

# Easy Boring in Concrete, Masonry and Stone

Choose the appropriate drill and bit for the job, then respect their limitations

by Bruce Greenlaw

**B**uilders once routinely used star drills to bore holes in concrete, masonry and stone. Star drills are straight, forged-iron shafts with star-shaped chisels on one end. Operating a star drill is simple: The drill is beaten with a hammer while it is rotated by hand between blows.

Today's run-of-the-mill masonry bits aren't always better than star drills. Driven by standard electric drills, these two-dollar bits can bore at glacial speeds while their pretty zinc coats peel off like pencil shavings. Fortunately, if you bore more than the occasional hole in concrete, ma-

grenade launcher and knocking a hole through concrete with it? As their monikers imply, these tools and other rotary hammers bore big holes in concrete with minimal effort (photo facing page). But they're overkill for boring lots of small holes, and their powerful blows can annihilate soft or brittle materials.

Standard drills are the best choice for boring brick, crumbly mortar, tile, old plaster, green concrete, soft limestone or other materials that might get damaged by percussion. In fact, standard drills and percussion drills that offer hammerless

two percussion cams to ratchet against each other as the spindle turns. This step adds thousands of tiny hammer blows per minute to the drilling operation. Hitachi's DV 20V2 hammer drill (Hitachi Power Tools, U.S.A., Ltd., 3950 Steve Reynolds Blvd., Norcross, Ga. 30093; 800-362-7297) (photo left) generates up to 41,600 blows per minute. This hammering action pulverizes materials to accelerate drilling, so caution is in order when hammer-drilling brittle materials. I've broken soft wall tiles with a hammer drill.

Within limits, the harder you push on a hammer drill in rotary-percussion mode, the faster it drills. Exceeding about 25 lb. to 40 lb. of pressure, however, can cause the motor to stall and overheat. Fortunately, it's easy to develop a feel for top speed.

Most hammer drills come with  $\frac{3}{8}$ -in. or  $\frac{1}{2}$ -in. chucks and bore holes with maximum diameters ranging from  $\frac{3}{8}$  in. to  $\frac{7}{8}$  in. in concrete. A notable exception is the AEG SB2-35RLD sold by Chicago Pneumatic (Chicago Pneumatic Tool Co., Electric Tools Division, 2220 Bleecker St., Utica, N. Y. 13501; 800-243-0870), which comes with a  $\frac{5}{8}$ -in. chuck and bores 1½-in. dia. holes in concrete. Regardless of these ratings, hammer drills don't bore big holes in concrete at production speeds. Subtract about  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in. from a hammer drill's maximum drilling capacity in concrete, which is listed in most catalogs, to determine its optimum drilling capacity in concrete. Conversely, add about  $\frac{1}{4}$  in. to determine its optimum capacity in masonry.

Hammer drills excel at boring masonry to accept small expansion anchors, toggle bolts, plastic plugs and metal or nylon nail-in anchors (left photo, p. 87). John Starr, a custom builder and remodeler in Littleton, New Hampshire, uses a  $\frac{3}{8}$ -in. Makita hammer drill (Makita U.S.A. Inc., 14930 Northam St., La Mirada, Calif. 90638; 310-926-8775) to bore pilot holes for hardened, self-tapping concrete screws and to set the screws in the holes. The screws fix hardware to masonry walls, fasten decorative lattice beneath porches to concrete piers and anchor wall plates to old concrete slabs that are too hard to accept powder-driven fasteners.

**Hammer-drill features that foster speed and accuracy**—Depending on your line of work, certain hammer-drill features might be worth shop-

**Hammer drills work best in masonry and soft concrete.** Big hammer drills such as Hitachi's  $\frac{1}{2}$ -in. model DV 20V2 easily bore  $\frac{1}{2}$ -in. dia. anchor holes in concrete block.

