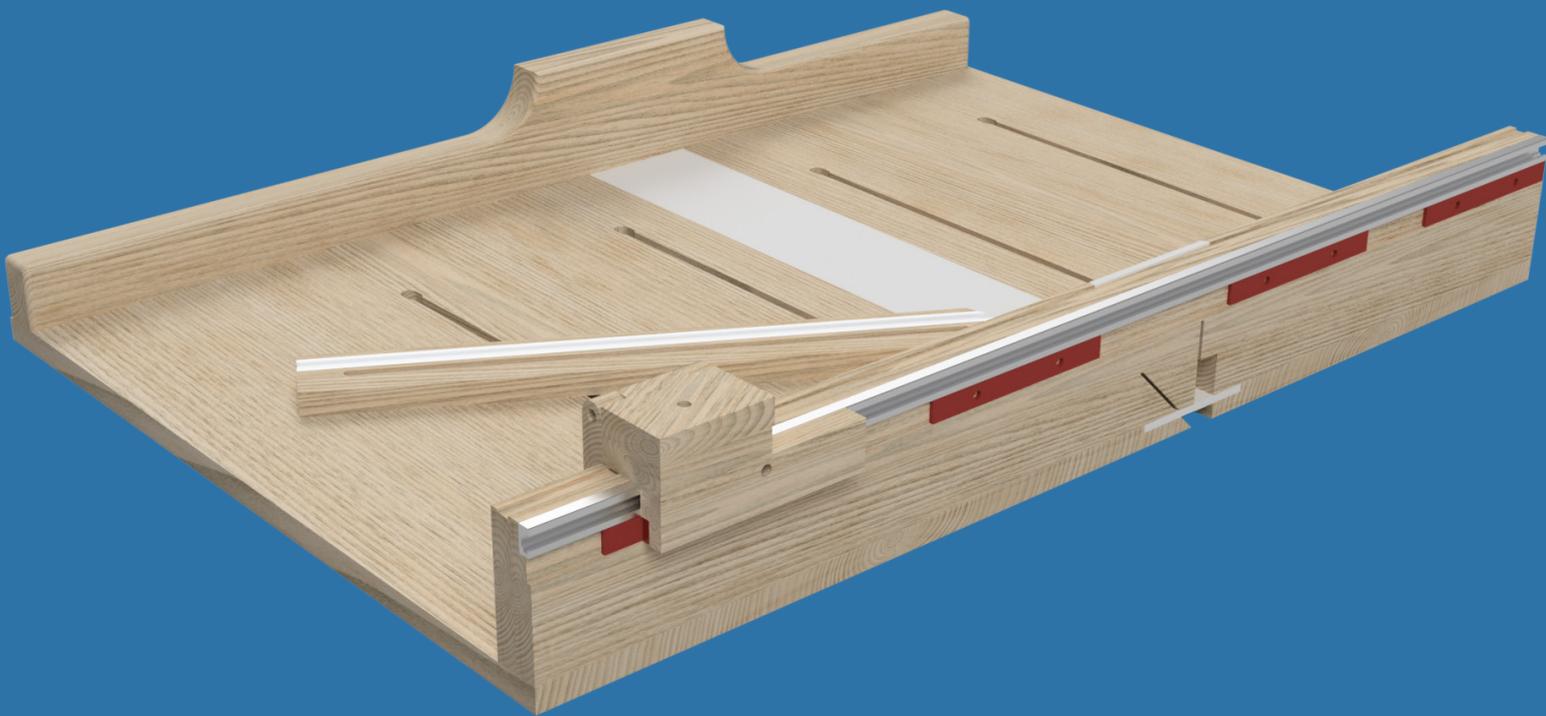


Timbecon



CROSS CUT SLED

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Introduction

A crosscut sled is one of the most vital jigs that you can build for any table saw. Don't kid yourself though, this particular sled is not just a one trick jig - you'll be able to use a dado stack, different blades, or angled cuts while not losing the desirable zero-clearance for tear out free cuts.

