

A not so trivial pursuit to challenge and show off your joinery skills

TRIVETS

By Geoff Birtles



Pic: Kevin McCarthy

As a bachelor who cannot, or will not cook, I cherish every dinner invitation and try to ensure I am asked back time and again. My favourite expression of appreciation (and bribery) are trivets. I have found metering them out to the host cook, one at a time, ensures that I am asked back!

Essentially, trivets are small triangular wooden frames that can be placed under a hot pan to protect a laminate kitchen bench top during food plating. Alternatively they can be placed between dinner plates and a stone bench tops to keep the plates and food warm. Cooks love them because they work well, are light to handle and are decorative. The joinery never fails to attract attention and provoke good pre-dinner discussion.

Timber preparation is exacting and the joinery challenges significant but not difficult. Three jigs are involved, so both beginners and experienced wood workers will enjoy a good deal of job satisfaction, not to mention much appreciation from the spouse. Batches of four are recommended to optimise timber preparation, and to fully capitalise on the jigs. You will need a few spare work pieces for set ups and inevitable first time errors.

WORK PIECE PREPARATION

1. Select a hardwood that will withstand abuse from heat and moisture (the trivets shown are from garden grade Merbu). Mill 610mm lengths to rectangular size (28x15 mm) ensuring all sides are flat and square with crisp edges. If there is a power tool for the job, I use it. A 6" jointer and 12" thicknesser make quick work of batches. Others may prefer the *zen* of a bench plane and shooting board.

2. Chop square to oversize length (200mm) and if the wood grain shows promise, keep track of adjoining lengths so you can run the grain around the triangle.

3. Time to build your first jig - a *Complementary Angle Cutting Jig* for your chop saw. Trivets have three corners, each of 60°. To achieve this you need to cut each end of each work piece exactly to length and exactly at 30° to the long axis. It's more challenging than you might think. See side bar feature #1 - *Increasing the angle capacity of your mitre saw*.

4. First cut one end of each work piece to 30°, then set your stop block to length (180mm), and cut the other end of each piece to exact length, also at a 30° angle. At this stage you should have 12 work pieces for a batch of four trivets. Preferably, you will have two or three extra set up pieces.

CUTTING LIST

Assumes a batch of four trivets

Hardwood sides

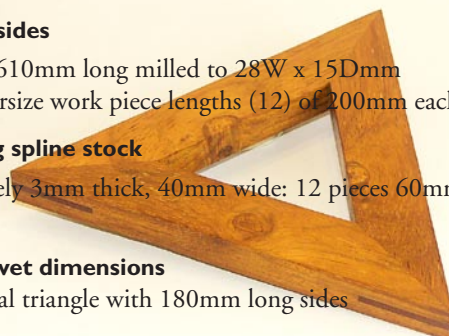
Four pieces 610mm long milled to 28W x 15Dmm
Chop to oversize work piece lengths (12) of 200mm each

Contrasting spline stock

Approximately 3mm thick, 40mm wide: 12 pieces 60mm length (long grain).

Finished trivet dimensions

An equilateral triangle with 180mm long sides



INCREASING THE ANGLE CUTTING CAPACITY OF YOUR MITRE SAW



Trivets are equilateral triangles - each corner is 60° . To form these you need to trim each end of each side piece at 30° . First do a test cut from scrap on your mitre saw. Set the cut angle to 30° , push your work piece against the fence and chop it. Use a protractor to check the angle. You got 60° ? Damn right you did! That's because the angles marked on your chop saw scale are not what they seem. They are *complementary* angles of 90° , the default angle of your saw blade to the fence. (A pair of angles are 'complementary' if the sum of their measure is 90°). So, the scale's 30° is deducted from 90° to arrive at the true cutting angle of 60° . Crazy, but that's how the scale is marked.

Fortunately the answer is more simple than understanding the maths. An auxiliary fence allows you to align the main (long) axis of your work piece at 90° to the mitre saw fence (i.e. parallel to the saw blade's default position). Now, the angle you set on your chop saw base scale (e.g. 30°) is the actual angle you get in relation to the long axis of your work piece. It's a lot easier than it reads - see the photo alongside.

