A Guide to Modern Wood Screws

They're stronger, easier to drive and hold a lot better, too

BY AIMÉ ONTARIO FRASER

The traditional, cut-formed wood screw, which is commonly called a tapered wood screw, has changed little since it was first made by machine more than 100 years ago. Walk into any hardware store or home center, and you will find it in a wide range of sizes and lengths.

In recent years, however, a new breed of wood screw has come along. Because of the way it's designed and built, this modern wood screw enjoys several advantages over the traditional version. Although the acceptance of this screw by the general population has been somewhat slow, as time goes by, more woodworkers are learning to appreciate all of those advantages.

It's not difficult to tell the old and new apart when you see them side by side. The most obvious difference is at the shank. On a traditional wood screw, the shank diameter and the major thread diameter (the outside diameter of an outside thread) are the same. But on a modern wood screw, the shank diameter is smaller than the major thread diameter. That's one of the main reasons why modern screws are easier to drive. They also have fewer yet sharper threads formed at a steeper lead angle, and almost always have a drive that's either square (Robertson) or Phillips, or a combination of the two. A star (Torx) drive is used sometimes, too. And the drive options continue to grow as some manufacturers develop their own drives.

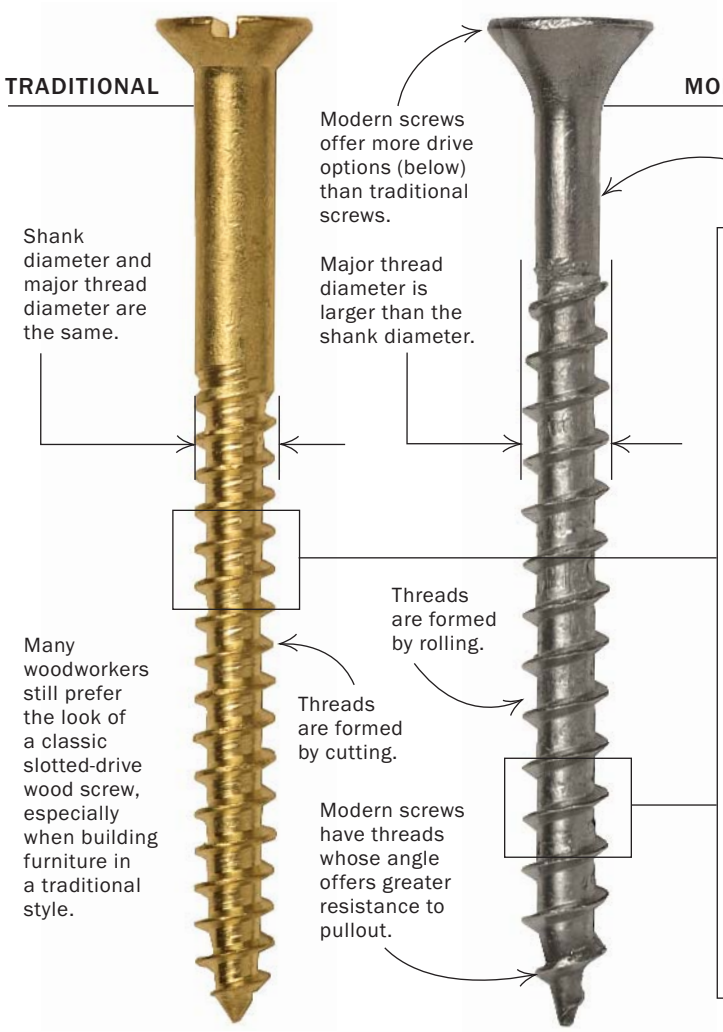
By the way, be careful not to confuse modern screws with drywall screws. That's easy to do, mainly because drywall screws have all of the general characteristics just mentioned. And for some woodworking applications, drywall screws are okay. However, because they lack some important qualities found in modern wood screws, drywall screws are not usually the best choice. For example, drywall screws don't have special tips (see the facing page), so they are considerably harder to drive, and

Photos: Michael Pekovich

MODERN SCREWS OFFER A VARIETY OF FEATURES

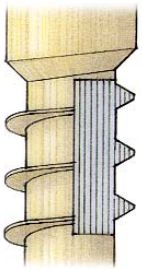
TRADITIONAL VS. MODERN WOOD SCREWS

Some of the differences between a traditional (left) and modern (right) wood screw are obvious.



