



# Choosing cutters

*Ron Fox continues his series of articles for newcomers by helping you choose the cutters you need from the huge range of sizes and profiles available*

The versatility of the router is due in a large part to the vast and bewildering range of cutters available for it. Here I want to pick a way through the maze, identifying the best way to get started, and the directions in which to expand your collection.

To illustrate the range of cutter sizes, **photo 1** shows examples of the extremes – the lock-mitre and panel raiser tower over the 3mm and 1.5mm straights.

Most beginners start out with a basic set of tungsten-carbide tipped (TCT) cutters. Many budget routers come with a set that may include anything from five to 35 'free' cutters. These are adequate to get you started but you'll soon want to invest in more, of better quality.

You're advised by router manufacturers to always wear eye protection when routing and, in my experience, this is essential when using giveaway cutters. I've had such cutters break, or shed a substantial chunk of blade in normal use.

A step up from free cutters is the budget boxed set. For someone new to routing this



1. David and Goliath: extremes in cutter size



2. Boxed starter sets of cutters



3. Cutters with 1/4in, 8mm, and 1/2in diameter shanks



4. The 'K' mark on a cutter shank indicates how far the shank should be inserted in the collet

5. Straight cutters with and without centre inserts



6. A selection of straight cutters



7. A group of spiral cutters



8. Trimming cutters



is my recommended option. You can buy budget boxes from suppliers such as Axminster, Trend, and places such as Argos. The arguments for a budget-box are:

**1** It provides a set of 12 up to 50 cutters that you can begin using, and experimenting with, without having to scratch your head as to which shapes and sizes to buy.

**2** Effectively you've more than the number in the box because you can try certain cutters at different depths, and also mix and match those with bearings to see what the effect is.

**3** You'll develop your cleaning and honing skills, and if you spoil a cutter, eg by rounding the edge on the hone, you won't be as upset as you'd be if it were a premium price cutter.

**4** You'll find that, as you gain experience, you become more critical of the shapes and sizes in your starter box. For example, you may prefer the 1/4in straight to be a bit longer, the round-over to be a smaller radius, the straights to include a 5/8in diameter, and so on. This applies as much to premium-priced sets but with a much higher cost penalty.

Having said all that, if you've bought a top professional router from Bosch, DeWalt, Trend, or any of the other major manufacturers you might well want cutters to match, and be prepared to pay for the individual cutters that you need without

buying cheap cutters that you won't use.

This is a perfectly valid argument; there's no right or wrong way, but you need to have a good idea of exactly what you want to do before you buy expensive individual cutters.

Where you can waste money is in buying a premium-priced boxed set and then finding that there are still several that you never use. The quality may be superb but it's a bit irrelevant if you don't use them.

**Photo 2** shows six boxed cutter sets. Clockwise from the top left, they're Axminster budget 24 for £31.43 (1/4in), £36.78 (1/2in); Trend 50th Anniversary set (30 for £70.50 (1/4in only); CMT 1/2in (13 for £224.90); CMT 1/4in (12 for 194.25); Axminster 'Value' set: 12 for 24.68 (1/4in), £39.95 (1/2in); **Wealden set: 12 for £89.95 (1/4in only).** (Prices are given as a rough guide only).

You need to know exactly what cutters are in the box and be reasonably certain that you'll use them all before splashing out on the most expensive sets. Whatever you buy, however, you'll keep them in tip-top condition by cleaning and honing them – see the 'Cutter Care' panel overleaf.

## Cutter materials

All the cutters in the above sets are TCT. With premium cutters, small diameters such as 1/4in are often made from one piece of solid tungsten carbide, but most consist of a steel body to which tungsten

carbide blades are brazed, hence 'tungsten-carbide tipped' (TCT).

The vast majority of cutters on the domestic market are TCT. The only practical alternative for the hobbyist is high-speed steel (HSS).

