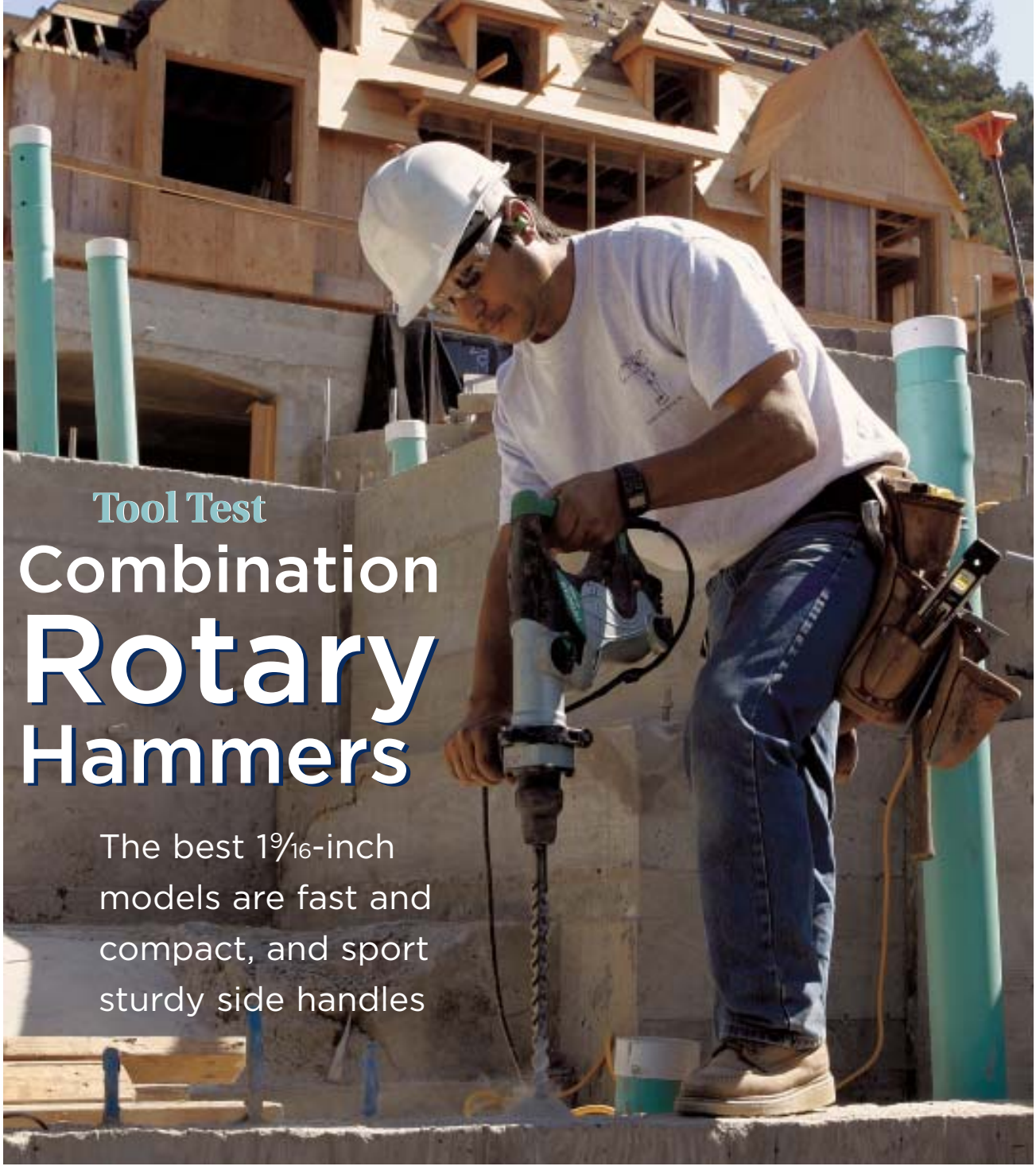


Tool Test

Combination Rotary Hammers

The best 1 9/16-inch models are fast and compact, and sport sturdy side handles

by Victor Rasilla

Hammer drills and small rotary hammers are fine for light work, but for tough jobs there is no substitute for a large combination hammer. The company I work for does additions and whole-house remodeling in the San Francisco Bay area. In this seismically active region, the engineers are always specifying added hold-downs to transfer shear loads to foundations. As a result, we frequently find ourselves drilling multiple holes in existing stem walls and grade beams.

