

# All About Chisels



Mortise? Bench?  
Butt? What do you  
need? We tell  
you what the  
catalogs don't

**BY BOB SMALSER**

**A**re you a bit overwhelmed by the array of chisels available today? I've been at this craft since the late 1950s and I still get confused. Back then, I worked part time in my uncle's boat shop, sharpening edge tools and handsaws for two lifelong wooden-boat builders. With generations of family tradecraft behind them, these gentlemen worked primarily with hand tools at a no-nonsense, commercial pace that would astound most modern woodworkers. I've followed in their professional footsteps ever since.

Pick up any two woodworking books and you'll find inconsistencies in the labels craftsmen apply to their chisels. That's because what a chisel is called is generally based on its function, not its shape, and varies depending on the trade, era, or country in which it was used. That said, specific functions require chisels shaped in specific ways. You'll find, for example, that mortise chisels from different cultures and times have similar characteristics. Read on to understand those characteristics and how they relate to the chisels sold today. I'll also mention a couple of older tools you can only find used.

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# Chisel anatomy

A chisel is a simple tool—just a cutting edge attached to a handle. However, there are subtle differences found in both components. There are two main types of handles, with various designs to prevent them from splitting when struck. And it's crucial to choose a chisel made from good steel with the appropriate bevel for a given task.



TANG HANDLE



SOCKET HANDLE



## GETTING A HANDLE ON THINGS

Chisels come with either tang or socket handles. Tang-handled chisels have a tapered steel shank at one end, similar to that of a file. It's driven into a stepped or tapered hole bored in the handle, with a brass or steel sleeve, or ferrule, fitted to deter splitting. If the tang is bedded in epoxy for a perfect fit and the ferrule is strong, the handle can withstand a good bit of pounding without cracking the ferrule or splitting the wood.

Socket handles were preferred in earlier days because work didn't have to stop when the handle broke; the tradesman simply pounded the socket until he found time to replace the handle. Socket chisels are more expensive to make than tang chisels, but their handles tend to last longer and are replaced easily. Today, they are found only in a few premium brands. Many modern bench and mortise chisels look like they have traditional sockets but really don't—cut the handles off and you'll see they are tang chisels with a socketlike appearance.

The striking end of the heavier-duty chisel often is protected to prolong the life of the handle. This protection can range from leather washers on bench chisels, to steel hoops or striking rings for heavy mallet work.



LEATHER WASHER



STEEL HOOP

## THE TASK DETERMINES THE BEVEL ANGLE

Bevel angles are usually the result of a compromise between sharpness and toughness. Chisels designed to pare thin shavings are ground with shallow, razorlike bevels of 15° to 20°. Whack them with a mallet, and you'll quickly break down that fine edge. Chisels intended for general use are found with 20° to 30° bevels. Mortise chisels are ground with 30° to 40° bevels that support the cutting edge and enable it to stay sharp as mallet blows drive it into the wood. The trade-off is that mortise chisels don't pare as well.

The characteristics of the steel affect the bevel angle. Generally, the harder the steel, the steeper the bevel must be to prevent chipping. Blades laminated with very hard steel at the cutting edge, as found in most Japanese tools, require steeper bevels.

You can add a secondary or microbevel to the cutting edge to make the honing process faster. A secondary bevel is achieved by raising the chisel handle an additional 2° to 5° during honing. Since only a few thousandths of an inch actually does any cutting, why hone the entire bevel every time? Of course, continued honing of only the secondary bevel will, in time, increase its size until the speed advantage is lost. So, on every third or fourth honing, I lower the handle and restore the main bevel on a coarse stone.



PARING CHISEL



BENCH CHISEL



MORTISE CHISEL

# Bevel-edge chisels

Most tool chests house a few bevel-edge chisels, whose angled sides ease working in tight quarters. There is some loss of strength, which doesn't affect, for example, a carpenter's butt chisel that mainly cuts out hinge gains, or a paring chisel that shaves with the push of a hand. Bench chisels will tolerate light mallet blows. Firmer chisels are slightly heavier versions of bench chisels.