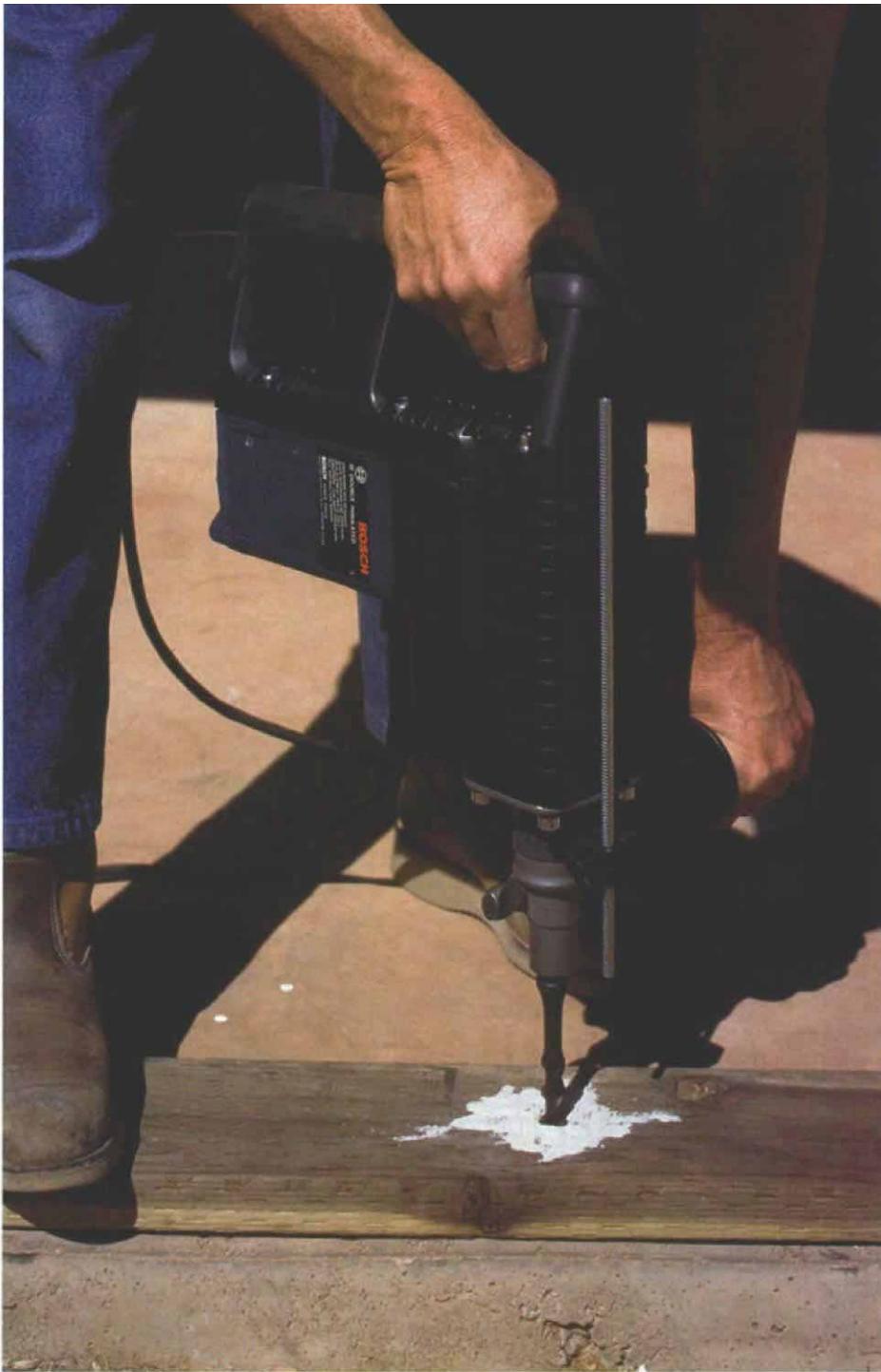
sony and stone, there's no need to suffer these indignities. The market is brimming with powerful, ergonomically correct impact drills and computer-designed masonry drill bits. Using the right equipment, you can easily bore the brawniest, grittiest and brittlest man-made and natural materials to accommodate everything from hardened screws to radon vents. This article describes the gear you need to bore holes in concrete, masonry and stone. The sidebar on p. 88 adds tips on using the gear.