This spring, my crew had the opportunity to test six 1 9/16-inch combination rotary hammers. These are larger tools than many carpenters are accustomed to, but they're the ideal size for drilling the 3/4-inch to 1 1/8-inch holes we typically need to make. Although a rotary hammer is primarily a drilling tool, the combination models are equipped with a hammer-only function that makes them suitable for chipping, "digging," and other tasks.

Our crew had the tools for several months. We did some head-to-head testing, but mostly we just used them on the job.

Models

For this story, we tested six tools: the Bosch 11241EVS, DeWalt D25500K, Hilti TE 56-ATC, Hitachi DH40MR, Makita HR4000C, and Metabo KHE 55. These models all take SDS-Max — or, as Hilti refers to them, TE-Y — bits, which are the next size up from the SDS-Plus bits used in the tools covered in *JLC*'s last rotary-hammer story (see "Compact Rotary Hammers," 5/05).

Most of the manufacturers of the tools we tested make other, similar models that use spline-drive bits, but unless you have a large arsenal of these bits, I can't imagine why anyone would opt for the older, less efficient spline system.

Not a hammer drill. Pound for pound, a rotary hammer is a much harder-hitting tool than a hammer drill. Hammer drills use a ratcheting action to make the chuck move in and out, whereas rotary hammers rely on a cam-driven piston to pneumatically drive a striker pin into the back end of the spinning bit. It's a much more effective way to transfer energy to the bit.

Capacity

The tools we tested are 1 9/16-inch models, meaning their manufacturers do not recommend using them for extended drilling with solid bits larger than 1 9/16 inches in diameter. They are best suited to drilling holes between about 1/2 inch and 1 3/8 inches. They will accept larger solid bits, and most are rated to handle rotary coring (hollow) bits of up to 4 1/8 inches in diameter.

For us, the size limitation for solid bits was not an issue, because we rarely make holes larger than 1 9/16 inches in diameter. On those rare occasions when we do have to make a lot of bigger holes, we can rent a 1 3/4-inch or 2-inch rotary hammer.

Hammer function. Most combination models have two modes: hammer and drill, or hammer only. The hammer-only mode is good for tasks like chipping, scaling, and digging. These tools will not break up a concrete driveway, but they are perfectly capable of doing light demo work or chipping holes for 4-inch drain pipe. Our electrician puts an attachment in his combination hammer and uses it to drive grounding rods into the soil.

Drilling Power

Drilling and chipping concrete is no fun, so it's best to have a tool with the power to do the work quickly (see specs, page 4).

The manufacturer's specifications for rotations per minute and blows per minute make perfect sense, but the specs for maximum impact energy give me the same queasy feeling I get when I see horsepower ratings or when people talk about power in terms of amps.

The problem is that the average carpenter is going to assume that if two hammers strike a similar number of blows per minute, and one hits harder, the one that hits harder will be the faster tool. Forget it! Using the hammers in the field often reveals something entirely different from what the specs imply. It's not that the manufacturers' numbers are wrong, exactly, or that you should ignore them — just take them with a large grain of salt.

There is one spec we can definitely vouch for, though: weight. We weighed the tools ourselves.

Everyday field work. The job we used these hammers on was a whole-house remodel that involved a lot of structural work. Each week, I brought in a couple of

Figure 1. Most side handles attach to the tool with a metal band. The band on the DeWalt (left) is narrow and is tied to a very long handle, so there's a lot of flex in the connection. The band on the Hilti (center) is slightly wider; it's attached to a shorter handle, so there's much less give. Somewhat heavier than the other two bands, the thick steel clamp on the Hitachi (right) provides the most solid connection of all.

different models, and the crew would use whichever ones they wanted. Over a period of months, we developed a sense of how fast each tool could do the work.

Timed drilling test. Since we also wanted to quantify differences between the tools in a more systematic way, we performed timed drilling tests with a known amount of feed pressure. Some manufacturers recommend letting the weight of the tool do the work, but this didn't seem realistic to us. Thus, we increased feed pressure by hanging weights from the tools and gripped the tools just tight enough to keep them under control. A friend of mine ran a stopwatch while I drilled holes. If I ran into rebar, I stopped and tried somewhere else.

