

# Dead or Alive?

Having demonstrated the beauties of English hardwoods a couple of issues ago, John Lloyd knows how to deal with defects

There are two distinct types of knot that might be encountered in solid timber, 'live knots' and 'dead knots'. A 'live knot', as you might expect, looks perky and healthy, forming an integral part of the surrounding timber. When the tree was felled these 'live knots' were at the base of a healthy, living branch or bud.

A dead knot, on the other hand, is likely to result from a branch that died a considerable time before the man arrived

with a chainsaw these knots are usually much darker than a live knot, they tend to have a gap around them which means that they often rattle around a bit and have sometimes rattled about so much that they're missing, leaving a gaping hole.

Apart from the visual aspect of a big blob in the middle of an otherwise blemish-free surface, the effect of knots on the strength of a piece of timber is something that must be considered when deciding whether to use the knotty timber or consign that part of it to the bin marked 'firewood'.

### Strength in life

A live knot is stronger than a dead knot and any knot right on the edge of a component, such as a leg or a rail, is unlikely to be a structural asset. On a chair it is worst to have a knot on the bottom edge of a rail, in tension under load. Any point of



Pic.1 A live knot with a shake. A live knot is stronger than a dead one, and can look perky and healthy



Pic.3 A live knot near the edge of a board that is worth watching but should be OK



Pic.4 On the other side of Pic.3, however, is a much more dangerous-looking semi-dead knot ready to chip away



Pic.6 You can rout to a line with a fine cutter freehand quite easily to remove a knot



Pic.2 A live knot that John is going to fill with epoxy (below)

weakness, such as a knot, might decide to let go of the surrounding wood, and this might result in the rail splitting, or ultimately, breaking. A knot on the top edge of a rail is less of a problem because it's in compression, so as long as it isn't a dead knot and it hasn't dropped out, it might not affect the strength of the rail too drastically, but this depends on size and the amount of weight it is being asked to take. The ideal position for a knot on a

structural component is running in the middle, having no compression or tension stresses. If a knot does not present a problem structurally, you have to consider the visual impact, which is a subjective thing. On balance I avoid knots if I can, but I'm not really of the mindset that any minor defect is to be rejected out of hand. After all, a defect can give a bit of visual interest to an otherwise rather bland piece of wood. It's also worth remembering that a

large, ugly knot on one face of a piece of timber might be rather smaller and far more acceptable on the opposite face.

### Working with knots

One reason for using timber with knots might be a lack of any alternative boards, in which case you may need a cunning plan either to make a knot presentable and structurally sound, or to disguise it.

On the basis that dead knots should be avoided if possible,

but a knot of either sort has been deemed to be visually acceptable, the thing to do is to make sure the knot is sound. If it's a dead knot it must be prevented from escaping and becoming a hole.

A live knot, which will often have a split, or 'shake', across its middle, should have the split filled to prevent it from deteriorating or spreading. My plan for this sort of situation is to use epoxy, which has very good gap-filling strength. West

System, boat-building epoxy, is in my opinion the strongest option and would be my first choice, although accurate measuring can be a bit of a fiddle, but another option is to use a 'two-tube' epoxy.

Either way the epoxy can have its colour changed with the addition of a tiny amount of pigment to help it blend with its surroundings. Knots often have quite a strong colour compared to the surrounding wood and it's a good idea if the epoxy can

look like it is just an integral part of the knot. West System epoxy is quite runny and needs to be thickened with one of West's fillers like 'colloidal silica' which is white, or the 'filleting



## How to repair a live knot with epoxy and colouring



Pic.7 Brush shellac on the knot so that the epoxy doesn't contaminate the grain, then mix the epoxy with pigment (right)



Pic.8 Use a palette knife to push the mixed epoxy into the knot. Leave the epoxy proud



Pic.9 Pare the excess epoxy back with a chisel (left), then level with a scraper (above) before adding any necessary acrylic colour with a fine brush (right). Finished (top)!



# Fundamentals Fact File

## No.8 Replacing a Knot

John Lloyd hides a knot with a diamond patch



**Pic.10** A dead knot that's a bit loose and needs to be checked in case it falls out. It is probably a candidate for replacement

blend' which is brown, or a mixture of the two to achieve a light brown 'wood colour' which can work well. I often just use colloidal silica and add a little of an appropriate pigment or a mixture of pigments to get a good colour. Before applying the mixed/coloured epoxy into a split with a small artist's palette knife I generally brush or wipe a coat or two of shellac onto the knot and its surrounding area, this just helps to prevent the mixed epoxy or any dust from final sanding from spreading into the surrounding grain.

Overfill the epoxy, and after curing, trim with a sharp chisel and finish off with a cabinet scraper and maybe a little sandpaper. If the colour needs a bit of a tweak, use a very small brush and artist's acrylic paints. A drop of shellac over the acrylic will seal it in and protect it.



**Pic.11** Fix tracing paper over a knot you want to replace so that you can make a patch that is routed into the surface

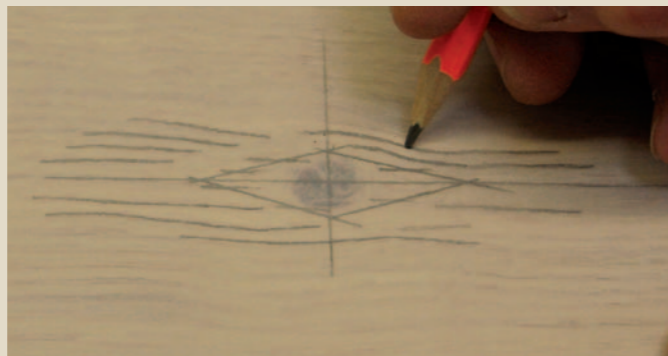
If a flawless, fault-free expanse of timber is the only thing that will do, and a knot, even a perky looking live one, is not an option, the only thing to do is to make it go away, and the only really fool-proof way to make it go away is to remove it and patch it with a piece of wood. Filler is not going to bear close inspection and will very likely end up just substituting the original eyesore with an even worse one. It doesn't have any grain, and no reflectivity, which is a particular problem if the 'repair' can be viewed from different angles.