**Standard drill, hammer drill or rotary hammer?**—Who can resist picking up a tool called a Macho V or a Bulldog, pretending it's a

rotary action are the only choice for boring holes in old brick buildings to retrofit seismic anchors. High-quality carbide-tipped rotary bits are available for this purpose (more on drill bits later).

**Hammer drills work best for installing small-diameter anchors**—Hammer drills are a step up the evolutionary ladder from standard drills. Like standard drills, hammer drills have three-jaw chucks that drive round-shank or hex-shank drill bits, and they perform basic rotary drilling in a variety of materials, including fragile masonry. But hammer drills can also add percussion to rotation. Pushing on a hammer drill that's switched to rotary-percussion mode causes





**Big job, big tool.** Rotary hammers such as Bosch's spline-drive 11214VS are the best choice for the production boring of big holes in concrete, such as for installing drop-in mudsill anchors.

ping for. Dual-range transmissions, for example, offer either high speed and low torque for boring small holes or low speed and high torque for boring bigger holes or setting screw-type fasteners.

Keyless chucks make bit-swapping quick and easy. This feature is convenient for, say, fastening a 2x ledger board to a foundation using a combination of wood-boring and masonry bits. Most manufacturers offer keyless chucks.

Cordless hammer drills keep improving. For reasonable power and longevity between charges, I'd consider getting at least a 12-volt model such as Makita's 8411D (left photo, p. 87). It features variable speed, a dual-range transmission, a  $\frac{3}{8}$ -in. keyless chuck and an electric brake.

I bored twenty  $\frac{3}{16}$ -in. dia. concrete-screw pilot holes in concrete block with one of these tools on a single charge.

If you plan to drive a lot of screws with a cordless hammer drill, consider getting one with an adjustable clutch, such as DeWalt's 14.4-volt DW996K (DeWalt Industrial Tool Co., P. O. Box 158, Hampstead, Md. 21074; 800433-9258). It comes with a  $\frac{1}{2}$ -in. keyless chuck plus the rest of the Makita's features. Unfortunately, the cordless hammer drills I've seen don't have depth gauges.

**Rotary hammers drill bigger holes with less effort**—If you figure to bore lots of holes in concrete, then rotary hammers are for you. They ro-

tate slower and deliver roughly one-tenth as many blows per minute as hammer drills do, but the blows can pack up to 10 times as much power. These blows easily pulverize hard concrete and aggregates. You don't want to subject soft materials to rotary hammers, though. I've seen them blow big craters out of brick and hollow concrete block at the exit point.

Rotary-hammer blows are typically conveyed to drill bits by a free-floating battering ram that rides inside a cylinder and is launched and retrieved by a piston. An airspace between the ram and the piston compresses and drives the ram forward as the piston advances, then vacuums it back as the piston retreats. The airspace acts as a shock absorber that reduces operator fatigue and wear on the tool.

Boring holes with a rotary hammer is almost fun. You grip the tool firmly, push just hard enough to keep it from bouncing off the work, pull the trigger and let the tool do the rest. Pushing harder doesn't speed the work.

Rotary hammers come with special heavy-duty chucks that hold drill bits specifically made to fit them. There are three basic types of rotary hammers, and they're differentiated by the way they hold bits in their chucks: SDS (slotted-drive system), spline drive and SDS max. SDS models are best-suited for medium-duty work. Spline-drive and SDS-max tools are better for heavy-duty jobs. Each type comes with a keyless chuck that makes it simple to change bits.

**SDS rotary hammers have a high power-to-weight ratio**—SDS rotary hammers typically weigh little more than a hammer drill, and they're best-suited to boring  $\frac{1}{2}$ -in. dia. and smaller holes in concrete.

For instance, DeWalt's hammer drills weigh 4.4 lb. to 5.75 lb., and its SDS rotary hammers weigh 5.3 lb. to 6.8 lb. (Core bits, which work like hole saws, increase the capacity of some models up to 4 in.) But they bore these holes two times to three times faster than hammer drills do.