Armed with new 7/8-inch bits in each hammer, we performed two different tests. For the first one, we hung 10 pounds of weight from the hammers; with each tool, we drilled five 7/8-inch holes 8 inches deep into a 3,500-psi footing containing 3/4-inch aggregate.

In the real world, you'd probably get fired if the boss saw you pressing so lightly on the tool, so for the second test we increased the weight. To decide how much to increase it by, we pushed a hammer against a bathroom scale with the same force we'd use when drilling hard. The scale read 65 pounds and the hammer weighed 15 pounds, so we hung 50 pounds from each tool.

Other than the weight increase, the only change we made in the second test was that this time we drilled into a 4,000-psi footing.

Fittingly enough, the results of the two tests (see chart, page 8) were in line with how fast the tools felt in everyday use. As far as I'm concerned, a few seconds' difference per hole is not significant — but 10 or 20 seconds is.

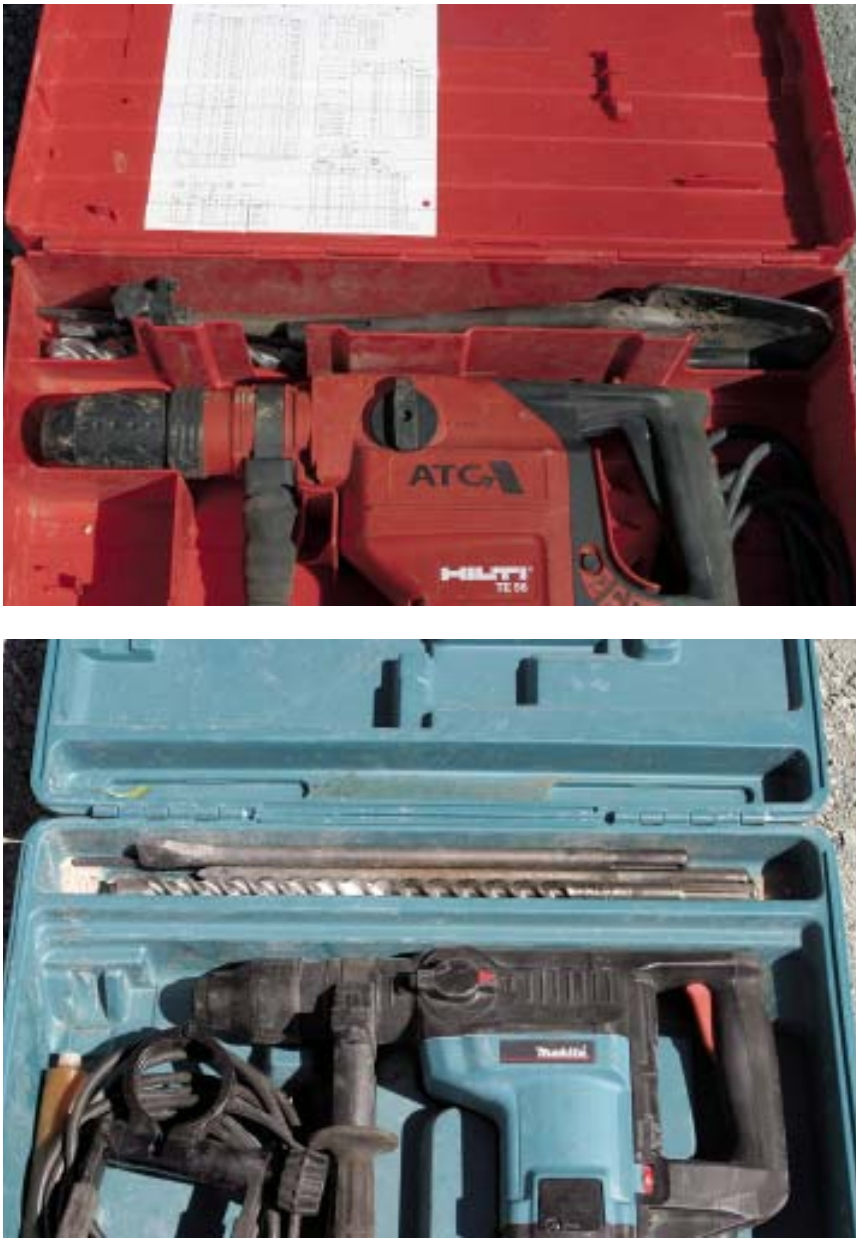
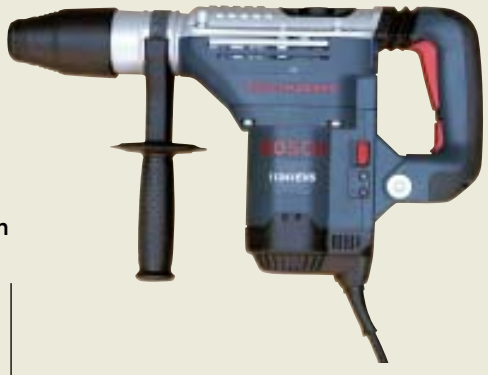