BUTT



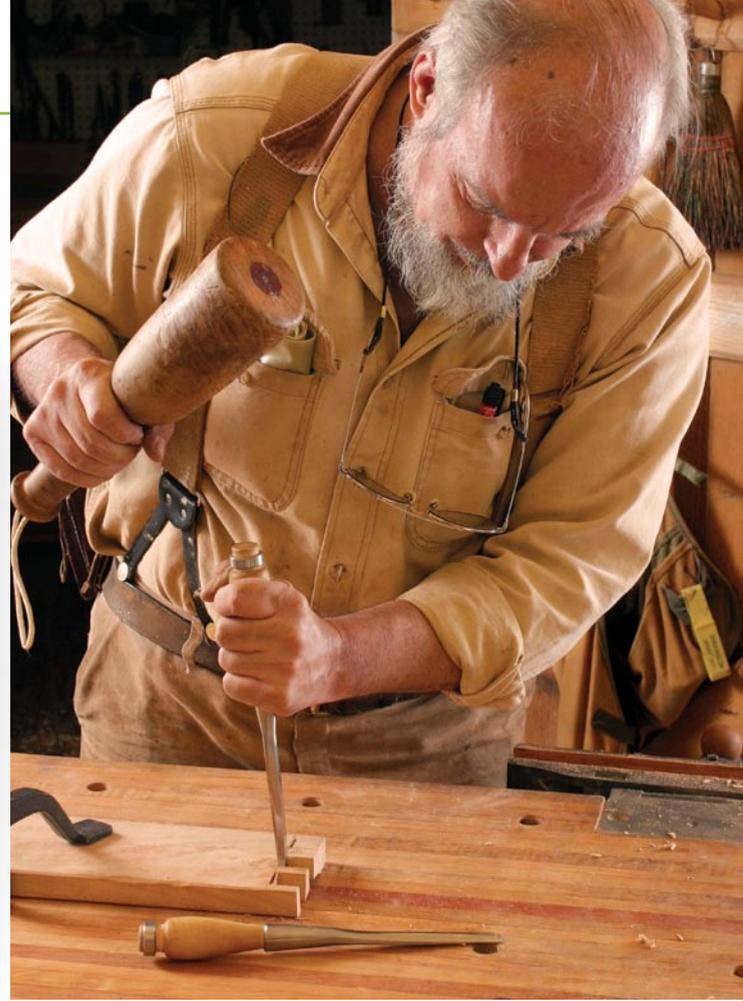
BENCH



PARING



FIRMER



## BENCH AND FIRMER CHISELS: THE WORKHORSES

Bench chisels are basic, all-purpose tools required in every shop. Their cutting-edge bevel of 20° to 30° is a good compromise that can pare tenons, trim dovetails, do light chopping, and cut shallow mortises for hardware. Bench chisels also can be used to square up the sides of deep mortises after the bulk of the wood has been drilled out. Bench chisels often are called bevel-edge chisels, but they're actually a subset. *Bench* implies a longer chisel used and kept at the workbench instead of in a portable carpenter's box or shipwright's chest, where shorter chisels are stored more easily. The longer chisel is easier to hold plumb for accurate cutting, and is preferred where practical.

Over the decades, the label "bench chisel" also has been applied to what we now call firmer and paring chisels. In today's tool catalogs, bench chisel generally refers to a medium-length, bevel-edge chisel with a blade of moderate thickness and strength.

Firmer chisels are the same length or slightly longer than bench chisels but are made of thicker, heavier steel; usually straight-sided, sometimes bevel-edged. Their 30° cutting-edge bevels make them appropriate for paring and moderate striking. They generally have socket handles, but also come in the tang-handled "registered" pattern (like the mortise chisels on p. 50). Firmer chisels are made for fairly hard chopping in heavier stock.



#### **BUTT CHISELS: TOOL-POUCH STANDARDS**

A butt chisel is any short chisel, usually with beveled edges and a design suitable for paring and moderate striking. Its cutting-edge bevel is usually  $25^{\circ}$  to  $30^{\circ}$ . Butt is an archaic word for hinge. These chisels were typically a finish carpenter's or shipwright's pocket chisel, easy to carry and store, with a major role in hanging doors and all-around trimming.

Today, butt chisels are inexpensive tools sold in almost every hardware store. They are important for repair work in spots too tight for bench chisels and too close to nails and other hardware, where you don't want to risk your more expensive bench chisels. Many older butt chisels began life as bench chisels, and as repeated sharpening wore away the length, their tradesmen owners reground them, added new handles, and turned them into butt chisels.



