4½-in. Angle Grinders

With the right wheel, this versatile tool can cut and shape wood, masonry, or metal

BY DAVID CROSBY

Get a handle on it.
Some grinders have threaded openings for two handle positions, and other grinders offer three positions (chart, pp. 60-61).

Choose your switch
based on the type of work you do. A paddle switch (shown here) is easy to use with a gloved hand and switches off automatically if the tool gets away from you.

An adjustable safety guard
lets you cover different sections of the wheel. Guards that use a detent or thumb-latch system are easiest to adjust. Some wheels require the use of special guards.

The wheel does the work,
and there's a vast selection of wheels available for use on different materials.

USING AN ANGLE GRINDER

Whether your task is quick and dirty or delicate and precise, two basic angle-grinder techniques lay the groundwork for dozens of specific tasks.

When using a grinder for **cutting**, make sure the wheel comes to full speed before entering the workpiece, and cut with the wheel at 90° to the surface.


Cutting


Grinding

If you're **grinding** or blending, the wheel should contact the surface at 5° to 15°. Going steeper can cause gouging. Use the same technique when sanding or polishing.

For information on choosing an angle grinder, see the **buyer's guide on pp. 60-61.**

The four most expensive words in construction are "I can fix that." When problems come up unexpectedly in a construction project, I'll do just about anything to make the fix faster. That's why I keep three 4½-in. angle grinders in my truck, all equipped with different wheels.

Basic angle-grinder techniques aren't difficult to master. If you select the right cutting or grinding wheel, you'll be surprised how much work you can do with this compact power tool. Whether you need to cut a concrete block, trim rebar, remove a damaged tile, or turn a rusty surface into shiny steel, an angle grinder can get the job done.

Angle grinders are categorized by the largest-diameter attachment they are designed to accept, and metalworkers often choose 7-in. and 9-in. models. But a 4½-in. grinder has more than enough muscle for most home-building applications. Features may differ, but all angle grinders share the same basic anatomy (photo facing page).

Safety gear is essential

I used to wear standard safety glasses when grinding, but I discovered that particles would hit my face, bounce off the back of the lenses, and land right in my eyes. Now I wear a face shield, but fully enclosed goggles are also a good choice.

I strongly recommend wearing a respirator or dust mask when using a grinder. It's also good practice to blow compressed air through the tool to clean out accumulated grit and dust from time to time.

These tools aren't excessively loud, but ear protection is always a good idea. Standard earmuffs or foam plugs do the job nicely.

Of course, safety gear is just the first part of safe grinding. It's also crucial to use the right abrasive wheel and the correct technique.

Match the wheel to the task

Abrasive wheels are what make an angle grinder such a versatile tool. Thanks to advances in abrasive technology, manufacturers now offer an impressive variety of grinding wheels, most of which are engineered to perform specific tasks. To get the most from your angle grinder and to work safely, you need to select the right wheel for the job at hand.

The universe of angle-grinder wheels divides logically into four groups: cutting wheels,

A sensitive touch is essential when using an angle grinder. Just a slight change in pressure can increase material removal significantly. This is true no matter what abrasive wheel you're using. A 60-grit or 80-grit flap wheel (shown here) does a good job of coping trim. For best results, work from the back of the molding toward the front so that you can creep up on the final profile. Don't expect the grinder to get all the way into sharp corners; you'll have to do this work with a utility knife or a chisel.

For aggressive stock removal with a Lancelot or Arbortech carving blade, make sure you have a firm grip on the grinder. Otherwise, the teeth on these wheels can grab the workpiece and jerk the tool out of your hands.

SPECIALTY WHEELS FOR WOOD

Replaceable carbide cutters on the **Arbortech** (www.arbortech.com) make this blade ideal for use on wood that may contain metal; it's great for pressure-treated lumber and general shaping. Cost: $110.