Big SDS rotary hammers are available, including Bosch's 10.1 lb.,  $1\frac{1}{8}$ -in. model 11222EVS (S-B PowerTool Co., 4300 W. Peterson Ave., Chicago, Ill. 60646; 800-815-8665), which easily drills  $\frac{7}{8}$ -in. dia. anchor holes in concrete. But SDS bits have relatively skinny shanks that are prone to breakage in larger sizes. Spline-drive and SDS-max ro-



**Four cutters bore faster than two.** Four-cutter bits (right) drill big holes faster and cut through harder concrete aggregates.

tary hammers drive bits that have fatter, sturdier shanks, making them a better choice for the production boring of big holes.

The keyless chucks on SDS rotary hammers are beauties. To install a drill bit, you align the shank so that it enters the chuck and then slide it in until it clicks into place. Bits are removed by pulling back on a collar and yanking them out.

All SDS rotary hammers offer rotary-percussion or rotary-only action. But some models, such as DeWalt's 3/4-in. DW514K (photo right) add a hammer-only mode that allows the use of bull points and chisels for light-duty chipping. This feature is handy for removing broken tiles and old mortar. Other hammer-drill features worth considering include reverse switches that help free stuck bits and allow screws to be removed, slip clutches that prevent kickback when bits jam, idle clutches that don't engage the hammering mechanism until you push on the tool (which is supposed to make parts last longer), electronic speed control for soft starts and constant speed under load and dust-collection systems for tidy workmanship in inhabited spaces.

SDS-shank, three-jaw chucks are available for rotary drilling, but DeWalt's DW553K and Black & Decker's 5053K (Black & Decker, U. S. Power Tools, 701 E. Joppa Road, Towson, Md. 21286; 800-762-6672) don't need them. They come with universal chucks that accept SDS bits and round-shank bits for boring wood, metal and plastic. But they don't offer a hammer-only mode.

If you're looking for cordless convenience, you might consider Bosch's 24-volt model (photo right) or Hilti's 36-volt one (Hilti Inc., P. O. Box 21148, Tulsa, Okla. 74121; 800-879-8000). Unlike their corded variable-speed cousins, these cordless rotary hammers are one speed. This limitation is too bad because variable speed makes it easier to start holes accurately and can limit breakout at exit holes. But these cordless models are surprisingly powerful. The Bosch one that I've used, for instance, bores 5/8-in. dia. holes in concrete in a pinch, and it effortlessly bored eighteen 1/2-in. dia. by 3-in. deep holes in an old concrete slab on a single charge. You can even hook a vacuum to it.

**Spline-drive and SDS-max rotary hammers tackle the toughest jobs**—Spline-drive rotary hammers (photo right) are the current heavy-



**Rotary hammers eat concrete.** Rotary hammers have built-in battering rams that break up the toughest concrete aggregates. From top to bottom: DeWalt DW514K SDS rotary hammer; Bosch 11213R 24-volt cordless SDS rotary hammer; and Bosch 11214 VS spline-drive rotary hammer.

weight champions. Their hammer blows are about twice as mighty as those delivered by SDS rotary hammers, resulting in even faster boring of big holes in concrete. Consequently, they cost about \$450 to \$750.

Unlike SDS rotary hammers, spline-drive rotary hammers don't even pretend to be rotary drills. You won't find rotary-only action or even reverse switches on these tools. Instead, they either come with rotary-hammer action only, or they add hammer-only action for light demolition and for setting self-drilling anchors.

I've talked with a slew of tradespeople who depend on spline-drive rotary hammers, and they all say the same thing: Bigger is better. Paul Bourke, a custom builder in Leverett, Massachusetts, owns a top-of-the-line Makita HR5000 rotary hammer. It's a 2Mb. spline-drive monster that will punch a 2-in. dia. hole in concrete with a spiral bit or a 5/8-in. dia. hole with a core bit. According to Bourke, "It solves concrete problems." So far, the tool has bored utility holes and anchor-bolt holes in foundation walls, punched a hole in an existing slab to make way



**Hammer drills bore virtually anything.** Hammer drills such as Makita's cordless 8411D (top) and Hitachi's DV 20V2 (bottom) work as standard drills, but they can also supply thousands of small hammer blows per minute over rotary action to speed drilling in concrete, masonry and stone.

for a sump pump and demolished concrete. One worker hammered a 2-ft. by 8-ft. opening in an 8-in. thick concrete wall with it in half a day.