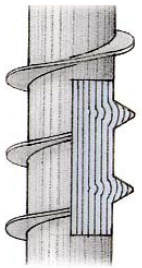
ROLLED THREADS VS. CUT THREADS

CUT



Cut threads sever grain lines in the alloy, resulting in short grain that is more likely to break.

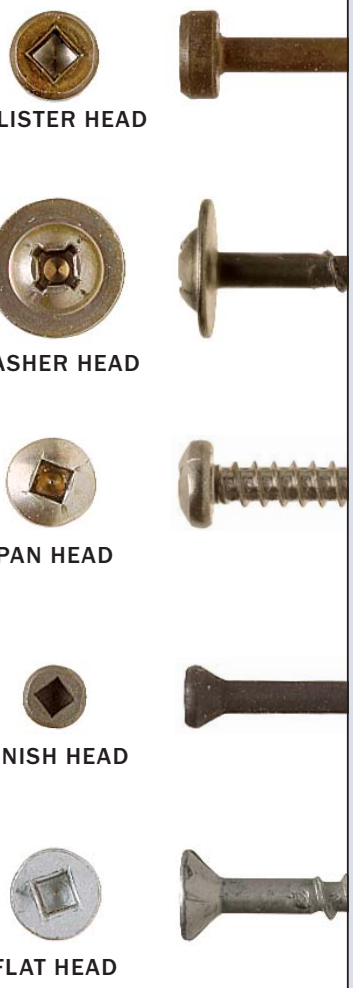
ROLLED



Rolled threads are stronger than cut threads. The grain of the alloy follows the profile of the threads and is less likely to break.

HEAD OPTIONS

Several different types of heads are available.

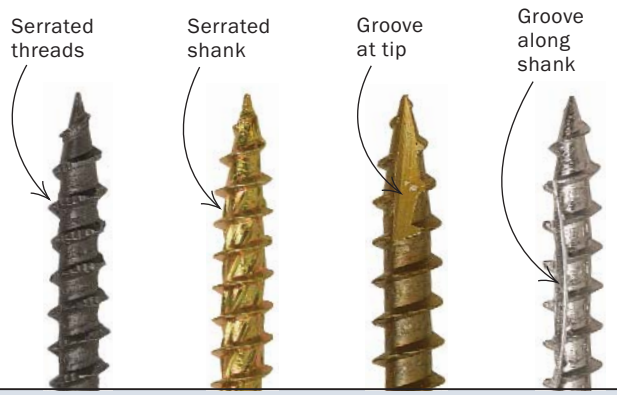


DRIVE CHOICES

Drives on modern wood screws are well suited for use with a drill driver. Drives include (from left): Phillips, square (also called Robertson), combination and star (also called Torx).

NO MORE PILOT HOLES

To eliminate the need for a pilot hole, many modern wood screws are self-driving. Various serrations and grooves help ease the screw into the wood.



Drawings: Vince Babak

Modern screws like man-made materials, too. *With sharp, coarse threads, modern screws work better than traditional screws in MDF, particleboard and plywood.*

they're more brittle, so they break more easily. Also, the threads extend from the tip to the underside of the head, which can create assembly problems related to bridging (for more on bridging, see the facing page).

After a few years of using modern screws, I've concluded that they outperform traditional screws in a number of ways. The thread angle, or pitch, is higher on modern wood screws, meaning they can be driven faster because the screws reach full depth with fewer revolutions. That's a plus when you have a lot of screws to drive. Of course, the high pitch requires more torque, but with the right drive, you can apply plenty of turning force without much fear of damaging the drive or having the tip slip out and mar your work.

