PHOTOGRAPHS BY LEWIS KNOX

Practical router jigs

In the first of this two-part article, Chris Yates moves on to the design of several general purpose jigs, this month looking at a production jig

This month, we design and make the first of a couple of general purpose jigs that are likely to find repeated use in a routing workshop. We will look at how we turn an initial idea into a practical design and consider some of the options open to us, depending on how we expect to use the jigs. We will use some of the hardware we introduced last month and put into practice some of the points covered in the series so far. The first jig is used to cut handholds; the second jig is rather more general purpose, and lets us cut transverse rebates. Examples of both jigs have appeared in photos in previous articles of this series.

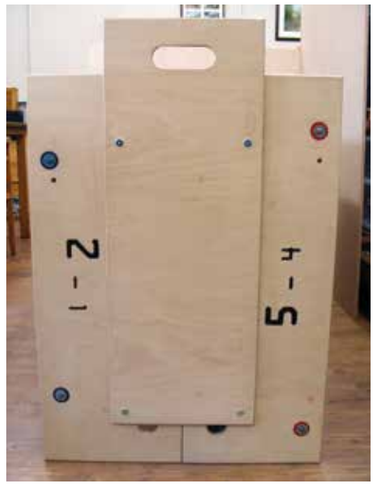
For most of us, jigs are like solicitors – we don't want a jig, but from time to time we may need one. One of the recurrent tasks that I undertake is cutting handholds in the protective ends of transportable model railway baseboards, to enable them to be carried safely and comfortably. I would be the first to say that cutting these handholds is not one of the most interesting tasks that I undertake in the workshop, but there does seem to be a steady stream of them to be done. Therefore, I naturally looked to make a jig to help the process – to speed it up and to improve the consistency and quality of outcome.

The examples illustrated are all made in 12mm birch throughout ply – this a medium grade ply that has the great virtue of machinability without resulting in lots of ragged edges and splinters to be cleaned-up by hand. I have used cheaper grades, but they just take longer to get to an acceptable finish.

Jig specification

Before we start work on our first jig, we should give some thought to how we will use it and the range of shapes and sizes of workpieces that we will use it on, as this may save a lot of time later on. In the case of my baseboard projects, I either fit two handholds on baseboard end protectors that can be up to around 950mm wide, or fit a single handhold on a joiner piece that enables two baseboards to be carried face to face. The size of handhold is the other important factor and here we can make use of the flexibility afforded by using a guidebush mounted in our router to change the size of handhold within a range of likely sizes to suit individuals.

Model railway baseboards can be manoeuvred safely



Two people can carry a pair of delicate but heavy baseboards safely and comfortably

Master jig

Another variable is likely to be the number of times we expect to use the jig. A quick round-up of the projects I have used it on in the last year or so gives me a total of over 100 handholds, but at the other extreme, you may only plan to use it on a specific project with perhaps a couple of handholds in a piece of portable furniture. Because I expect to make mistakes from time to time as well as using the jig quite a lot, I will make a master jig first and only use this to make the jigs I will use on my projects. As it will have very little use and can be expected not to show signs of wear, I will make it out of MDF as it is easier to cut to the shape I need – I will then replicate it in harder-wearing plywood for the jigs that will do the work