Veteran Arlington, Virginia, remodeler M. Scott Watkins uses a Milwaukee 1½-in. spline-drive rotary hammer (Milwaukee Electric Tool Corp., 13135 W. Lisbon Road, Brookfield, Wis. 53005; 414-781-3600) to bore holes for lead shields and lag bolts, dowel new foundations to old ones with short lengths of rebar, run ductwork through brick and block walls, and accomplish small demolition jobs, such as taking apart brick piers

and stoops. For big demolition jobs, Watkins rents a demolition hammer for about \$45 to \$60 per day.

David Grammer, president of Stone Ridge Radon in Chester, New Jersey, tells me that his company uses big rotary hammers to run 3-in. to 6-in. dia. PVC vent pipes through slabs and foundation walls. And Bosch's biggest spline-drive rotary hammer lets a local concrete man anchor forms to bedrock and existing concrete. On weekends, he chucks a splineshank spade in it and uses it to plant fruit trees.



**Rebar cutters save bits and bores.** Relton's rebar cutter gnaws through rebar, eliminating the need to relocate holes.

SDS-max rotary hammers cover pretty much the same ground as spline-drive models. They were developed jointly a few years ago by Bosch and Hilti (which calls it the TE-Y system), and they do have some minor advantages. SDS-max chisels, for instance, can typically be locked into several different positions to give the best working angle, while spline-shank chisels can't. At the moment, Black & Decker, Bosch and Hilti are the only companies I know of that make SDS-max rotary hammers.

Generally, deluxe features offered by SDS rotary hammers are also available for spline-shank and SDS-max models. Black & Decker, Bosch, Hilti, Metabo (Metabo Corp., P. O. Box 2287, West Chester, Pa. 19380; 800-638-2264) and Milwaukee are the only companies I know of that make variable-speed models.

**Concrete and masonry drill bits**—Most ⅛-in. to 1½-in. dia. masonry bits made in the United States and Europe comply with ANSI (American National Standards Institute) standards, which means they drill slightly oversize holes that grip masonry anchors according to published design specifications. Installing standard anchors in non-ANSI holes could cause them to fail in critical applications.

Masonry bits that are designed for rotary-only drilling generally have harder, sharper and brittler carbide tips than rotary-percussion bits do. Rotary-only bits shave materials, but they don't tolerate percussion.

The throwaway rotary bits stocked by hardware stores come with fast-spiral flutes (which resemble bolt threads) and those shiny zinc coatings (photo 2, p. 89). The bits perform pretty well in masonry, tile and soft-aggregate concrete. But forget boring hard aggregates, rain-soaked masonry or even the occasional piece of wood with them. Hard aggregates stop them cold, and wet masonry or wood can clog the flutes and cause the bits to overheat or break. Also, running these bits at high speeds can bend their shanks.

Professional-grade rotary bits don't have shiny zinc coats, and they come with sturdy shanks and with the highest quality carbide tips, some of which are serrated for faster cutting. These bits are designed for boring in fragile masonry.

Galaxy (Galaxy Industries Inc., 231 Jandus Road, Cary, Ill. 60013; 800-323-7595), New

England Carbide (New England Carbide, 2808 Highway 82 West, Unit #3, Northport, Ala. 35476; 800-225-0740) and Relton (Relton Corp., P. O. Box 60019, Arcadia, Calif. 91066; 800-423-1505) make the heaviest duty round-shank rotary bits I know of. Relton's seismic bits (photo 2, facing page) bore holes in old brick walls to admit resin-type anchors that help prevent collapse during earthquakes. The bits measure up to 1 in. in dia. (2½-in. dia. bits can be special-ordered) and 24 in. long. The 1-in. bits cost up to \$165. SDS-shank versions are sold by Relton and Hilti.

Rotary core bits cut even bigger holes. They come with center pins or pilot drills that get the holes started, then are removed. New England Carbide's and Relton's core bits have maximum diameters of 3 in., and Galaxy's bits have maximum diameters of 6 in. These bits are ideal for radon work or jobs that require the running of pipes or vents through fragile masonry walls.