#### **PARING CHISELS: ELEGANT TOOLS FOR FINE WORK**

Longer and thinner than bench chisels, paring chisels have  $15^{\circ}$  to  $20^{\circ}$  cutting-edge bevels. This knifelike bevel can be honed to a fine edge, but that edge doesn't stand up to impact. That's fine, because paring chisels are meant to be pushed, not struck. They are cabinet-maker's chisels made to reach deep into a carcass or drawer to remove small wood shavings for a perfect fit. Paring-chisel blades often are forged with a slight bend in them to provide handle clearance when making a flush cut. They are elegant, lovely tools. Any chisel, however, can be reground into a paring chisel, and through the years many shipwrights, interior joiners, and finish carpenters have carried a short butt chisel with a thinned, finely beveled blade used for light trimming in conjunction with their block plane.

Some paring chisels have severely "cranked" or bent handles for clearance. These were used primarily by pattern makers making negative patterns in soft pine or basswood. If there is no wood carving in your immediate future, then you probably don't need these, as bench or butt chisels used bevel-down can perform many of the same tasks.

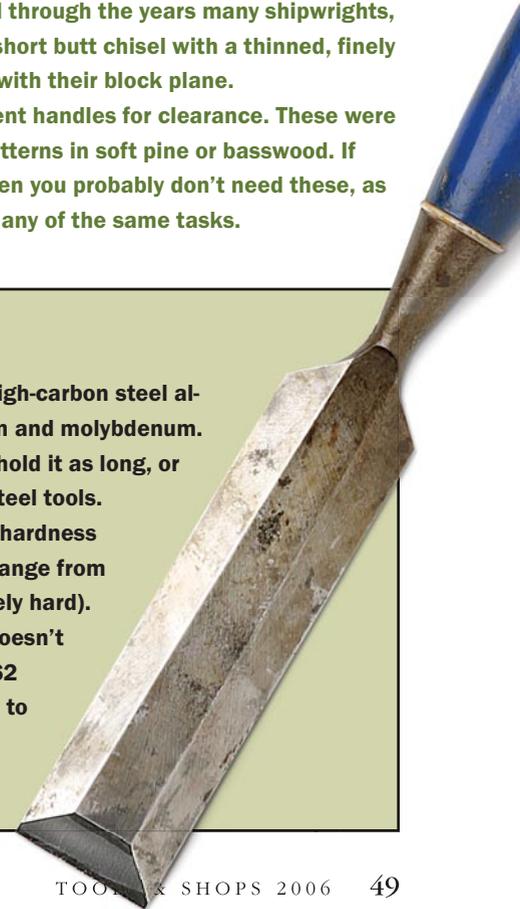
## **THE COLD FACTS ABOUT CHISEL STEEL**

Today, all types of steel are uniform and of high quality, but that wasn't always the case. As a result, trade names from the late 1700s are still used for high-quality steel such as Crucible and Sheffield. These high-carbon steels remain the mainstay of edge-tool production. Properly forged and heat-treated, high-carbon steel takes an excellent edge and sharpens easily.

High-speed steel sometimes is used for chisels. Chromium, tungsten, molybdenum, and vanadium are added to resist softening when overheated. Used primarily in drill bits and lathe tools, this steel holds its cutting edge longer than carbon steel, but is very difficult to hone.

The modern compromise is A2, a high-carbon steel alloyed with small amounts of chromium and molybdenum. A2 blades take a very good edge and hold it as long, or longer, than the best prewar carbon steel tools.

Catalogs often state the Rockwell hardness number (Rc) of their chisels. Chisels range from Rc56 (relatively soft) to Rc64 (relatively hard). Softer steel is easier to sharpen but doesn't hold its edge as long. Steel above Rc62 holds an edge longer but takes longer to hone. It also can be brittle and prone to chipping.



# Mortise chisels

These heavy-duty chisels are designed to chop out mortises without any predrilling.

1



SASH

REGISTERED

MILLWRIGHT

BOLSTERED

Mortise chisels come in several varieties and are generally straight-sided, although some have side bevels for ease in popping out chips. Today's manufacturers often refer to these chisels as "trapezoidal," as the blade looks like a shallow trapezoid when viewed from the working end. All usually are ground with 30° to 40° cutting-edge bevels, because steeper bevels hold their edge better under hard use.

## SASH MORTISE CHISELS: FOR LIGHT CHOPPING

The most common mortise chisel, modern sash mortise chisels are medium length for bench use, generally with unhooped handles. They are intended for relatively light work, and originally were used in window construction, joining relatively thin mullions and muntins to heavier frames. There is some confusion in describing both medium and long mortise chisels as sash chisels. Traditionally, window and millwork factories used longer, heavier chisels. Today, the medium-length tools usually are called sash chisels.