A square piece of 18mm MDF is secured to the mitre saw's fence, from behind, with two hidden wood screws. (The front clamp simply stops the auxiliary MDF fence from levering upwards when the work piece clamp is in use).



- Work Piece (trimmed 30° to long axis)
- Fence location block (37mm square x 235 mm long) glued and screwed to the back of MDF auxiliary fence. Secures to mitre saw fence with wood screws (from behind).
- Work piece toggle clamp
- Adjustable work piece length stop
- Square MDF auxiliary fence
- Clamp to hold MDF fence down
- Mitre saw angle set to 30°

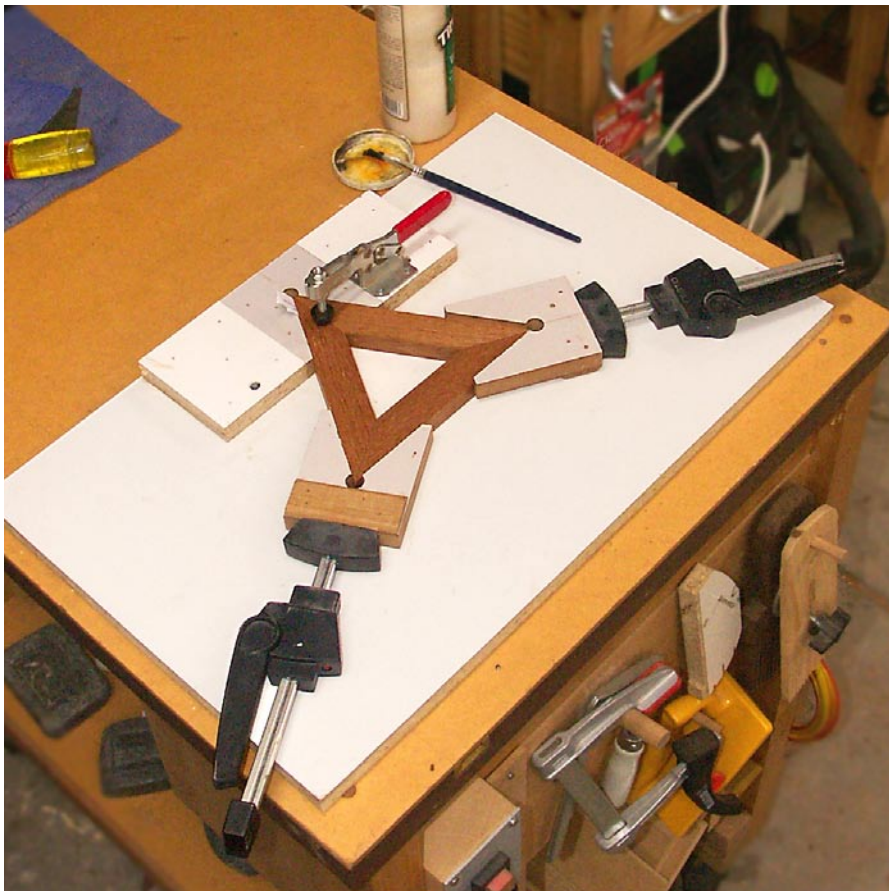
The left hand side of the MDF fence sits along the 90° blade axis. A toggle clamp secures the work piece alongside and an adjustable stop block ensures equal cutting lengths for each work piece. Set the blade to 30° on your scale and this is what you will get - subject to an accurate setting. Do check, your saw scale may be out and this will effect your joinery.

Important Note: Do use a toggle clamp because this is all too close for comfort with short narrow work pieces, particularly when the rotational direction of the blade will want to pull the work piece toward the back of the saw.