Throw in some auxiliary fences and you can do compound cuts or set it up like a [Wedgie sled](#) for segmented turning.

This document has an accompanying video, so head over to [The Wood Knight on YouTube](#) if the instructions are unclear.

Required Tooling

Tool	Use
Router	Tracks in base, dovetailed insert
Table Saw	Cutting things real good
Router Table	Aux fences
Cordless Drill/Driver	Installing fence

Optional Tooling (though recommended)

Tool	Use
Random Orbital Sander	Smooth plywood out to be buttery smooth
Drill Press	Insert plates & flip stop.
Bandsaw	Back fence curves/weight reduction
Bench Belt Sander	Smooth curves, and create profile for hinge

Parts

Hardware Kits

There are two Timbecon Crosscut Sled Hardware Kits, the Standard and Deluxe.

The **Standard** kit includes

- Two 1220mm T-Tracks
- Ten 63mm T-Track Bolts (5/16" with 1/2" head)
- Four star 5/16" threaded knobs
- Incra Metric Rack
- Small T-Track hold down/clamp

The **Deluxe** kit includes all the above as well as

- Two Aluminium Mitre Bar/Runners
- Large T-Track hold down/clamp

Other Hardware

In addition to the hardware available in the two hardware kits, you'll also need:

- Some wood screws to affix the two fences and Incra Racks
- Six T-nuts
- Six flat head cap screws¹ with matching thread to the T-nuts.

I recommend M6 or smaller.

Wood

My sled is made from **18mm plywood** and **6mm MDF**. However, all plywood will work just fine too. In fact the base can be constructed from any stable sheet good - MDF, melamine, hardwood or softwood plywood. This can be constructed from laminations of materials (which can be beneficial if you don't want to use a dado cutter for the zero clearance inserts), but 18mm thickness is needed - any thinner will not be stiff enough, any thicker and you may lose too much cut depth.

The front (user side) fence should be constructed from plywood for strength and stability, the back fence can be plywood or hardwood.

Also make some consideration towards the weight of the sled when selecting materials. My last sled was made from Birch ply and is *noticeably* heavier (and more awkward to use) than this 'Malaysian hardwood' plywood.

Material	Use	Quantity	Size
18mm Plywood	Base	1	950x650mm
18mm Plywood	Fence Parts	4	100x950mm
6mm MDF	Insert Plates	1 (at least)	650x100mm
6mm MDF	Fence insert plate	1 (at least)	90x120mm
Hardwood	Runners, optional	2	650x20x10mm

Customising it to your saw

This sled is designed around some very specific parameters of my table saw - a SawStop Contractor. However it is pretty easy to adjust the values to your saw, though you may have to dig out the owners manual.

You'll want to look for the **Max Blade Height at 90°**, **Max Blade Height at 45°**, **Max Dado Width** and **Max Dado Height** and adjust the "Fence Cutout Detail" drawing values accordingly.

Base Layout

Cutting the tracks

You will need a 5/16²² (7.9mm) and 1/2" (12.7mm) router bit. A clamping guide³ should be used too, though a jointed piece of wood or straight edge clamped will work just as well.

Clamp the guide across the base, offsetting it the distance between the center of the cutter and the edge of your router base.

In my case (Bosch GOF 1600 CE) it was 73mm.



Using the 1/2" cutter first, route a groove slightly deeper than the thickness of the T-Track bolts. If the bolt head is proud, it'll drag on the table saw surface and skew the sled. At the "back end" (towards the back fence) of the sled, plunge all the way through the material to create a cut out large enough for the bolt head to pass through. This slot should be about 25mm long.

Without moving the clamped guide, switch to the 5/16" cutter, and take several passes to go all the way through. By not moving the guide, the 5/16" slot will be perfectly centred in the 1/2" slot. After the first slot is done, rinse and repeat for the other 3 slots.