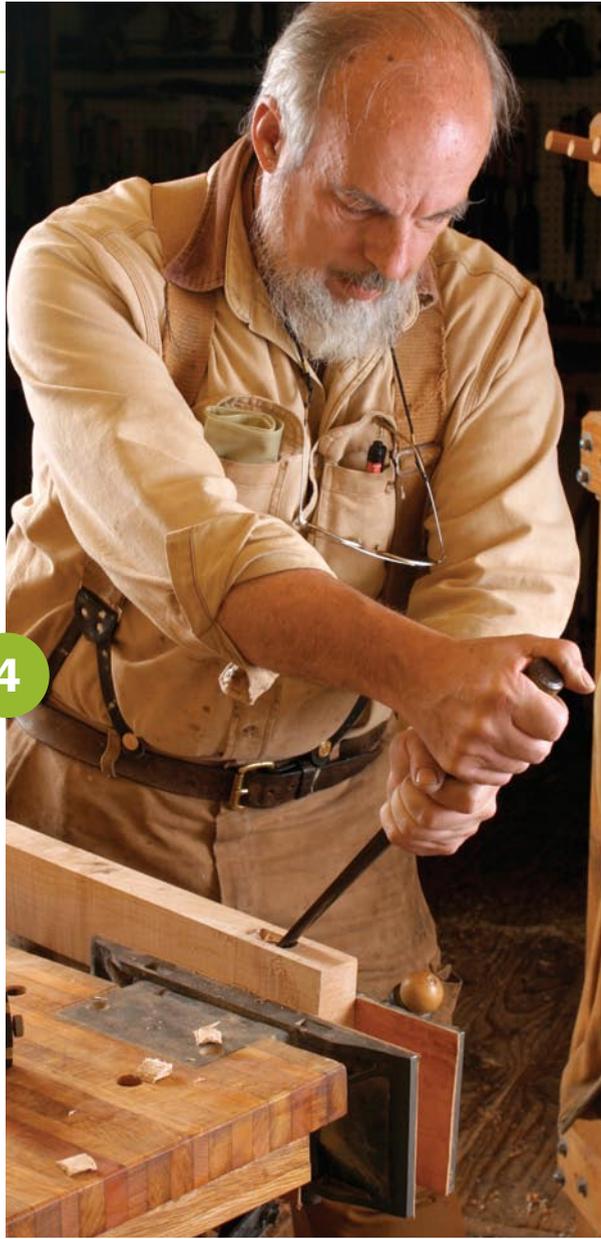
2



3



4



## CHOPPING A MORTISE

Lay out the mortise with a mortise gauge and a marking knife. Take a heavy blow with the chisel held plumb, just inside the knife mark (1). The next blow is taken bevel up (2), the waste levered out (3), and the process repeated from the opposite direction. For clearance as the mortise deepens, make the angled blows bevel down. Clean the mortise by levering the tool along the bottom (4). To support the short grain atop the mortise, leave the workpiece long, and trim it later.

### REGISTERED MORTISE CHISELS: STRAIGHT, SQUARE SIDES

Some manufacturers call these large chisels “heavy-duty sash mortise chisels.” They have heavy blades, square sides, and hooped tang handles for tougher use than many sash chisels can handle. “Registered” simply means that the sides of the blade are perfectly square and parallel with each other, not beveled like many bench chisels or trapezoidal like many bolstered mortise chisels. The square sides are an aid when chopping mortises. Most of the German-made mortise chisels are of this design, as are English “registered” or “shipwright” mortise chisels.

### MILLWRIGHT MORTISE CHISELS: AN AMERICAN CLASSIC

Not made since World War II, many were 18 in. long for ease in holding plumb. Always with hooped socket handles, they were designed for factory hands to use making window sashes and other millwork on a rapid, piecework basis. Combined with a heavy mallet, these rigid mortise chisels stood up to heavy use better

than any chisel I know of. Millwright chisels are common on the used-tool market (they frequently come up for sale on online auction sites such as eBay) but because of their size and appearance, they often are mistakenly called framing chisels. Timber frames in buildings and ships used much larger mortises than the ½-in. through 1-in. widths of these chisels.