**Hammer-drill bits are versatile**—Most hammer-drill bits have a black industrial finish, work with or without percussion for boring hard or brittle materials and cost between \$2.50 and \$50. Their relatively blunt carbide tips allow them to bore quickly without disintegrating in the hammer-drill mode but tend to make them slow-pokes in the rotary mode.

Chicago Pneumatic's hammer-drill bits (photo 3, facing page) typify the top of the line. They come with diameters up to 1 in. and lengths up to 20 in. Combination hammer-drill bits such as Bosch's Multi-Purpose bits (photo 3, facing page) and Black & Decker's Multi-Material bits drill metal, wood and plastic, plus masonry. These handy bits, for instance, allow you to bore a pilot hole through a steel doorjamb in the rotary mode and then switch to the hammer-drill mode to finish boring through concrete block.

ITW's Tapcon system (photo 3, facing page) (ITW Brands, 226 Gerry Drive, Wood Dale, Ill. 60191; 800-982-7178) might be one of the most useful hammer-drill accessories around. It includes hammer-drill bits that bore pilot holes for Tapcon screws, plus an installation tool that quickly slips over the bits to drive the screws. The system installs about three screws per minute.



**If you can't drill it, break it.** Rotary hammers with hammer-only action can power a variety of chisels for light to medium demolition.

**Rotary-hammer bits have heavy-duty shanks that fit particular rotary hammers**—

Most rotary-hammer bits have either SDS, SDS-plus, SDS-max, Hilti TE-C+ Hilti TE-Y, spline, A-taper, B-taper or hex shanks. Don't worry. This riot of shank types is really far less complicated than it seems.

SDS, SDS-plus and Hilti TE-C+ shanks are identical (photo 4, facing page). They have two grooves and two slots that are gripped by two roller balls and two drive splines inside SDS chucks. Spiral-fluted SDS bits have diameters ranging from 5/32 in. to 1 in. I've seen stock lengths up to 38 in., but Hilti's bits can be special-ordered in lengths up to 51 in. List prices range from about \$6.50 to \$115.

Hilti also makes SDS-shank cruciform bits that increase the capacity of SDS rotary hammers. Cruciform bits have a built-in pilot drill surrounded by several carbide teeth that pound concrete into submission. The bits bore holes

with diameters ranging from 1½ in. to 1½ in., and they're long enough (10 in. to 18 in.) to go through most foundation walls.

Still larger holes can be bored using Bosch, Hilti and Milwaukee SDS-shank, thin-wall core bits. The maximum diameter of these bits ranges from 3½ in. to 4 in., with list prices starting at around \$100. Core bits are just a few inches deep, so boring deep holes without bottoming out requires that the concrete core be broken out repeatedly with a hammer and a chisel (or with a chisel chucked in the rotary hammer).

Pivoting SDS right-angle attachments made by Bosch and others allow you to bore holes in confined spaces. They deliver 90° rotary-hammer action at about a 40% loss in impact force.

SDS-max and Hilti TE-Y shanks are identical, too. They're similar to SDS shanks, but they have a much beefier cross section and an extra driving slot for heavier duty work (photo 4, facing page). The bits fit all of Hilti's and some of Bosch's and Black & Decker's 1½-in. and larger rotary hammers. Diameters range from ½ in. to 2 in. for spiral bits; 1½ in. to 3½ in. for through-hole bits such as Hilti's TE-Y cruciform bits; and 1½ in. to 6 in. for core bits. The spiral-fluted bits list for about \$65 to \$280. Prices for cruciform and core bits go sky high.

Spline-shank bits (photo 4, facing page) fit the rest of the 1½-in. and larger rotary hammers on the market. They come in roughly the same shapes and sizes as do SDS-max bits.

Spline shanks have 12 drive splines, so they absorb plenty of punishment. Two of my favorite spline-shank bits (also available in SDS-max versions) are Bosch's one-piece Thru-Hole bit and Chicago Pneumatic's modular Turbo Tunnel bit (photo 1, facing page), both of which resemble Hilti's Cruciform bits. Turbo Tunnel bits come with a separate drive shank, fluted shaft and drilling head, allowing you to customize your own bit. If a shaft breaks or a head wears out, you need only replace one part instead of the whole bit. This feature can save \$100 in replacement costs.