2 [Torquata Straight Flute Router bits](#)
3 [Beladonia Power Tool Guide Rail System](#)

Attaching aluminium mitre runners

If you purchase the Deluxe kit, you'll have two aluminium mitre bar/runners. Open up their packages, and fit them to your table saw by adjusting the set screws. I found it easiest to almost back the screws almost all the way out so they wouldn't fit in the mitre slots at all, then 1/4 of a turn at a time advance the screw until they fit. Once one screw would fit in, repeat the process for all of them.

Put a few small washers in the mitre slots, then place the mitre bars in on top of them. Place a few strips of double sided tape on the mitre bars, then position the table saw fence to 400mm - this helps with aligning the sled. Put the sled where you want it in relation to the mitre bars, then push down to press it up against the double sided tape.

Gently slide out sled, flip it over and drill pilot holes then screw in the provided screws - a Vix bit⁴ (self centering drill bit) is a good choice here. There is no need to remove the double sided tape, but it won't secure the runners by itself.



An alternative to double sided tape is to use a few drops CA (cyanoacrylate) glue - be careful not to glue your sled to your tablesaw!

Making your own wooden runners

If you go for the Basic kit, you'll need to make your own runners. While wooden runners are probably the 'trickiest' part of this sled, that is all relative and they're not too hard to make.

Measure your mitre slot - they're typically 3/4" (19mm) x 3/8" (9.5mm), but there is variation. Choose a stable hardwood (softwood and plywood are undesirable) - the denser the better. Cut the strip to slightly wider than your mitre slot. Test to make sure it doesn't fit the slot, then nudge your saw fence over to trim the slightest amount off *or* head over to a thicknesser to remove 0.1mm. You want a tight fit that has no play, but can still slide freely in the slot.

Then trim the height (thicknesser or table saw) to be slightly under the table height (~8.5mm). This dimension isn't as critical.

To mount the runner to the sled, use the same trick of washers underneath the runners, but apply wood glue then weights (tool boxes, benchtop tools, etc) to clamp it in place until the glue cures.

4 [Vix bit \(MC-2316\)](#)

Dado for insert

To handle swappable zero-clearance plates, we need to create a dado for the insert to fit into. Carefully raise the blade height to the thickness of your insert material (ie 6mm MDF), and perform a few test cuts on scrap pieces to ensure that you have the right height. You want it sitting flush (or worst case, slightly below so you can shim it with paper later)



Alternatively, a router table or router with edge guide can make this cut out pretty easily.

If your dado stack leaves behind coarse grooves/ears, it may be wise to slightly undersize the groove and come back with a rabbeting block plane to smooth the surface out.

Fences

Preparing the fences

Both fences are constructed from two layers of 18mm plywood. The desired size is 90mm high. However, cut the layers a little wider at ~100mm. This allows enough room to easily clean it up using a saw to make sure everything is dead flat.

Glue up the two layers using wood glue and leave it overnight to dry properly. If you have a jointer or jointing sled for a table saw, you don't have to worry too much about alignment. If you don't, it's best to leave one edge overhang slightly along the whole length (consider cutting one piece to 110mm instead of 100mm).

After the glue is cured, use that extended edge against the fence of your table saw to trim to the opposing edge square and smooth, then flip and cut to final width.