Figure 2. Like most of the cases that come with these tools, Hilti's (top) has room for multiple bits, chisels, and a clay spade. The Makita case (above) is cramped, with room for only a few small bits.

TOOL SPECS

Bosch 11241EVS



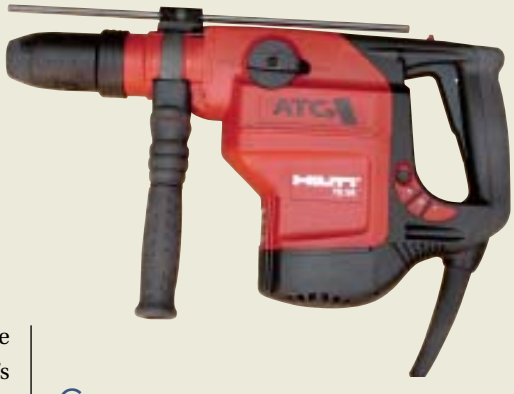
Rpm: 170–340
Blows per minute: 1,700–3,300
Maximum impact energy: 7.4 foot-pounds
Weight (with handle but no cord): 14 pounds
Street price: $519

Bosch Power Tools, 877/267-2499, www.boschtools.com

Pro: With its light weight and shock-absorbing rear handle, the 11241EVS is very comfortable to use. Extra features include a service indicator light, a power indicator light, and a trigger that can be locked into "On" in hammer-only mode. A unique swivel fitting reduces cord wear.

Con: Compared with the other hammers, this model is very slow at drilling.

Hilti TE 56-ATC



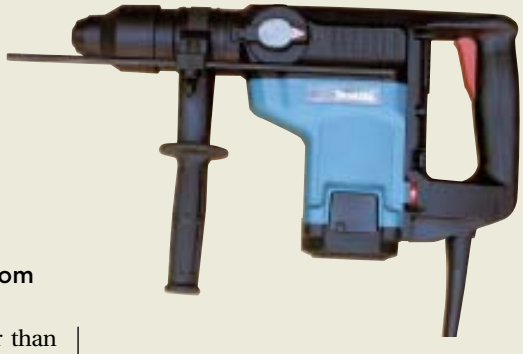
Rpm: 0–480 (0–720 in drill-only mode)
Blows per minute: 0–2,886
Maximum impact energy: 5.2 foot-pounds
Weight (with handle but no cord): 15.6 pounds
Street price: $1,095 ($895 without ATC)

Hilti, 800/879-8000, www.us.hilti.com

Pro: The TE 56-ATC is a smooth-operating machine with the best overall fit and finish of any tool we tested. It's one of the faster-drilling hammers and has more features than the other models, including a variable-speed trigger and a drill-only mode.

Con: This tool is less compact than others and the ATC feature makes it harder to clear jammed bits. It's also very expensive.

Makita HR4000C



Rpm: 230–450
Blows per minute: 1,250–2,500
Maximum impact energy: 4.9 foot-pounds
Weight (with handle but no cord): 14.6 pounds
Street price: $549

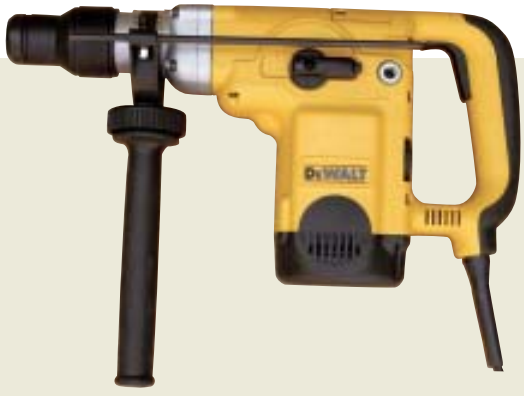
Makita USA, 800/462-5482, www.makitatools.com

Pro: The HR4000C runs smoothly and drills faster than every model except the Hitachi. It has a service indicator light and a power light that can be used to troubleshoot problems.