The shape of a patch is important for it to blend nicely with its new surroundings, and the shape that seems to work best for most straight-grained woods, and is the easiest to execute, is a diamond. What you must avoid at all costs are patches that have gluelines at right angles to the grain. The acutely-angled points of a diamond patch, although more difficult to fit, can merge seamlessly with care.

### Tracing paper

The first thing to do is to work out what size and shape of diamond will cover the offending knot. The easiest way to do this is to lay tracing paper over the wood and draw a diamond shape around the knot. Add a few lines to the tracing that show the line of the grain and any prominent lines of figure. The tracing paper can then be laid onto a selected offcut which has promising grain, and the lines of grain/figure on the tracing paper are used to get the tracing in the right position.

It's not just a question of lining up the grain, the grain must also be in the right



**Pic.12** If you want to completely 'lose' a knot you will need to make a diamond patch. Trace around the knot and add grain lines (above). Then cut through the tracing paper onto the wood that is going to be a patch



direction! Getting the 'reflectivity' wrong in a patch is a cardinal sin that will give a result that is less of a subtle patch and more of a prominent beacon. It's very easy to get this wrong, particularly when the wood in question is not polished.

Think of grain in wood like grass that has just been mown, when the grass is bending away from you it looks light in colour, when it comes towards you it is darker. The same is true of the fibres in wood. To make the grain direction more obvious wet the surface and look at it from both directions to see if one way is darker than the other. Mark the direction on the surface straight away; if you put your offcut down while you look for a pencil Murphy's Law will surely apply!

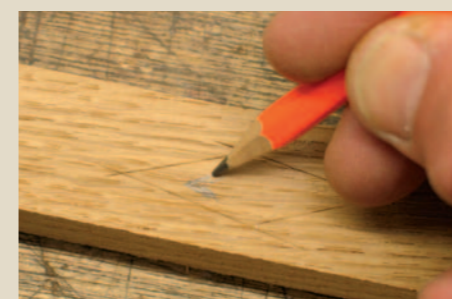
Now you can shape the patch. A bandsaw is useful to get the patch to a manageable thickness, probably around 4-6mm, and a small fine-toothed saw can be

used to cut close to the lines outlining the diamond shape. Now, the cunning plan for making a patch that will be invisible is to put a slight angle on the edges of the diamond, creating in effect a tapered patch, much like a plug made with a tapered plug cutter.

I use a disc sander (Pic.13) for this and I have made a small jig which consists of a piece of thin MDF with a strip attached along one edge to tilt the jig slightly when it is sitting on the sander table. This avoids having to change the setting of the main table, which can be a bit of a palaver. Just sit the patch on the tilting jig and ease it towards the spinning disc, being careful not to give yourself a manicure in the process.

### Tapered plug

Remember that you can achieve a slower, rather more controlled rate of cut by staying closer to



**Pic.13** Make sure you mark which direction the grain runs in (left) before cutting out the patch and tapering it to shape on a disc sander (above)

the centre of the disc, which is moving at a slower speed than the edge. An alternative method is to use a block plane (Pic.14). I would have a very sharp blade set to a very fine cut, with the adjustable mouth almost touching the blade. Hold the block plane still, move the patch across the blade on its edge and hold the patch at a slight angle to achieve the desired taper.

### Offending knot

The tapered patch is then carefully positioned over the offending knot and marked around with a scalpel (Pic.15). A small router fitted with a small straight cutter (2-3mm dia.) can be used freehand to remove the top of the offending knot and create a mortise for the patch. Set the depth stop to just less than the thickness of the patch to ensure that the patch protrudes just a little when fitted. Don't be alarmed at using a

router with no fence. When fitted with a tiny cutter it will behave perfectly, but take care if your router doesn't have soft-start.

How close you get to the scribed lines with the router depends on how brave/lucky you're feeling. I would probably leave about 1mm which can then be pared back to the scribe lines with a razor-sharp chisel. It can be a little tricky to remove the waste from the acute points, but a little careful work with a scalpel should deal with this.

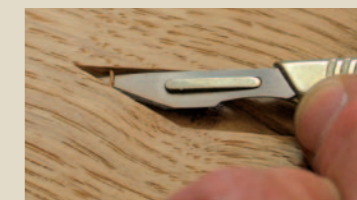
Glue and cramp the patch, which should be a tight fit, with a block under the cramp and level the patch when the glue has set (Pic.17). If there's any visible glueline around the patch this can usually be disguised with a few spots of an appropriately coloured acrylic paint, and if necessary a few painted lines of 'grain' can be added to complete the disguise.



**Pic.14** An alternative method for tapering the plug for a tight fit in the cavity is with a block plane (left). Have it set really fine, with the mouth tight too



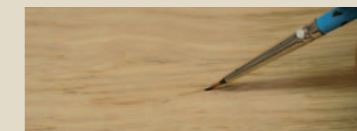
**Pic.15** Line the grain direction of the patch on the knot (left) then mark the diamond shape and rout out the bulk of the waste



**Pic.16** Use a scalpel to clean out the corners, then glue in the patch



**Pic.17** The patch should be slightly proud (above) then planed level



**Pic.18** Use acrylics to disguise the gluelines, finish and you're done!