GLUE UP

1. Time to build your second jig - A *Glue Up Press*. Do not worry - having made one batch of trivets you will be called upon for many more. My glue-up jig (below) is made from a 500 x 330 mm scrap piece of 16mm melamine faced chipboard with three 60° (inside face) clamping cauls (you will need your complimentary angle cutting jig to make these out of 40mm wide melamine strips). One caul is fixed to the base and heavily reinforced, the others are loose. I use two Festo side push clamps PN #488030 (which locate in 20mm holes) to press the trivet into the fixed stop block and force the 30° end faces together. Note: These clamps are expensive, although extremely useful around the shop. Cheaper push-pull 'Good Hand' toggle clamps are widely available (Carba-Tec PN #GH-302F) and do the job well.

2. Glue up each trivet, one at a time allowing about 45 minutes for the glue set up. Be generous with glue (these are end grain joints) and use a waterproof product such as Titebond3. Squeeze out doesn't matter because of the melamine jig faces and later finishing processes. You will find even the most accurate end cuts will sometimes require paper shims in the inside face of the 60° cauls to close up the joints (see photo). Allow 24 hours before moving on to the next cutting step.



Trivet Glue Up Press

This is a dry set up to ensure we have got it all correct before glueing.

Note that the main caul stop block is secured to the base and supported on each side to withstand the pressure required for gap free joints.

The bottom right caul is pictured upside down to show how they are constructed from two 40 mm strips each end cut to 30°. The 15mm relief hole in each caul allows the trivet apex to settle in, as gaps close. The toggle press clamp on the stop block caul is optional. With practice and the use of paper shims I found it unnecessary.

CUTTING KEYED MITRE SPLINE SLOTS

Keyed mitre splines serve two purposes. The first is to reinforce an otherwise weak end grain joint, the second is a point of visual interest. Crisp edges, tight joinery and clean well fitting splines are a matter of professional pride and will provoke admiration from recipients, (hey, we all need it)!

1. Time to build your third jig, a **Keyed Mitre Slotting Jig** for the table saw. (I told you this would be fun). You can do this while your trivet glue ups are curing overnight. My spline cutting jig is built from MDF scraps, see side bar feature #2, *Keyed Mitre Slotting Jig*.

2. You can now proceed to cut the spline slots. I use a thin kerf blade, which is good and bad. Thin keys look good but thin kerf blades, at higher cutting heights, flex marginally, which result in fractionally different spline fits (you can't see it, but you need to be aware of it when preparing your spline stock).

Set your rip fence to centre the spline and set your blade height for an attractive spline depth (about 35 mm, not critical). Use scraps to ensure you have got it right as you are deep into the project by now. Cut the first slot, rotate the work piece, cut the second and then the third slot. Keep the work piece pressed hard against the right hand side of the jig and rip fence.

SPLINE MITRE KEYS

1. Select a contrasting wood (I used Jarra off cuts) and rip long grain to a thickness that is oversized to your trivet spline slots (about 3mm). I re saw off cuts to approximate thickness on the band saw, rip to approximately 40mm width strips on the table saw, then run the strips thru my drum sander, testing the thickness with each pass on a slotted trivet until the fit is just right. You could rip with care on your table saw and then sand with an orbital sander, as thickness and tolerances are not that critical. (Glue will expand the key later on).



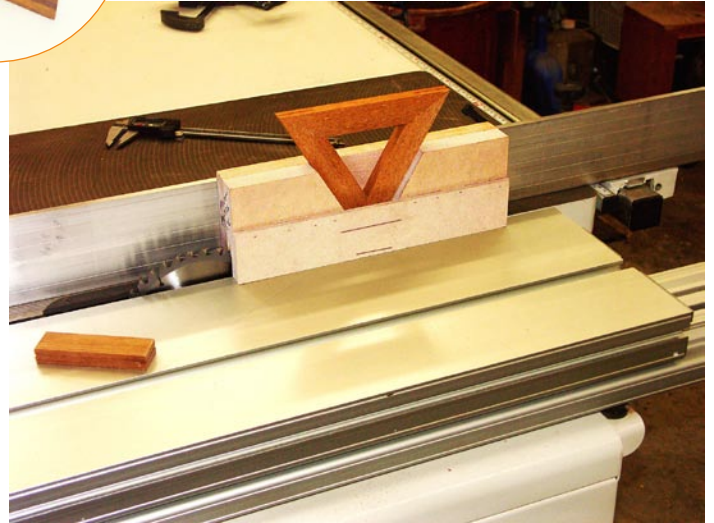
Drum sanding stock to final thickness for mitre splines. Note: MDF sled which allows accurate tolerances at this fine thickness and the test trivet sitting on the WIP rest for constant checks on fit - see text.