Heavy-duty core bits are also available for boring big holes (photo 1, facing page). And if you have a rotary hammer with a hammer-only

**Drilling tips**

- To make a hole that stretches the capacity of your drill, first bore a pilot hole that's about half of the diameter of the finished hole.

- Establish hole centers with a center punch to prevent drill bits from walking.

- To bore a big hole without using a through-hole or core bit, draw a circle at the hole location, bore a series of small holes around its circumference and then knock out the core with a sledgehammer or with a slotted chisel chucked in a rotary hammer.

- Most masonry bits can't bore rebar without damaging their carbide cutters. If you hit rebar, the best bet is to relocate the hole or to bore through with a rebar cutter. Relton makes ½-in. to 2-in. dia. rebar cutters (carbide-tipped rotary-drill bits) (right photo, p. 87) that list from \$42 to \$199.

- If hard concrete aggregate impedes progress, withdraw the drill bit, break the aggregate with a drift punch and a hammer, and keep drilling.

- Boring deeper than a spiral bit's flute length can trap debris

- in the hole and cause the bit to overheat, which can loosen carbide tips, or cause it to bind. Regardless of flute length, withdraw bits often when boring deep holes to scoop out debris and dust.

- Before installing an anchor in a hole, vacuum out debris, or blow it out using plastic tubing, compressed air or a blow-out bulb. Bosch, Makita, Metabo and others sell blow-out bulbs.

- Pouring water into a hole to settle dust while you're drilling can cause drill tips to fracture and can cause binding.

- If a drill bit gets stuck in a hole, try using a larger drill to break it free, back it out with a pair of 10-in. or longer locking pliers or, as a last resort, drill adjacent holes and break out the concrete.

- Keep the shanks of rotary-hammer bits clean and lightly lubricated to minimize their wear. Both Bosch and Makita sell bit grease.

- Always wear safety glasses and earplugs when boring concrete, masonry or stone. If you kick up dust, wear a dust mask, too.—B. G.

mode, keep in mind that most manufacturers sell a host of bull points, chisels and even ground-rod drivers (photo facing page).

**Four cutters are better than two**—Spiral-fluted spline-shank and SDS-max bits usually have a single bar of carbide embedded in the cutter-head that's ground to a point to produce two cutting edges (left photo, p. 86). But for 10% to 15% more money, you can buy  $\frac{5}{8}$ -in. to 2-in. dia. bits that have four cutters instead of two. According to manufacturers that I've talked with, four-cutter bits drill faster, produce rounder holes, cut through the hardest concrete aggregates, fare better when they strike rebar, reduce noise and vibration, increase bit life and draw less amperage. These advantages are supposed to appear the most pronounced when you are boring large-diameter holes.

Bosch is the only manufacturer I'm aware of that now offers SDS-shank four-cutter bits. The bits come in diameters ranging from  $\frac{3}{4}$  in. to 1 $\frac{1}{2}$  in.

**Offbeat rotary-hammer bits fit old drivers, cost less or both**—A-taper and B-taper bits fit old industrial machines. But by using the right adapter, you can plug one of these bits into almost any rotary hammer (photo 4, right). A-taper bits bore holes with diameters ranging from  $\frac{3}{16}$  in. to  $\frac{7}{8}$  in., and B-taper bits bore bigger holes with diameters ranging from  $\frac{1}{2}$  in. to 1 $\frac{1}{2}$  in.

Tapered bits cost less than other types in equivalent sizes, which is why some builders prefer them. A-taper bits list in price from about \$10 to \$70, with adapters costing up to \$50. B-taper bits list from about \$20 to \$125, with adapters costing as much as \$70. Incidentally, adapters are available for most other types of shanks, too. According to Bosch, the use of adapters generally causes a 10% to 15% power loss and a 15% to 20% increase in bit wear.

Hex-shank rotary-hammer bits are almost dinosaurs. They fit discontinued hex-drive rotary hammers. But if you happen to get stuck with one of these old machines, take heart that you can still buy high-quality bits to fit them from several sources, including Galaxy, Milwaukee, New England Carbide and Relton.