Cutting the master jig handhold

The hand-hold shape that I use is a simple slot with semi-circular ends. It needs to be big enough in both length and width to generate the largest handhold likely to be required plus offsets for the guidebush and cutter combination – see sidebar in the next issue for calculating the offsets. It doesn't matter how you choose to cut this 'master' slot, but it must end up with smooth sides and ends and no ripples. My chosen method is to use a Forstner bit to cut holes at either end, then jigsaw the waste from between them, keeping 1-2mm inside the lines marking the finished sides. These can then either be finished on the router table by very gently incrementing the distance between the fence and a straight cutter that is set to just above the MDF thickness. Take great care when setting the fence position that the cutter only just approaches the widest point of the semi-circular end at the left-hand side of the workpiece. Then gently move the workpiece to the left until the cutter is in the corresponding location at the right-hand side of the workpiece. At all times keep your hands clear of the cutter and at the end of the cut, pull the workpiece slightly forward of the cutter before stopping the cutter rotation. Then adjust the fence further back a smidgin and repeat the process, until the one edge is smooth and accurately aligned with the ends of the semi-circular shapes. If at all possible, fit a top safety guard to cover the cutter. Two further safety points: hold the workpiece firmly in your hands – if it is too small to do this, you may choose to cut the template within a larger workpiece and trim to fit afterwards, or even add some temporary handles. And do not try to trim the opposite side by passing the workpiece from left to right with the workpiece sandwiched between the cutter and fence, as there is every chance that you will lose control of the workpiece and, at the least, it may get projected from the table and it will inevitably get spoilt. When it comes to trimming the second long side, simply flip the workpiece front to back and repeat the process, but note that for this to work, both sides of the slot must be parallel to both edges of the workpiece and it must not be too big to fit on the router table. Let us assume that we now have a fairly good shape cut by machine. The next step is just to smooth it by hand using abrasive paper and a small wooden block or an engineer's file to smooth out any remaining fine ripples in the straight sides of the hole. Where the straight sides meet the semi-circular ends, these can best be smoothed using a finger and very gentle pressure. Bear in mind that any protrusions will be reflected by the router cutter in every handhold cut, so it is worth getting a good finish on the master jig shape.

Using Forstner bits to cut the round ends of the handhold

Jigsawing the waste between the holes

Moving the workpiece from right to left and progressively moving the fence further back until a smooth straight edge is formed

If the last stage is done carefully, there should be very little to do by hand

Making the production jig

The next step is to make a working jig to fit on the eventual workpieces. In my case, these are rectangular so I usually just fit guide battens to position the jig in the right place on top of the workpiece – it saves a lot of measuring and marking and reduces the opportunity for silly mistakes. However, don't fit these positioning battens just yet, but make sure that the working jig is big enough to accommodate them.

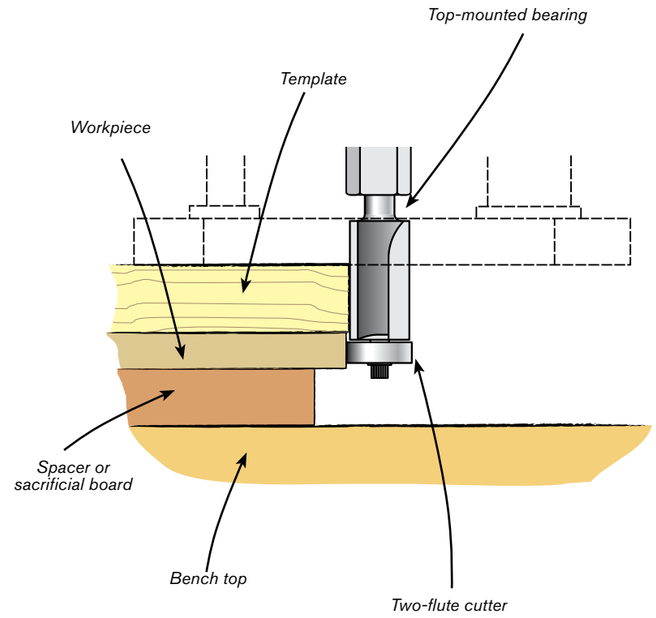
The next step is to cut one – or more – working jigs using the master jig. You do not want to damage the master jig at this stage, or you will probably have to go back to the beginning to make another one, so take extra care.

The master and working jigs will need to be kept together in register, so decide how you want or can do this. Clamps are fine in many cases, but don't forget to leave enough surface area around the handhold to navigate the router.