2. Cut spline material to oversize length (about 60mm) and get ready for the glue up. Test each spline for a snug but easy fit before gluing, as keys expand quickly with moisture. Work some glue into each slot (one at a time), and apply glue to contact areas of the spline stock. Wiggle each spline into its slot ensuring you

(Sidebar/feature #2)

KEYED MITRE SLOTTING JIG

This spline cutting jig is designed for the table saw. It is constructed from four pieces of MDF scrap.



Overall the jig is 300mm long x 100mm high x 49mm thick. The rear piece of MDF (riding along the fence) is 18mm thick. The two centre pieces, each with a 30° angle intersecting to provide a 60° cradle, are from 25mm board and the outside front support is 6 mm thick - all just spot glued and pinned together with brads.

I constructed the cradle to oversize height and width, then trimmed (ripped) the bottom to just under the trivet bottom line (to minimise thin kerf blade flex) and cross cut each end to flush them up.

The two lines on the outside face are set up lines. The lower line indicates the bottom of the trivet, the top line the top of the required slot - you set your blade height to this.

have a close fit at the back of the spline, 'persuade' if you have to. Wipe excess glue and check for no rear gaps again. If you feel your spline fits are a bit loose, use small G clamps to close the slots for a snug fit. This is much better than trying to hammer home splitting splines that are too tight. I hope it is clear that the long grain of the keys (ie, the 60 mm length) run across the trivet ends for strength. Let the keys set for at least half a day before trimming.

3. Now trim each spline to about 3mm from the trivet sides with a Dozuki or other fine blade cross cut saw.

4. Splines can be milled flush to the trivet sides in many ways. Just be sure not to lose the crisp edges. You can use a sharp block plane (planing from the tip toward the center of the trivet), use a sharp chisel to pare away the excess, or do it the easiest way of all, use a flat belt finisher with a light touch, square feeding and remembering at all times that a finisher takes more from the leading edge, so you need to rotate the work piece. Practice first!

At this stage your trivets are looking pretty good, but a little messy from the glue up and maybe the odd mitre edge standing a little proud on one side if its a first time exercise.



Trimming splines to about 3mm from trivet sides

FINISHING

1. Do not be tempted (as I first was) to use a 6" rotary orbital sander on the faces, you will inevitably lose the crisp flat sides. Use a sanding block or a fine (2mm stroke) orbital small (80 x 130mm) flat sander such as Festo's RS400. Work up from #180 grit to #220 to #320 grit if you are looking for a special appearance. Use only a sanding block on the sides, taking particular care to retain squareness and sharp edges.

2. Trivets suffer a fair bit of abuse. So I like to spray them with a pre-catalysed clear sanding sealer such as Mirotone's Mirocat #3242. Two coats, wet on wet. Its ready for sanding in 90 minutes and hand sands silky smooth in seconds with #320 grit paper. The residual surface is hard and durable. Then just wax for a luxurious soft satin sheen. I use Mirotone's Mirowax #738 because it's non-toxic and silicone free. Incidentally, this is a beautiful finish for small boxes and even furniture.

Brush on sealer and wax will work well, but I do not recommend shellac given the high heat and moisture trivets sometimes endure.

Footnote:

Trivets have become some what fashionable. Recently I saw imported versions in The Age Epicure feature at \$49.95 each. These had angled sides and a mixture of joinery techniques including half-lap, mortice & tenon and splines. Could be a commercial opportunity here for some-one with Mothers' Day coming up!

About the author.



Geoff Birtles is a marketing & communications professional who until he retired, headed his own business. He has worked with wood since his early school days and his workshop is an all abiding passion. He keeps busy with woodworking, writing, graphic design, vets road cycling and the odd corporate marketing assignment.

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