There are still plenty of HSS cutters about, and they're less expensive than TCT. They can be honed to razor sharpness but the edge wears rapidly and has to be maintained by frequent honing. Nevertheless, HSS gives the best results with furniture woods and some HSS cutters (e.g. for dovetailing) can be machined to more delicate shapes.

TCT cutters can't take such a keen edge as HSS cutters, but they hold it much longer. They can also cut chipboard, plywood, and MDF, which would quickly ruin an HSS cutter.

Unless, therefore, you plan to double up on your cutters – HSS for natural timbers, TCT for manufactured boards and tough hardwoods – the choice comes down to TCT.

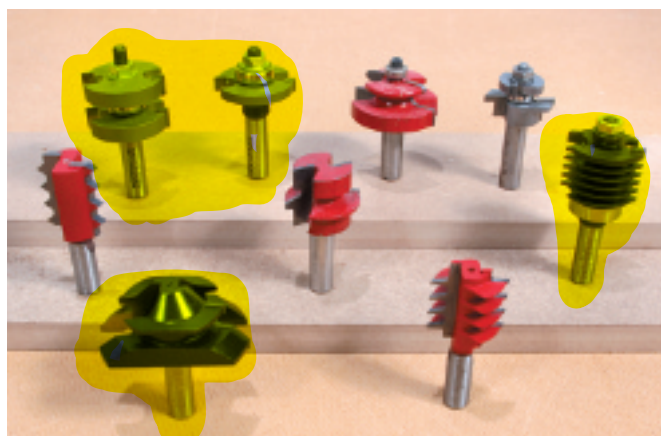
## Shank diameter

The vast majority of routers in use in the UK are 1/4in collet types, so 1/4in shank cutters are correspondingly widespread. They can also be used in 1/2in routers, of which the better models come with a proper 1/4in collet and the others with a reducing sleeve. However, the larger the





9. A small selection of shaping cutters



10. A variety of jointing cutters

shank diameter the less whip and chatter, so if you've a 1/2in router you should aim to use 1/2in shank cutters wherever possible.

A relatively recent development in the UK is the introduction of cutters on 8mm shanks. An 8mm shank has nearly 60%

more cross-sectional area than a 1/4in one, which not only gives a firmer cut but also opens up the prospect of using a wider range of larger cutters in your medium-power router. Most popular models offer an 8mm collet, either as standard equipment or as an accessory.

An important application is dovetailing. A dovetail cut is always a heavy cut since you can't take several light passes, because of its shape. An 8mm shank with its additional stiffness gives a better cut.

**Photo 3** shows cutters with 1/4in, 8mm, and 1/2in diameter shanks. The differences are striking.



Honing a cutter

### Cutter care

Cutter care is covered in more detail starting on page 46 of this issue of Practical Woodworking.

Briefly, frequent cleaning and honing will keep your cutters in first-class condition. Dirty cutters result in a heat build-up on the cutting edges, which dulls them.

Remove resinous deposits with a cleaning fluid. Several branded makes are shown in the main photo on page 44 but, for hard resin, I use contact adhesive remover. For burnt-on deposits use a mild abrasive household cleaner such as 'Astonish'.

With bearing-guided cutters, remove the bearings before cleaning to avoid washing out their lubricant. If you use WD40, keep it away from bearings.

After cleaning, hone the flat surface of the cutter blades using a 'fine' grade diamond hone and Trend lapping fluid for lubrication. This gives better results than water, and the cutters don't need spraying with a lubricant afterwards. Give each face of the cutter the same number of strokes to preserve the balance.

Finally, wipe the surface of the hone and clean it with a plastic eraser.

### Cutter insertion

Cutter manufacturers typically advise you to insert three-quarters of the shank length into the collet. Recent regulations, however, require cutters to carry a mark on their shank indicating exactly how far into the collet they should be inserted.

**Photo 4** shows a cutter shank with the arrowhead mark on it. From the side it looks like the letter 'K' and is located just below the bearing-retaining collar.

### Plunging cutters

It's widely assumed that any straight cutter can be plunged, but this isn't the case. For plunging, straight cutters over 1/4in in diameter should have centre inserts, but many – and not only budget-priced sets – don't have this feature.