Most modern wood screws have special tips or serrated threads that, in many cases, eliminate the need for a pilot hole. Keep in mind that this self-drilling feature isn't found on all modern screws, and those that have it don't work perfectly in all woods or in all situations. For example, when drilling in woods that are particularly hard, or where the screws are near the ends of a board, you'll need to drill pilot holes to prevent the screws from breaking or the wood from splitting. That said, though, it's possible to screw #10 by 2½-in.-long modern wood screws into some hardwoods without drilling any pilot holes.

Because the threads on modern wood screws are coarser and deeper, they bite into the wood at an angle that is approximately parallel to the wood's surface. As a result, when compared with traditional wood screws, modern screws require more force to pull out.

The threads on modern wood screws are stronger than on traditional versions. That's because modern wood screws are formed by rolling the threads out from the shank under high pressure, so the grain of the alloy flows approximately parallel to the surface of the thread. On the other hand, the threads on most traditional wood screws are shaped by cutting. As a result, cut threads end up with short grain that is more likely to fracture.

Because they're made by rolling rather than cutting, modern wood screws can be created from stronger alloys than traditional screws. The pressure exerted during the rolling process adds even more strength to the alloy. As a result, modern screws have higher torque, tensile and shear strength.

If you've ever tried to drive a screw at the outside of your reach, you'll appreciate the fact that many modern wood screws have square drives. Because the four-sided drive provides lots of surface area between driver and screw, you can put the screw on the driver and then maneuver the screw into position without having it fall off the bit. Often called "stick fit," this small detail makes a big difference in ease of use.

Plywood, particleboard and medium-density fiberboard (MDF) are widely used these days, but traditional wood screws don't get a good grip in them. That's not so with modern wood screws. Their sharp, coarse threads enable them to hold well in these difficult materials, so there's no need to keep two different screws on hand for wood and manufactured products. A modern screw works just fine in both.

Manufacturers often customize modern screws in an effort to tweak their performance. For example, some screws contain a dry lubricant, which makes them easier to drive. You can get flathead screws with tiny serrations on the underside of the head that enable the screw to form its own countersink as it is being driven. Modern screws are available in a range of alloys, surface platings and head options. Also, some screws have longer shanks to reduce bridging. Finally, modern wood screws typically cost less than traditional screws, although screws with special features may be more expensive.

Faster, cheaper, stronger and usually better suited to the job at hand—what more could you ask for? Modern wood screws in a variety of sizes are pretty much all you need. □

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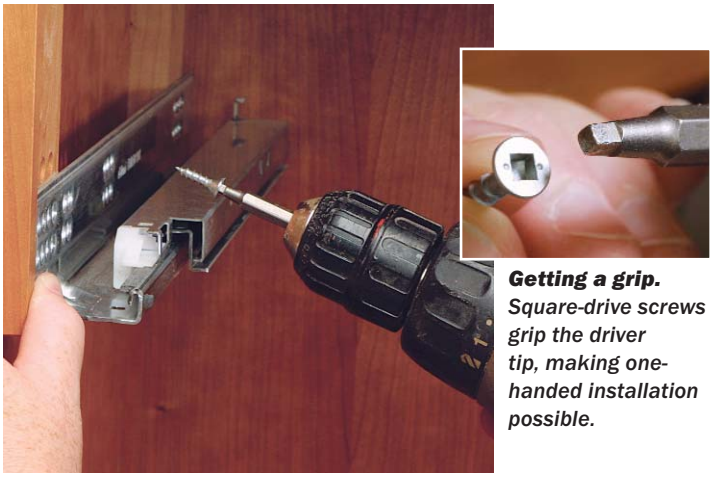


Getting a grip. *Square-drive screws grip the driver tip, making one-handed installation possible.*

Installing modern wood screws

As a modern screw enters wood, the self-drilling tip removes some wood to make way for the screw, but it leaves enough for the thread to bite. The threads cut some wood fibers and crush some others, but for the most part, the wood is compressed; engineers say the wood flows around the threads. The tight contact made with largely intact wood fibers keeps the screw from pulling out.