Cutting the profile

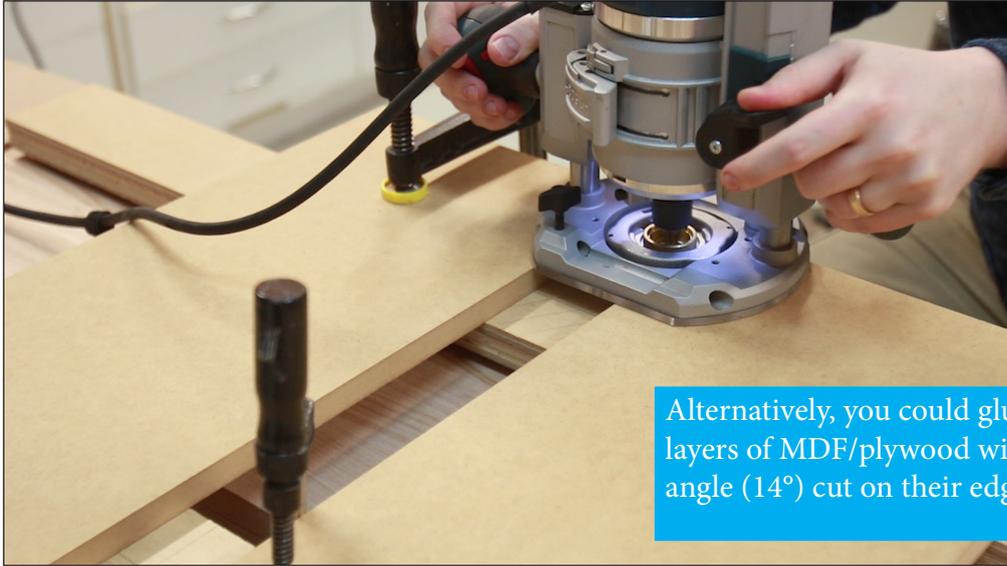
To house both the T-Track and Inkra positioning racks, two dados are needed on the user-side of the front fence, and a very shallow dado for the scales (ruler tape) on the top.

As always, do test cuts beforehand to establish the exact sizes - a tight fit makes alignment easier as well as the stop block glide smoothly.

Dovetailed Insert

Like the base of the sled, the fence receives a dado to accept an interchangeable zero clearance plate. There is some irony that if you have a crosscut sled, this step would be trivial.

Using a router with a guide bushing, two fences can be setup to hog out all the material for the insert.



Once the majority of the material is gone, switch it out to a dovetail bit, adjust the fences and route the dovetail edges into the side.

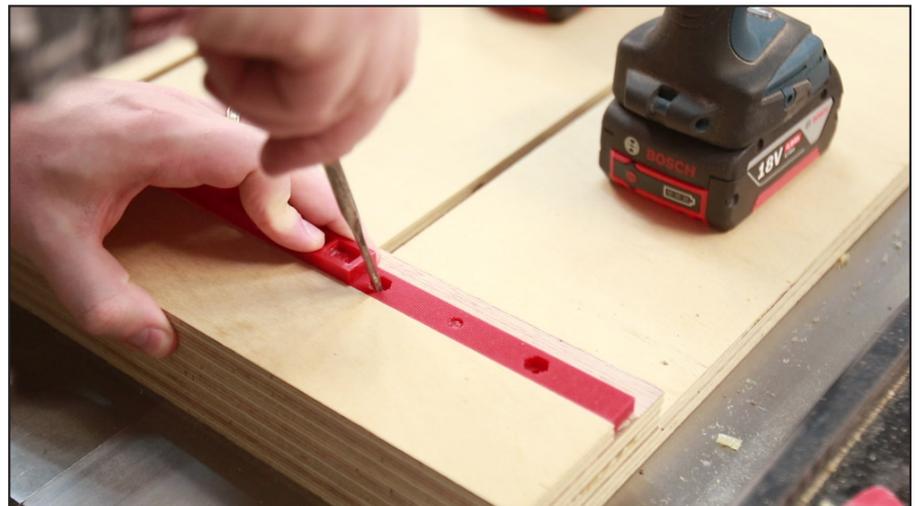
Installing T-Track, Incra Rack

The aluminium T-Track can easily be cut with any woodworking tools - hacksaw, handsaw, jigsaw, bandsaw, tablesaw, or my preference - the mitre saw. Just feed the blade through a little slower than you would for hardwood, and make sure you've got eye protection on.