**Hire a specialist to bore the biggest holes**—

If you need to bore a hole in concrete that's too big to handle, you can do what John Starr and Napa, California, rammed-earth builder David Easton routinely do: Call in a contractor that specializes in concrete cutting and coring. These outfits bore smooth, large-diameter holes in concrete using diamond core bits driven by industrial drilling rigs. Or they can cut openings of any size in slabs and walls using heavy-duty circular saws with diamond-tipped sawblades. Cost is tabulated according to diameters and depths of holes, or to depths and lineal footage of sawcuts.

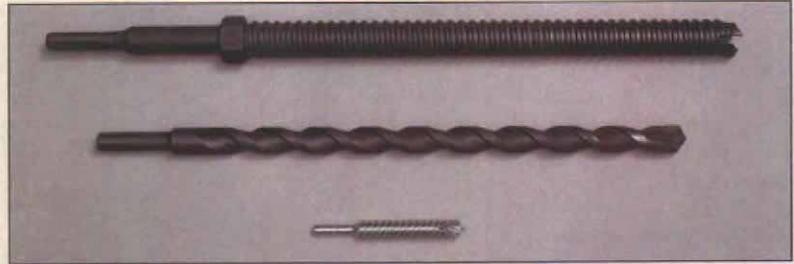
Cutting and coring contractors are listed in my local Yellow Pages under "Concrete Breaking, Cutting, Sawing, Etc." □

*Bruce Greenlaw is a contributing editor of Fine Homebuilding. Photos by the author.*

**Tough bits for hard materials**



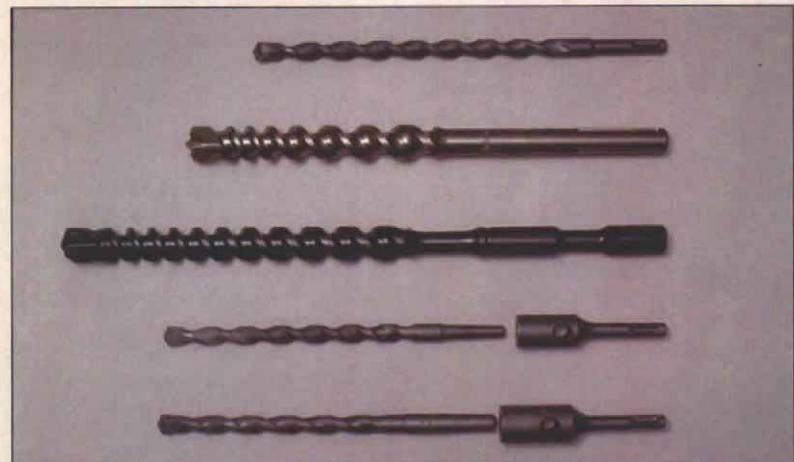
**1. Specialty bits bore the biggest holes.** Chicago Pneumatic's three-piece Turbo Tunnel bit (top) can be customized or rebuilt piece by piece. Bosch's Thru-Hole bit (center) comes in one piece. Bosch's core bit (bottom) bores large-diameter holes.



**2. Rotary bits don't break fragile materials.** From top to bottom: Relton multiple-cutter bit bores glazed-brick walls to accept seismic anchors; Relton single-cutter seismic bit bores brick walls; and standard masonry bit bores soft-aggregate concrete.



**3. Hammer-drill bits bore where other bits won't.** ITW's Tapcon system (top) combines drilling and driving; Chicago Pneumatic's round-shank hammer-drill bits (center two bits) bore through wood before attacking concrete and masonry; Bosch's Multi-Purpose bit (bottom) bores sheet metal, wood, plastic and masonry.



**4. Fat shanks take more abuse.** SDS-max and spline-shank drill bits have much thicker shanks than SDS bits do, so they're less apt to break. Adapters allow A-taper and B-taper bits to be used with any rotary hammer. From top to bottom: Relton SDS spiral bit, Bosch SDS-max spiral bit, AEG spline-shank spiral bit, Relton A-taper spiral bit with SDS adapter, Relton B-taper spiral bit with SDS adapter.