The centre insert enables a cleaner plunge with less burning, less strain on the router, and less wandering of the cut.

**Photo 5** shows examples of straight cutters with and without centre inserts.

### Cutter groups

Starter sets typically include several straight cutters of different diameter, two or three bearing-guided cutters, one or two special cutters – eg, a V-groover for incised lettering – and a dovetail cutter.

Larger sets include more of the different types, eg, several round-overs of different diameter.

When you outgrow your starter set you'll want to buy straight cutters of different diameter and length, moulding cutters of specific shape and size, special cutters for jointing and panelled door construction, slotters for t&g construction, and so on.

However many you accumulate they'll all fall into one of five main groups, according to their purpose.

### Group 1: Straights

Straight cutters are the workhorse cutters with which most of the basic woodworking operations are carried out, including grooving, trenching and joint making. **Photo 6** shows a few of the sizes available.

A special category of straight cutter is the spiral, although their cutting edges look anything but straight. **Photo 7** shows a group of spiral cutters.

They're usually made from solid carbide rod (although it's possible to buy HSS spirals) and they cut with a shearing action, giving a very smooth cut, especially on veneered boards. The spiral can be made in two opposite 'twists': upcut and downcut.

There's also the vicious-looking combined 'up-down' cutter which incorporates both up and down twists and gives a fine finish on both sides of double veneered boards. An example of the 'up-down' spiral can be seen on the right-hand side of **photo 7**.

### Group 2: Trimmers

Trimming cutters are straight cutters with bearings mounted either at the bottom end of the cutter or on the shank immediately above the blades. Most of them have bearings of the same diameter as the cutter and are useful for flush trimming lippings and laminates, trimming boards to exact size, and repetitive cutting of shapes using a pattern.

**Photo 8** shows a selection of trimming cutters. Note, **top left, the Wealden**



11. Frame/panel making cutters



12. Slotters and rebaters

**multi-trimmer.** This has a bearing at each end of the cutter and enables the cut to be made always with the grain for a better finish.

## Group 3: Shapers

These are the cutters with which the router is most closely associated. They're used for producing the decorative edges and panels for which the router is renowned.

They come in a vast number of shapes and sizes, often with rather strange names taken from architecture, like astragal, bolection, ogee, ovolo, pilaster etc. Most, but not all, are fitted with a bearing to guide the router and position the cut.

**Photo 9** shows a very small selection from the enormous range available.

## Group 4: Jointers

These are specialised cutters for producing joints such as edge-to-edge board joints, corner joints, and finger joints. Most of them are large, requiring heavy-duty routers with  $\frac{1}{2}$ in shanks, and must be used in a router table with reduced motor speed. **Photo 10** shows some of the available jointing cutters. Note that they all have  $\frac{1}{2}$ in shanks.

Another type, which can be grouped with the jointing cutters, consists of the profile/scribe and panel raising cutters for frame/panel construction. **Photo 11** shows a colourful collection of these, most of which are on  $\frac{1}{2}$ in shanks, with one or two on 8mm shanks.

## Group 5: Specials

This is basically the 'all the others' group and includes slotters, rebaters, and drilling bits. The latter are relatively new to the routing scene and the range is increasing. Effectively they're twist drills manufactured to run at router speeds.

**Photo 12** shows some of the slotters and rebaters available. The slotters are mounted on an arbor to act rather like miniature circular saws. They can be



13. Drilling bits

fitted with more than one slotter at a time to vary the width of the slot. For hand-held use, they're fitted with a bearing to guide the router. The rebaters are also bearing-guided, some with a set of bearings to vary the width of the rebate.

**Photo 13** shows a selection of router drilling bits with my home-made drilling

base fitted to the DeWalt DW621 router. These cutters can be run at motor speeds between 1,500 and 24,000rpm.

This has been an overview of cutters. The different groups of cutters, and their uses, are covered in more detail elsewhere in this issue.

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