Built like a chainsaw, the **Lancelot** (www.katools.com) is designed to remove stock quickly. But embedded metal will ruin this $40 blade in a hurry.

Available in different grits, **flap wheels** can remove wood quickly and accurately. They also work well on masonry and metal. Prices begin around $7.

Drawings facing page: Wayne Clark

grinding wheels, wire wheels, and specialty wheels. Cutting and grinding wheels have more variations than the other types because different abrasives and levels of coarseness are required for different materials and applications.

The rule of thumb when choosing and using wheels is never grind with a cutting wheel and never cut with a grinding wheel. Some wheels require the grinder's standard guard to be replaced with a specialized guard. Make sure to follow manufacturer's recommendations for the best results.

Success comes with an angled attack and lots of practice

There's no doubt that an angle grinder requires some getting used to. Selecting the right wheel is essential, but when you get down to doing the work, only two basic techniques really apply.

When using grinding, sanding, cleaning, or polishing wheels, hold the tool at a 5° to 15° angle. Too great an angle causes concentrated pressure on smaller areas and can lead to gouging and burning of the worksurface. Best results come when you apply steady, uniform pressure during use.

When using the grinder for cutting, allow the wheel to come to full speed before starting the cut. Make sure to cut at a 90° angle to the worksurface using only the edge of the cutting wheel. Although most folks associate angle grinders with heavy-duty grinding and cutting assignments, these tools are capable of fine, exacting work as well. In experienced hands, a grinder can be used to cope moldings, scribe-fit tile and trim, and shape wood handrails.

What to look for in an angle grinder

If you're in the market for an angle grinder, resist the temptation to buy a bargain-priced model. The eight grinders reviewed below are two or three times as expensive as some of the cheaper models you'll find, mainly because of features you can't see: powerful motors, high-quality sealed bearings, and well-machined gears. Taken together, these features mean longer tool life and better performance.

One of the first things you'll need to decide is what type of switch will be best for you. Most manufacturers offer a choice of a paddle or a slide switch, but I prefer a paddle for most jobs. You'll find it on the Bosch, DeWalt, Milwaukee, and Metabo models reviewed here. If your grinding work calls for long run times, you might want a slide switch because it keeps the wheel turning no matter what grip you're using on the tool.

BUYER'S GUIDE

4½-IN. ANGLE GRINDERS

The eight angle grinders featured here are the best models available for home-construction and remodeling work. You'll find less-expensive models for sale that appear to have comparable features, but don't be fooled. An angle grinder is fairly useless without a good motor or quality gears and bearings, and these unseen components are not up to snuff on cheaper machines.

	BOSCH 1710	DEWALT DW402	HITACHI G12SA2	MAKITA 9564CV
	www.boschtools.com 877-267-2499	www.dewalt.com 800-433-9258	www.hitachipowertools.com 800-706-7337	www.makitatools.com 800-462-5482
Weight	4.3 lb.	4.5 lb.	4.2 lb.	4.0 lb.
Guard adjustments	Thumb latch	Screwdriver	Screwdriver	Thumb latch
Switch type	Paddle (lock on)	Paddle (lock on)	Slide (top)	Slide (side)
Handle	Two positions	Three positions	Two positions	Two positions
Wheel changes	Good	Fair	Good	Good
Balance and feel	Good	Good	Good	Excellent
	Well-constructed, solid tool that operates smoothly. Raised-spindle lock is easy to use. Has toolless guard and vibration-dampening handle. **Price $80**	*Short and lightweight tool for occasional use. Lock-on switch is not as easy to use as others. Optional three-wire grounded cord available.* **Price $80**	*Larger and more powerful than most; suitable for heavy use. Comes with compact plastic case that lacks storage room for wheels and accessories.* **Price $90**	AUTHOR'S BEST OVERALL CHOICE *One of the lightest models tested, but more powerful than most. Both smooth and quiet. Soft-start feature reduces operator fatigue; also has variable-speed control (2,800-10,500 rpm). Overall, an outstanding tool.* **Price $165**

masonry

To make a straight cut or closely follow a line in thick, dense material like this bluestone, it's best to use a diamond wheel. Cut a shallow pass first so that you have an easier time controlling the blade. Then deepen the cut with successive passes. Concrete, tile, and most natural stone will break along a scored line, so it's not necessary to cut all the way through the material. Clean up a broken edge by smoothing with a flap wheel or a composite grinding wheel.