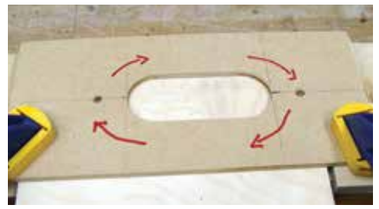
Select a suitable straight router cutter and guidebush combination and using some offcuts, practise making a working jig insert. The size of the finished hole can be varied by changing the diameter of cutter or guidebush. Remember that the larger the guidebush diameter, the smoother the finished hole will be, as a larger radius guidebush will tend to glide across the tops of any minor imperfections in the edge of the jig, whereas a smaller diameter guidebush will tend to follow such imperfections more closely.

If you expect to cut a lot of holes, you might choose to use a replaceable tipped cutter, as the cutter will be expected to do a lot of work. In any case, make sure that you use a bottom cutting cutter – e.g. W-point – as you will have to plunge the cutter through the workpiece.

When setting up the jig and workpiece, remember to include a spelch board underneath the workpiece, or you may have an unintended handhold in your workbench! Then, before actually cutting the first working jig, check the plunge depth and set the turret depth stop to give progressive depths of cut.



A typical setup for working with a template and bearing-guided cutters with a hand-held router on top of your workbench

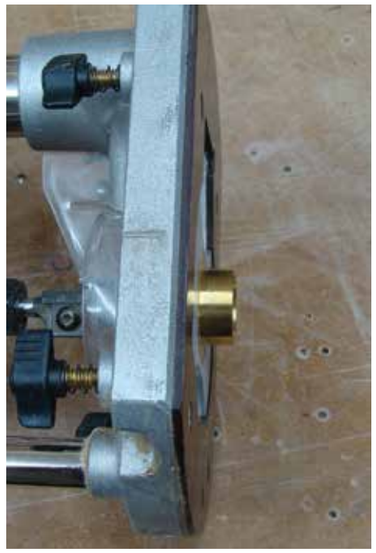


Master jig temporarily fixed to the blank production jig

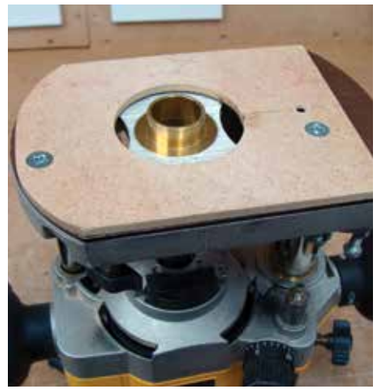
Not all guidebushes are created equal

When selecting a guidebush, be aware of the depth of shank protruding below the base of the router. Whatever pattern of guidebush you use, remember that the jig material ideally should be at least as thick as the guidebush shank is long. If it isn't, you must either pack the jig above the workpiece; shorten the guidebush shank, use a shorter guidebush or fit a false base to the router. This is most likely to be an issue with the thin master jig, which might well be just 6mm thick, so making special provision for the couple of copy jigs is not such an issue, but I would not want to be bothered doing this for a production run – it pays to think ahead and select material for the working jigs that is thick enough to avoid this problem.

The sequence of photographs shows the stages in production of this simple but useful and adaptable jig. Remember to take repeated passes at increasing depth rather than trying to cut the full depth in one pass. Also, plunge the router in the waste area and bring the guidebush to and along the edge of the jig in a smooth movement, guiding it away from the cut edge before changing the plunge depth or removing it, in order to avoid imperfections and burn marks on the finished jig or workpiece.



Using the appropriate Leigh baseplate enables almost any router to accommodate guidebushes. The guidebush in this photo is from UJK Technology, and the router cutter has replaceable carbide tips and is from Trend



Fitting a false baseplate to overcome the excessive depth of the guidebush is simple

NEXT MONTH

Carrying on from this article, Chris will look at the making stage for the production jig, constructing a stopped rebate jig, positioning and clamping the workpiece, labelling the jigs and developing jigs for more sophisticated tasks F&C