### ENGLISH BOLSTERED OR PIGSTICKER MORTISE CHISELS

Still made by Ashley Iles, pigstickers commonly are found on the used-tool market. These short and stubby chisels fit easily in a tool chest and have a thick, unhooped, oval tang handle that’s designed for heavy striking. The handle is mounted against a disk-shaped guard or bolster to absorb the force of the blow. An incredibly tough chisel, pigstickers have been imported for sale to North American cabinetmakers and finish carpenters since before the 1850s. Many have the advantage of being available in ¼-in. increments.



## Specialty chisels

These chisels perform specific tasks, generally for advanced craftsmen whose work requires those tasks often enough to justify the purchase of a special tool. Most of the tasks can be performed adequately, but not as efficiently, with common bench and mortise chisels or other tools in the shop.

### SKEWED PARING CHISELS

These are thin and skew cut to reach into corners, and usually come with tang handles. Bench chisels are converted easily to skewed parers by regrinding to thin the blades and applying 20° bevels to the cutting edges.



### SWAN OR GOOSENECK CHISELS

Designed to deepen or clean up the bottom of a mortise, the curve in the gooseneck's blade functions as a fulcrum, levered against the mortise's sides. Most mortises can be cleaned up just as well with a conventional chisel by anchoring the bevel of the chisel against the mortise end and scraping the bottom. Swan and gooseneck chisels are made primarily for locksets and other mortises too long for that technique.



### DOVETAIL CHISELS

Defined by triangular blades with 20° bevels, dovetail chisels are paring chisels with cranked handles designed to reach into sliding dovetails. Another “dove-tail” chisel is a bench or paring chisel reground by the craftsman to reach into the spaces between dovetail pins instead of using a skewed parer for that task.

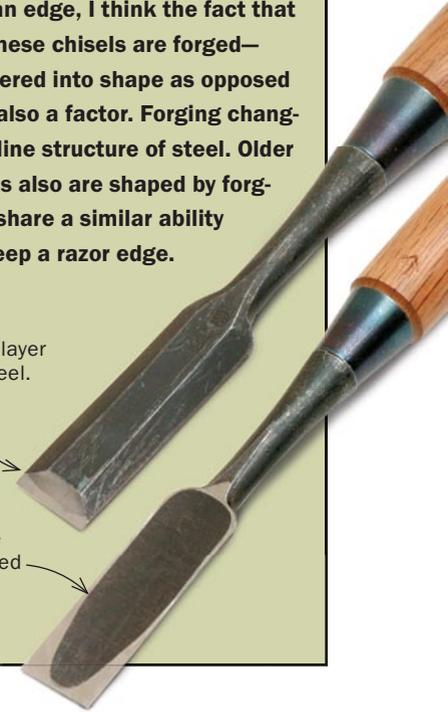
## JAPANESE CHISELS

Hand-forged, best-quality steel is the mainstay of legions of knowledgeable woodworkers who use Japanese tools. Traditional Japanese chisels are forged from a combination of softer steel in the shank and body for toughness, and very hard high-carbon steel for the back, which takes a keen edge. This combination speeds sharpening, as only the cutting edge is of the hardest steel. The backs are hollow ground and can be flattened quickly.

While the steel’s hardness certainly helps it take an edge, I think the fact that the best Japanese chisels are forged—that is, hammered into shape as opposed to ground—is also a factor. Forging changes the crystalline structure of steel. Older American tools also are shaped by forging, and they share a similar ability to take and keep a razor edge.

Soft steel is laminated to a layer of hardened steel.

The back of the chisel is hollowed out to speed honing.



### CORNER CHISELS

Once made strictly in large sizes for timber-frame mortises in buildings and ships, corner chisels now are made smaller for cabinetry. Their primary function is to square up mortises that have been drilled first, although that also can be done with conventional chisels. If you chop mortises with proper mortise chisels as opposed to drilling and then paring with bench chisels, you won’t have a use for these.



## What to buy first

To begin building your set, you certainly don’t need anything expensive. A set of beveled-edge bench chisels in 1/8-in. through 1-in. widths and a set of 1/4-in., 3/8-in., and 1/2-in. mortise chisels (sash if you do lighter work; registered, millwright, or bolstered for heavy chopping) can make a lifetime of heirloom furniture and handle most household woodworking projects. That’s all I used for most of my working life. Just as astounding as how quickly my mentors’ wooden boats went together using mostly hand tools was how few tools those gentlemen owned.