In dense woods, the fibers don't compress easily. As you drive the screw, the wood has nowhere to go, and it jams around the screw threads so tightly that the force required to turn it may become greater than the screw can handle. When that happens, the screw breaks. Sometimes the screw is strong enough to shove aside the wood, but the fibers won't compress around the screw, and the piece splits. A similar situation occurs when driving screws near the end of a board—there's not enough material to absorb the compressive forces, so the piece splits. In these cases, the only way to get a full-strength joint is by driving a pilot hole to remove a core of wood so that the screw can go all the way in.

Once you've drilled the pilot hole, you should attend to the details of proper screw driving. First of all, if the screw isn't lubricated by the manufacturer, you'll want to add lubrication. Use wax, paint, boiled linseed oil or proprietary mixtures, but use something. This small detail makes your screws much easier to drive.

It takes a lot of power to drive a screw. If you're not situated correctly, you won't have the strength to oppose cam-out, which is the tendency of the driver to rise out of the screw drive as the screw becomes more difficult to turn. The turning driver bounces out of the slot, spins and then falls back into the slot. Not only does cam-out make driving slower, but the hardened-steel driver can damage the screw drive, making it impossible to drive the screw farther in or get it out.

Resist the temptation to mash the trigger and drive the screw at full speed. Turn the high-low switch to low and use a steady, moderate speed to drive the screw until the head is near the surface (at this point the screw becomes most difficult to drive). Then, while pushing down, pulse the drill by quickly pushing the trigger on and off. If you still get cam-out, reposition yourself to allow more downward force on the drill.

Another common problem with modern screws is called bridging, or jacking (right), which occurs when you're screwing two boards together and the threads cross the joint line and bite into the upper piece. Driving the screw causes the parts to separate, and it can be a chore to get them back together. If your pieces don't pull together tightly when the screw is driven to full depth, simply bore another pilot hole in the upper piece with a diameter sufficient to prevent the threads from biting.

SOURCES

HIGHLAND HARDWARE
(800) 241-6748

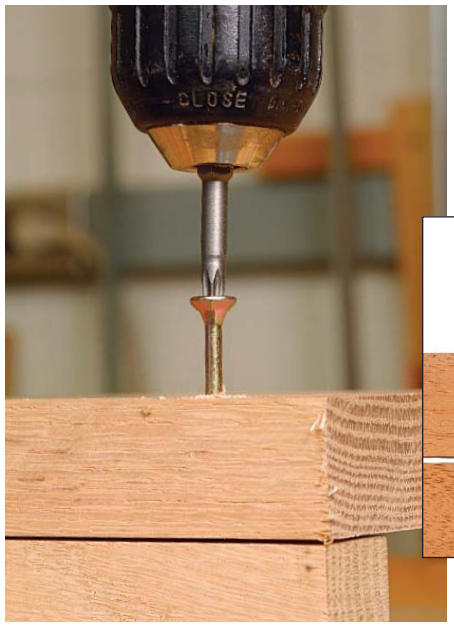
MCFEELY'S
(800) 443-7937

ROCKLER
(800) 279-4441

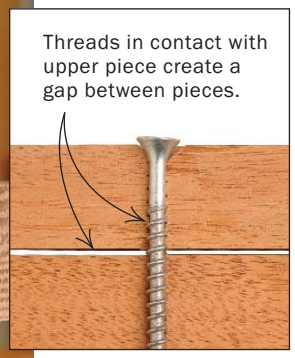
WOODWORKER'S SUPPLY
(800) 645-9292

WOODWORKER'S WAREHOUSE
(800) 767-9999

BRIDGING IS A COMMON PROBLEM



Threads that extend across a joint line can sometimes cause the two parts to separate as the screw is driven home.



PREVENT BRIDGING

Simply drill a hole in the piece that accepts the shank of the screw. The hole should be only slightly bigger than the diameter of the screw thread.