Con: I don't like the case: It's big on the outside and cramped on the inside.

TOOL SPECS

DeWalt D25500K



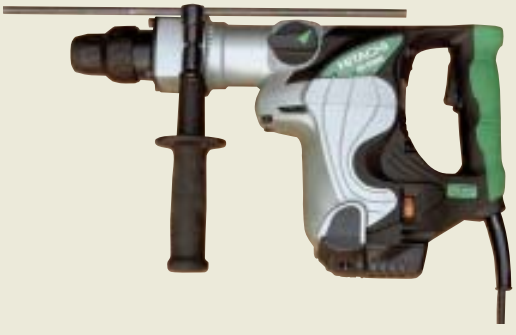
Rpm: 140–280
Blows per minute: 1,330–2,600
Maximum impact energy: 7.3 foot-pounds
Weight (with handle but no cord): 14.5 pounds
Street price: $399

DeWalt Industrial Tool Co., 800/433-9258, www.dewalt.com

Pro: This is a simple tool with few added features, but it does what it needs to do. It's relatively light, has a roomy case, and is the least expensive tool in its class.

Con: There is no service indicator light, and the strap that holds the handle on in the forward position is somewhat flimsy.

Hitachi DH40MR



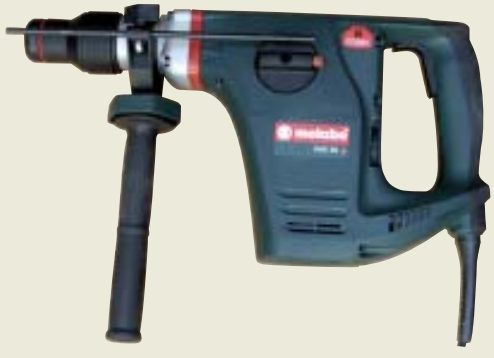
Rpm: 240–480
Blows per minute: 1,320–2,650
Maximum impact energy: 7.4 foot-pounds
Weight (with handle but no cord): 16 pounds
Street price: $449

Hitachi Power Tools, 800/829-4752, www.hitachipowertools.com

Pro: The DH40MR is simple and compact, and drills faster than any other model. It's quiet, smooth-running, and less expensive than most hammers in this category. The side handle is very rigid because it's attached with a steel bracket.

Con: This tool lacks a service indicator light, and theall-metal housing makes it heavier than other $1^{9}/_{16}$-inch hammers.

Metabo KHE 55



Rpm: 135–275
Blows per minute: 2,600 maximum
Maximum impact energy: 6.6 foot-pounds
Weight (with handle but no cord): 14.6 pounds
Street price: $569

Metabo, 800/638-2264, www.metabousa.com

Pro: The KHE 55 has many parts in common with the DeWalt 25500K, so it performs about the same as that tool. Added features include a service indicator light and the CODE! security system.

Con: The security system may deter thieves, but the need for an electronic key makes it inconvenient to use. The key itself is rather flimsy, as is the connection strap on the tool's side handle.

Size and Weight

Sometimes we have to drill in crawlspaces or other confined areas; this is a lot easier to do if the tool is compact. The Bosch and Hitachi are noticeably more compact than the others.

Including side handles but not cords, all the tools we tested weigh between 14 and 16 pounds. Although a two-pound difference is significant on a circular saw or a cordless drill, it would not affect my purchase decision on a combination hammer of this size. I might feel differently if we used these tools to drill overhead, but usually we're going down or to the side.

Of the models we tested, Bosch is the lightest and Hitachi the heaviest.

Main Features

Some hammer-drill models are very simple, and others have added features. For example, the DeWalt and the Hitachi drill and chip, and that's about it. This is not necessarily a bad thing; tools with fewer features cost less and in theory have fewer things to break. Bosch and Hilti, on the other hand, took a different approach; they added all sorts of features to their tools.

Speed control. Speed control allows you to slow down to avoid destroying soft material like brick. Every tool we tested except one had a single-speed trigger coupled with a separate speed-control dial. The Hilti had a true variable-speed trigger plus a button-activated high range for drill-only mode.

In our work, we hardly ever run the tools at anything less than full speed. When we do slow down, the control dial settings are usually adequate.