Masonry dust is messy and hazardous to breathe, so work with a partner who can keep a shop-vacuum nozzle close to the wheel as you're cutting (see "Tips & Techniques," p. 30). This is especially true if you're working indoors.

AFFORDABLE DIAMONDS

Diamond blades are surprisingly inexpensive (prices begin around $10). They can make precise cuts in any type of masonry, including stucco and plaster.

Available in a wide variety of profiles and grits, **composite wheels** are the economical choice when accuracy is less of a concern. Prices start around $2.

Made for heavy stock removal, the stout design of a **flared-cup wheel** (prices start around $6) is especially suited to smoothing rough concrete. A cup wheel usually requires a special guard.

4.0 lb.	4.9 lb.	4.4 lb.	5.0 lb.
Screwdriver	Detents	Allen wrench	Screwdriver
Paddle (nonlocking)	Paddle (lock on)	Slide (side)	Slide (top)
Two positions	Three positions	Three positions	Two positions
Excellent	Good	Good	Good
Excellent	Good	Excellent	Good

METABO WPS 7-115

www.metabousa.com
800-638-2264

Smooth, powerful, well-constructed, generally a superb machine. Toolless arbor nut is outstanding. Features safety clutch and restart safety devices. Auto-stop brushes shut down tool when maintenance is required.

Price $140

MILWAUKEE 6148-6

www.milwaukeetool.com
800-729-3878

Steel case has plenty of storage room. Handles and switch accommodate many tasks. Detents allow for quick, easy guard adjustments.

Price $100

PORTER-CABLE 7430K

www.porter-cable.com
800-321-9443

Among the smoothest and quietest; a solid, well-built, no-frills tool. Handle has spanner wrench built in. Well-designed case.

Price $80

RIDGID R1000

www.ridgid.com
800-474-3443

Features a clutch to protect against kickback and tool damage from binding. Plastic case includes storage for accessories. Auto-stop brushes shut down tool when maintenance is required.

Price $90

Other features to consider include the guard, auxiliary handle positions, and the ease of wheel-changing. Being able to change the position of the guard without using a screwdriver or an Allen wrench is also a big plus. The Bosch, Makita, Milwaukee, and Metabo grinders all offer this capability. As you'll see in the chart on pp. 60-61, some grinders have three positions for the handle, while other grinders have two. The importance of an extra handle position really depends on the type of work you do. As for wheel changes, each grinder, except for the Metabo, requires the use of a standard two-pronged wrench to remove the arbor nut. If you buy the Metabo grinder, wheel changes can be made quickly and easily with only hand pressure, no other tool required.

Of the eight grinders I tested, the Makita earns my vote as best overall, with the Metabo following close behind. Light but powerful, the Makita also was comfortable to use because of its soft-start feature. Variable speed comes standard, offering additional control and the ability to run a broader range of wheels and accessories. □

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FROM RUST REMOVAL TO POLISHING

Flex wheels fit into places regular wheels won't and are great for working on inside corners or removing broken bolts. Cost: around $5.

Thin, flat **cutoff** wheels have abrasive grains along the outside edge only. Match the wheel to the material you need to cut. Cost: $2 and up.

The abrasive grains of a composite **grinding wheel** are bonded to the face of the wheel and are great for grinding and blending. Prices start under $2.

Wire wheels and cup brushes are excellent for rust and burr removal; they also can strip paint from metal or prepare metal to be painted. Priced from $16.