Cut the T-Track down to 1000mm. To drill mounting holes, use a 2.5mm twist bit to drill a through hole, then a 5 or 6mm twist bit to counter sink the hole for 6 gauge screws.

The T-Track fits into the upper of the two grooves on the user-side of the front fence, secure it with at least 5 screws.

The lower groove houses four of the five Incra racks. These should be positioned so that it doesn't matter where the fifth rack is, it should always engage at least one rack. Install (using two 6g screws) the first rack about 50mm in from the edge of the left side, then use the fifth rack to space out and lock in the second rack. You want each of the racks to mesh properly, so its important to align it with the 'spare' rack.



Back Fence

The back fence is laminated and trimmed just the same as the front fence, however it does not need to be the full height across the entire length. To reduce weight and it make it look more attractive, its recommended to cut some curves/material off. Make sure to leave about 200mm (100mm either side of where the cut line is) for strength.



Auxiliary Fence

The auxiliary fences provide an easy way to make angled cuts and are just one type of accessory that can take advantage of the routed tracks. A pair of them can be used like a Wedgie Sled to create segments for turning.

Using a dado stack at the tablesaw (alternatively rebate or straight bits at a router table), cut away a rebate for the T-Track to sit in.

Two pilot holes should be drilled through the aux fence where the through slot goes. Use a 8mm or 5/16” drill bit. These will serve as the start and stop points when routing.



Using the same 5/16” router bit from earlier, over at the router table “connect-the-dots” and route the groove between the two previously drilled holes. Do this in stages of about 4mm height per pass. Cut the remaining T-Track down to 500mm and mount it to the groove in the aux fence.

Finally the corners should be knocked off both the T-Track and plywood - you can do this at the mitre saw cutting through both the plywood and aluminium at the same time. By having it angled on both ends, the aux fence can get closer to the front fence, allowing larger capacity.

Assembly

Attaching the back fence

The back fence can just be screwed on - its alignment isn't critical and is there entirely to provide rigidity/stability to the sled.

Use at least six 50mm screws to secure the back fence.

Attaching the front fence

Until you calibrate the fence (see below), just attach the front fence with two screws - one at each end of the fence, about 50mm in from the edge.

Calibration, the 5 cut method

The 5 cut method is the easiest and likely most accurate way to get the all important front fence properly aligned to the blade.

Get a scrap piece of some sheet good - I found out the hard way that MDF works far better than "packing" grade plywood which splinters if you look at it funny. Ideally the piece will be as big as safely possible to fit in the sled - let's go with 400mm square.

With the sheet up against the fence on the left side of the blade, make cut #1 on the sheet cutting off just slightly more than your blade's kerf, then rotate the board clockwise so that the freshly cut side is now against the fence. Rinse and repeat for 3 more times. Each of the offcuts can be discarded.

At this point you should be back to the original cut edge lined up ready to be cut again. This time slide it over to cut off 25mm or so. This time, keep the cut off and make note of its orientation (just "front" and "back").

Take that offcut and measure both the "front" and "back", subtracting one from the other to get the "out of square" error.

