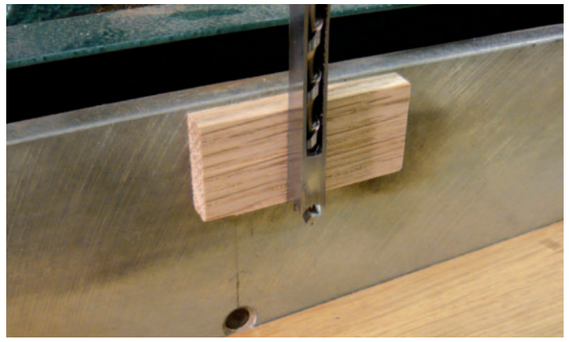
Neater Mortising

The demands of cutting many mortises for his award-winning chair force **Eric Mertens** to devise clever mortising tricks for a hollow chisel machine

My Hinta dining chair (BW26:50) has an aberrant construction. One reason for this is that I wanted to lose the stretcher in front and back view. The 20 seat and back slats are all joined to the seat rails and back posts by tenons and mortises. In order to drill the series of mortises easily I developed a special routine. For the drilling I use my hollow chisel mortiser and the way it is set up makes the job easy. First thing to do is to install the 6mm hollow chisel. It has to be parallel to the back. This is always the case, so why isn't there a standard set-up for this? To line it up parallel I have made a little stick that fits square and tight around the drill (Pic.1). Aligning the stick parallel to the back positions the drill.

Now the correct distance from the back has to be set. To do this I use another stick that fits between the tenon and the cheek (Pic.2). I cut it on the tablesaw but you can easily plane them to the right thickness. I want it to be just not tight. Put this stick between the chisel and the fence to set up the correct offset. The drill must touch the piece, but do not clamp it as it can bend.

Pic.1 **Eric has a notched stick (above) for setting the hollow chisel parallel to the fence. Why isn't this a standard feature?**



Pic.2 **Eric uses a spacer the thickness of the tenon shoulder (above) to set the fence accurately (left). A notched bar (below) helps align the mortise and holds down the workpiece (below)**

Pic.3 **Each slat on Eric's Hinta chair (top) is tenoned into the rails or the back leg. Eric has a trick for paring mortises without the auger (above, see right)**

Guiding strip

Next make a strip of wood with an opening in which the drill fits. For a 6mm chisel I have an opening of 6.1mm wide and 4mm deep. The thickness of the strip depends on the offset of the drill. It has to fit behind the drill and is attached to the fence (Pic.2). This strip has three purposes. It stops the workpiece lifting when pulling up the drill. Second it stabilises the drill; harder woods with messy grain can push the drill out of direction. Third, it gives you a good impression where the drill will cut.

The opening is 0.1mm wider than the drill, so more or less 0.05mm on both sides. I mark out, in this case, with a 0.5mm pencil. I push the pencil line to the edge of the drill opening so that half the pencil line is drilled away. First I drill the two outside holes and then the inner ones. The strip of wood prevents the material lifting but lets it slide easily, which helps repetitive work.

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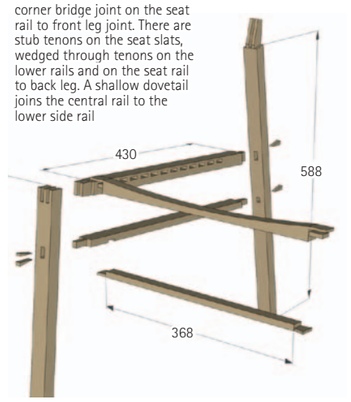
Fig.1 Detail of Eric's Hinta chair

The Hinta chair has a double corner bridge joint on the seat rail to front leg joint. There are stub tenons on the seat slats, wedged through tenons on the lower rails and on the seat rail to back leg. A shallow dovetail joins the central rail to the lower side rail



