approached the last of the nine holes in the 1¼-in. hole-boring test.

Street price $99
Battery . . . . . Two NiCd
Screw test 226
Weight . . . . . .5 lb. 1 oz.
Auxiliary side handle . . . . . .No
Battery combines with six other tools.

Photo top center: Roe A. Osborn

Two standouts

SMALLEST DRILL DOES THE MOST WORK

Don't be fooled by the Panasonic cordless drill's small size. It weighs 4½ lb. and measures only 8½ in. from the chuck to the rear end of the barrel. The Panasonic's 3.5 amp-hour Ni-MH battery powered a stellar performance in the endurance test, enabling the 15.6v drill to drive 110 more screws (463 total) than the closest 18v drill.

With numbers like these, the future looks bright for Ni-MH. Currently, only Panasonic and Makita are producing Ni-MH batteries. They're more expensive, however, and require a more sophisticated charger. And for the present, at least, they're considered to be more environmentally friendly. The alternative, NiCd batteries, are considered toxic waste and can't be simply tossed into the garbage.



It may be only 15.6v, but it sank 110 more screws than its closest 18v competitor.



18v BATTERY FITS 13 OTHER DEWALT TOOLS

The advantages of working unplugged are even greater when batteries combine with other tools. More cordless tools mean more backup batteries. And occasionally switching batteries extends battery life. Today, DeWalt leads the pack; its 18v cordless-drill battery interchanges with 13 other tools. They're listed below.

1. Hammer drill (pistol grip)
2. Hammer drill (T-handle)
3. ⅜-in. drill/driver
4. ⅞-in. SDS hammer
5. 6½-in. circular saw
6. 6¾-in. metal-cutting saw
7. Reciprocating saw
8. Jigsaw
9. Plate joiner
10. Pivot flashlight
11. Floodlight
12. Radio/battery charger
13. Rotary laser

winner was the Panasonic, which drove 463 screws before it stopped. The Panasonic cordless drill drove 110 more screws than its next-closest competitor, the Metabo.

The last test was another hole-hog test, but one that's closer to what might be done on the job site. With each drill, we bored nine 1¼-in. holes (an arbitrary number) through a 2x10. And just like before, all the drills' batteries were fully charged. Six out of 10 drills passed this test with flying colors (more in the information on each drill, pp. 60-61).

Ergonomics comes from balance and handle design

Excluding weight, the features that make a drill comfortable to use for an extended time are subjective, but handle design and balance are key.

Of the 10 drills surveyed, eight have sleek-looking, no-slip grips more akin to snow tires than power tools. The Porter-Cable handle has three vertical textured stripes, while the Hitachi's grip is smooth and wraps around the entire handle. However, it has a slight indentation, which I found uncomfortable. Several friends who used it disagreed, though. Most of the other drills have a rubber portion that wraps around the back half of the handle, next to the palm. The Makita and the Metabo don't have this feature.

Top photo: Roe A. Osborn

Balance is also important. Vince Caito, a marketing manager with Makita, says that the reason manufacturers favor the T-handle design (instead of the pistol grip) is balance. As battery sizes increased to provide more power, manufacturers slid the handle forward to what's now the T-handle position. This configuration prevents the drill from being nose-heavy and balances the drill at the handle.

Read the instructions on charging

None of us likes to read instructions—we'd rather be building. The problem is that if you don't follow the charging instructions provided by the manufacturer, you may end up out buying a battery instead of building.

Porter-Cable, Milwaukee, Grizzly, Hitachi and Makita have detailed instructions on recharging and when to recharge (basically before you exhaust the battery). DeWalt's instructions say that you may charge a partially used battery whenever you desire, without adverse effects.

All the batteries can be recharged in an hour or less, and all the chargers in the survey have internal sensors that shut off the charger when the battery is fully charged. Some sensors work by measuring the battery's voltage; others measure temperature. Most chargers have a trickle or maintenance-charge feature that lets you leave the battery in the charger for days without damaging the battery.

Unless you mistreat your batteries by charging, storing or using them in extreme temperatures, short-circuit them or leave them on the charger for months, they should lead long, healthy lives. For more battery dos and don'ts, see the sidebar at right.

Author's picks

Most of these drills are solid tools and have a place in the construction world. The clear winner, however, is the 15.6v Panasonic EY6432, which performed well in both hole-boring tests and blew all the other drills out of the water in the screw test. And the Panasonic is lighter and less expensive than many of the other drills in the survey.

After the Panasonic, and if money is no object, I'd probably go with the Milwaukee 0622-24. It performed well in the two large hole-boring tests, and it did a respectable job of driving screws. □

Rex Alexander builds cabinets in Brethren, MI. Photos by Chris Green, except where noted.





Built-in levels aid horizontal and vertical drilling. *Only the Ryobi 18v cordless drill has two built-in levels: one on the end of the barrel (facing the user) and one on top of the drill. The one on top is removable.*

Exceptional side handle. *Makita's auxiliary side handle has a collar with toothlike protrusions that match those on the barrel of the tool. The result is a secure side handle that doesn't slip. Here, the author drills holes for shelf pins using the side handle with the adjustable depth rod attached.*

Be kind to the battery

All batteries eventually die. The care you give them determines their longevity. For a primer on the topic, see "Understanding Cordless-Tool Batteries" (*FHB* #128, pp. 108-109).

All cordless-tool batteries are made of groups of 1.2v cells. Inevitably, one cell becomes weaker than the others. During use, the battery gradually loses its charge; the weakest cell loses its capacity first. No real damage is done unless you continue discharging the battery and reversal (going beyond empty) occurs in the weak cell.



Battery covers prevent unseemly mingling. *Terminal covers supplied by Makita and Bosch prevent short circuits caused by wayward drill bits or screws bridging the battery's contacts.*

BATTERY DOS AND DON'TS

- **Don't store, use or charge your batteries in extreme cold or heat (14°F or above 105°F).**
- **Don't run your cordless drill's battery to exhaustion. Recharge when the battery first shows signs of weakness.**
- **Every so often (every 10 charges or so), allow your battery to "top off" (get a good full charge) by allowing it to trickle charge (a deeper, longer duration) for a day or two.**
- **Once in a while (every few months if you use your drill daily), discharge the battery pack a little lower under light load to maximize battery life and to maintain capacity.**
- **Avoid short-circuiting the battery's contacts in the drill case.**