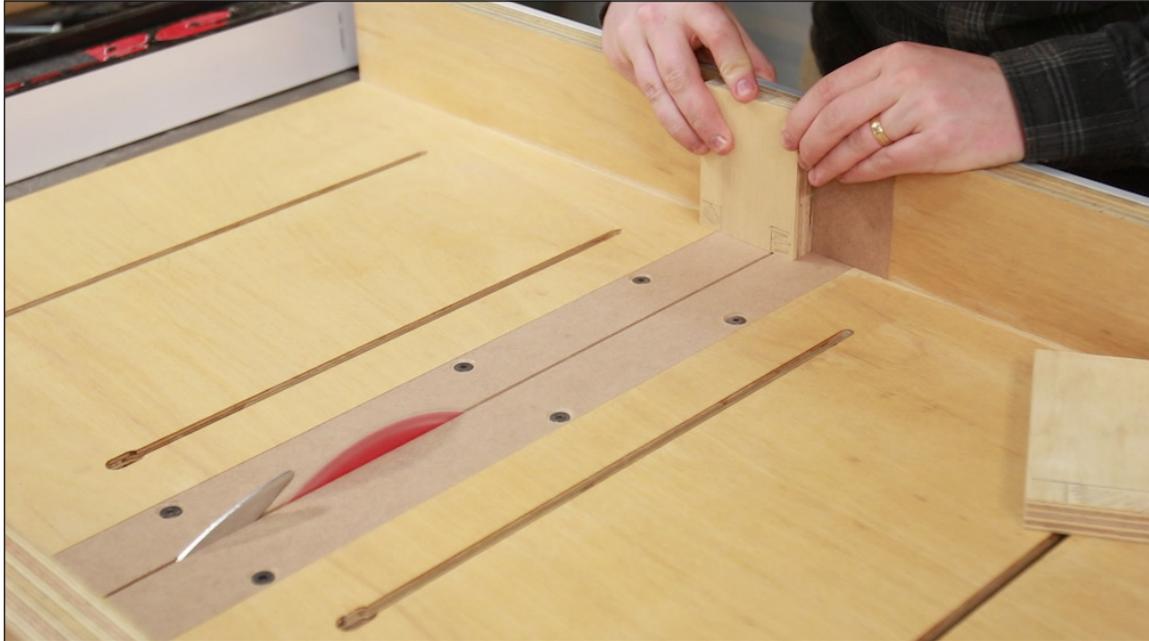
ie, $25\text{mm} - 24.5\text{mm} = 0.5\text{mm}$ over the 400mm

However that value is actually four times greater than the true error as the cut travelled around the board resulting in an error of 0.5 over 1200mm.

To correct that error, clamp a block to the base of your sled pressed up against the fence. Remove one screw, add in a feeler gauge of the error you had, push the fence up against the feeler gauge and clamped block, then drill a new hole, screw down and repeat the 5-cut method until you're happy with the result.

Repeatable stop

The heart of this sled is the repeatable stop. Using the Inkra saw tooth positional racks which pull the stop block into the same position they were previously at - that is, if you're aiming for 50mm, it'll always be exactly the same rather than 50.1mm or 49.5mm depending on your eyesight.



Cut out all the pieces from 18mm plywood. The hinge parts are the 'trickiest', but really they're just a single box joint. The top (shorter) piece can be cut with just four cuts, while the actual stop piece requires hogging out a fair bit of material - you could switch to a dado stack or even a bandsaw once you've cut the establishing lines, but even with a thin kerf blade, it doesn't take too long.

Once they fit snugly together, take it over to the drill press and drill through both pieces at the same time for whatever pin you'll be using - I went with a M8 bolt. While at the drill press, drill out the remaining blocks according to the drawing.



Separate the two parts out, and take them to a sander (or router table with roundover or bullnose bits) and sand a curve into it so the hinge can actually pivot

Assembly is fairly straight forward, with only the 'bracket' on the back being glued together.

Eventually I'll come back to this stop and create a micro-adjust feature to get sub-mm accuracy. The plans for that - when they're done - will be freely available on TheWoodKnight.com