Mortise flaws

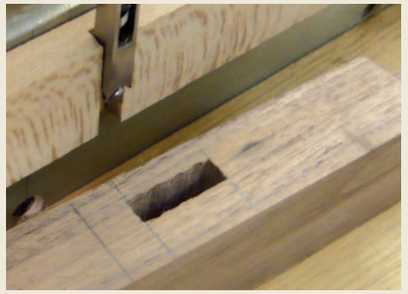
How to keep through mortises really clean and stop the chisel clogging with waste

The inner augers of hollow chisel drills have a design flaw. With only one cutting edge the auger can easily push itself out of direction, sometimes far enough to spoil the straight lines cut by the chisel (Pic.4). This is no problem when the mortise is not a visible construction detail, but is when you want a through mortise and tenon joint enhanced with wedges. In order to make this a beautiful detail it has to be neat. No lost fibres and certainly no spoiled lines.

Of course the chisel must be sharp. If not, sharpen it on a fine waterstone.

I do the cross-grain marking out with a knife. The cheeks of the mortise won't be marked out: the machine setting will take care of that. To aim the chisel parallel to the back I use the stick that fits square around the chisel. Offset from the back by using a stick with the right thickness. Because the drill will go through the workpiece use plywood underneath to protect the drill and and the table.

When I want a 10mm wide mortise I use a 8mm wide hollow chisel with the auger. Drill away the central waste, staying 1mm away from the edges. Now remove the auger (Pic.3 & 5). When the outside faces of a through mortise are angled for a wedge, tilt the bottom or use a wedge of the right angle underneath. Move the chisel 1mm to cut the first cheek using a piece of wood of the right thickness. This paring is done outside inwards in small steps (Pic.4).

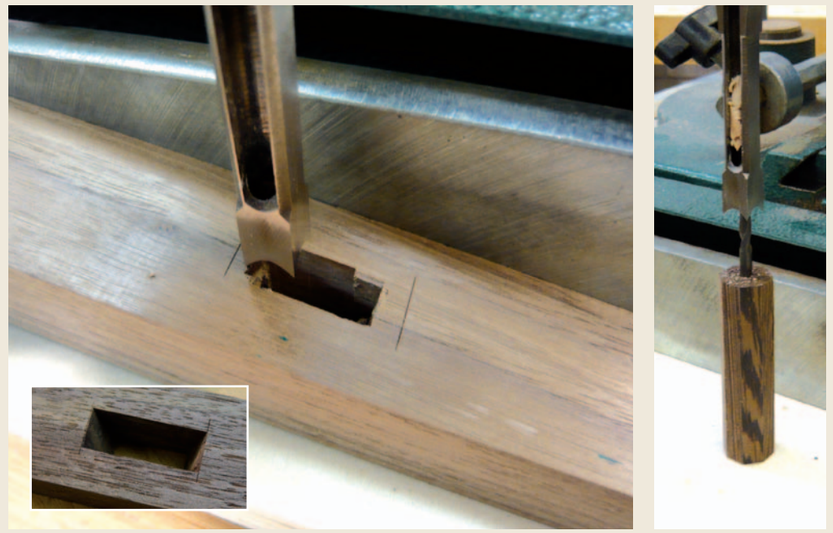


Pic.4 **Because the auger inside a hollow chisel has only one edge it can drift outwards and cut beyond the edge of the mortise**

Not only the paring is done outside in, I also push all the waste material downward, so if a fibre is being splintered it is on the inside of the joint. Working slowly to the edge and having the right angle, the cross grain-marking-out outside and inside will meet. To do the other half of this cheek tilt the bottom to reverse angle. To cut the other cheek bring the chisel outwards to the right distance and repeat the two actions. Of course when working in series the machine settings are changed after all identical parts are being processed.

Without the use of the inside drill waste material clogs inside the drill. To push this up I use a little device (Pic.5). Do this regularly in order to allow the chisel to cut properly.

I never split my tenons. I believe splitting the tenons makes them weaker, I glue the wedges to the sides of it. This also gives a smoother image. The wedges I cut with a jig on the bandsaw.



Pic.5 **Paring away one of the cheeks with a hollow chisel, having removed the auger for a neater finish (above and inset). Eric has a little device for clearing waste from inside the chisel**