Clutch mechanism. All of the hammers are equipped with some kind of safety clutch, which protects the tool's gears as well as the user. When the clutch engages, the drive train typically slips, and you hear a clicking sound from the housing. The impacting motion continues, which makes it easier to extract a jammed bit by wiggling the tool and pulling up on it.

Hilti's $1\frac{9}{16}$-inch hammer comes in two versions: regular and ATC (active torque control). We tested the more expensive ATC version, which has an electronic overload device that reduces speed or stops the motor when there is a sustained overload or jam. I'm sure there are circumstances in which this feature could indeed prevent an injury, but my crew and I found it annoying when we drilled deep holes, as we often do, in the 12-to-15-inch range. Once the mechanism engages, you have to release and resqueeze the trigger to restart the tool. This makes it harder to loosen deeply jammed bits.

Other than that feature, I liked the Hilti tool — but if I were to buy one, I'd get the version without ATC.

Handles. The manufacturers recommend using the side handle to maintain a solid grip, and there are few circumstances in which I wouldn't follow that advice. Side handles take a lot of pressure, so they need to be strong.

The DeWalt and Metabo tools have very similar handles; in fact, these models look like they came out of the same factory. The handles are very long, and when I first saw them I thought this would be a comfortable feature. As it turns out,

Figure 3. A clay spade (left) is indispensable for loosening packed soil, especially in cramped quarters. Here, a carpenter uses a combination hammer with a clay spade to help dig a trench (right).

though, the long handles create too much leverage, and the steel strap that holds them on feels as if it will break. We managed to bend one of the straps.

The DeWalt also has threaded inserts for the side handle on each side of the housing near the back of the machine. With this arrangement, you can alter your work position by putting the handle farther back.

With one exception — the Hitachi — the other models also have steel-strap–type handles. The straps on the Makita and Hilti are wide and very strong. The Bosch has a narrower strap that deflects slightly in use, but the handle is short enough that the strap seems sufficient. Hitachi's handle attaches to the tool with a steel bracket; it feels much more rigid than the others (see Figure 1, page 2).

The Makita includes a D-handle attachment for use in hammer-only mode. I spend much more time drilling than chipping, so the extra handle is not a plus for me.

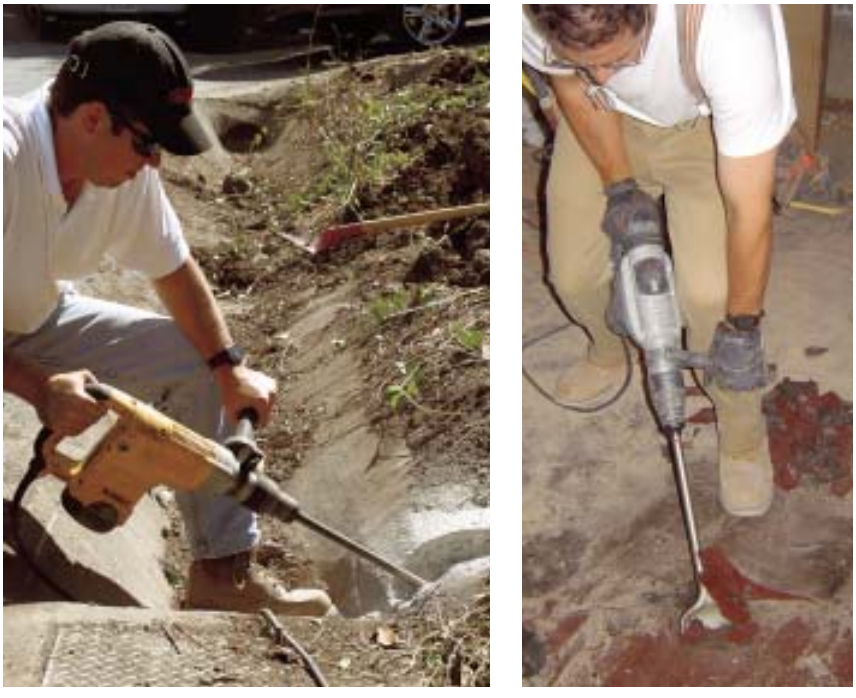


Figure 4. Combination hammers are designed mainly for drilling, but the chipping function comes in handy for a variety of tasks. In the examples shown here, the author breaks out a curb to run a drain into the gutter (left) and, with a wide flat chisel, scrapes up floor tile (right).

Other Features

The Bosch sports a unique vibration-dampening handle. It really works: After long periods of drilling with this tool, my wrist felt less fatigued than it did with other models.

Security device. Built into the Metabo hammer is a security feature called CODE!. When activated, it prevents the tool from turning on. This "lock" is controlled by a programmable electronic key that resembles a car alarm's remote.

Perhaps if I ran a giant crew and never left the site, this feature would be more appealing. But on most days I visit two or three jobs, so I'd have to make sure someone on site had my key or I'd have to buy extra keys. Furthermore, even though the hammer itself is well made, the key's cheap plastic housing came apart in my pocket.

One of the indicator lights on the Hilti hammer is for an antitheft mechanism that did not yet exist when we tested the tool. According to the manufacturer, the system is built into every hammer and can be activated with an optional electronic key that will soon be available.

The Case Counts

It's important to me to have a good case, because I don't want to arrive at a job and discover I don't have the right accessories. In addition to the tool, the case needs to accommodate four or five bits, a chisel, and a clay spade (Figure 2, page 3).

Other than the color and logos, the DeWalt and Metabo cases are virtually identical. Both have metal latches and plenty of storage space for the accessories I like to carry. The cases for the Bosch and Hitachi are smaller on the outside, but they too have ample storage space inside.

Space is tight in the Hilti case, but there's still room for a clay spade and the bits I usually carry. Makita makes the only blow-molded case, but even though it's larger than the rest, there's little room inside. It will hold a few straight bits but not a spade or a 2-inch chisel.

Accessories

Most people are familiar with the drill bits and chisels that fit this kind of tool, but it's worth noting that many other accessories are available as well.

Clay spade. For my work, a clay

Drilling Time Tests (five 7/8-inch holes, 8 inches deep)		
Model	**10 lb. added weight, 3,500-psi concrete (average seconds per hole)**	**50 lb. added weight, 4,000-psi concrete (average seconds per hole)**
Hitachi	58	44
Makita	60	51
Hilti	62	60
DeWalt	67	60
Metabo	67	64
Bosch	89	83

The manufacturers' specifications say nothing about how fast the hammers actually drill concrete, so the author tested them by timing how long each one took to drill a series of holes in the same concrete footings. To ensure even feed pressure, he hung weights from the tools and grasped them just tight enough to keep them under control. The photo at right shows a hammer with two 25-pound weights attached.

spade is an indispensable accessory. The end of this tool is a "digging" shovel that's about 4 inches wide (Figure 3, page 6). It won't lift the dirt and throw it over your shoulder, but it is a great replacement for a pick when digging compacted soil. A clay spade is especially handy for working in tight crawlspaces or for digging a narrow, stepped utility trench.

Chisels. Pointed chisels and flat narrow chisels are available for hole-chipping and demolition. Broad flat chisels are good for chipping up ceramic or asphalt tile flooring (Figure 4, previous page).

Regular drilling. Hilti makes a TE-Y-to-standard drill chuck attachment that works with standard shank bits for drilling wood or metal. This attachment fits any SDS-Max tool, but it works best in the Hilti because, unlike other hammers, the Hilti has a drill-only mode with a higher-than-normal speed range.

Other attachments include bits for chasing mortar joints, cutting channels, cutting asphalt, tamping soil, and driving ground rods. Bosch and Hilti make a ton of attachments; the best places to look for them are on the Bosch (www.boschtools.com) and Hilti (www.us.hilti.com) Web sites.

Favorites

My favorite 1 9/16-inch combination model — by a wide margin — is the Hitachi DH40MR. It's simple, compact, and noticeably faster than the other hammers. With its all-metal housing, steel-bracket side handle, and heavy blow, it has a toughness unmatched by the other tools.

It's hard to come up with second- and third-place models because each of the other hammers we tested has problems. I like the Makita HR4000C, the second-fastest tool in the test. But the cramped case is a deal-breaker; it makes it too likely I'll arrive on site without some vital bit or attachment.

The Hilti TE 56-ATC is beautifully made, has loads of features, and is the third-fastest machine. If price were no object, I would probably buy the non-ATC version of this tool, the TE 56, because the ATC feature makes it harder to loosen jammed bits. But at $1,095 with ATC and $895 without, a Hilti hammer is just way out of my price range.

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