Finish

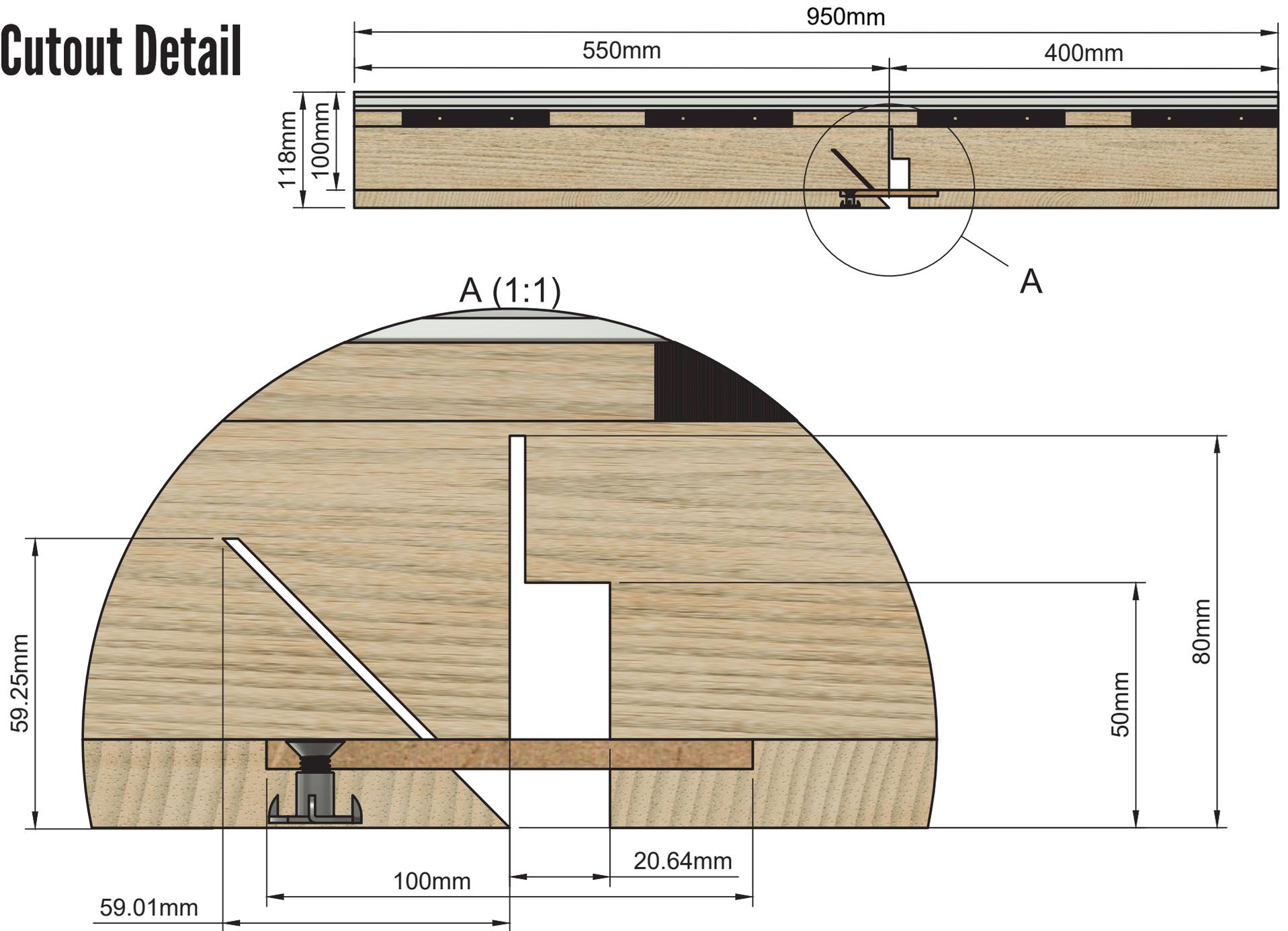
The crosscut sled doesn't strictly need any finish, though wax¹ on the underside and some sort of sealer on the rest of the sled aren't a terrible idea. The wax reduces friction further making the sled glide effortlessly, and a sealer on the rest serves two purposes - it'll firm everything up, and it can make it easier to visually see unfinished work pieces against a finished sled - particularly useful if you use that type of MDF/plywood in other projects!

I find for these sorts of shop projects, shellac² is perfect as it dries nice and quickly.

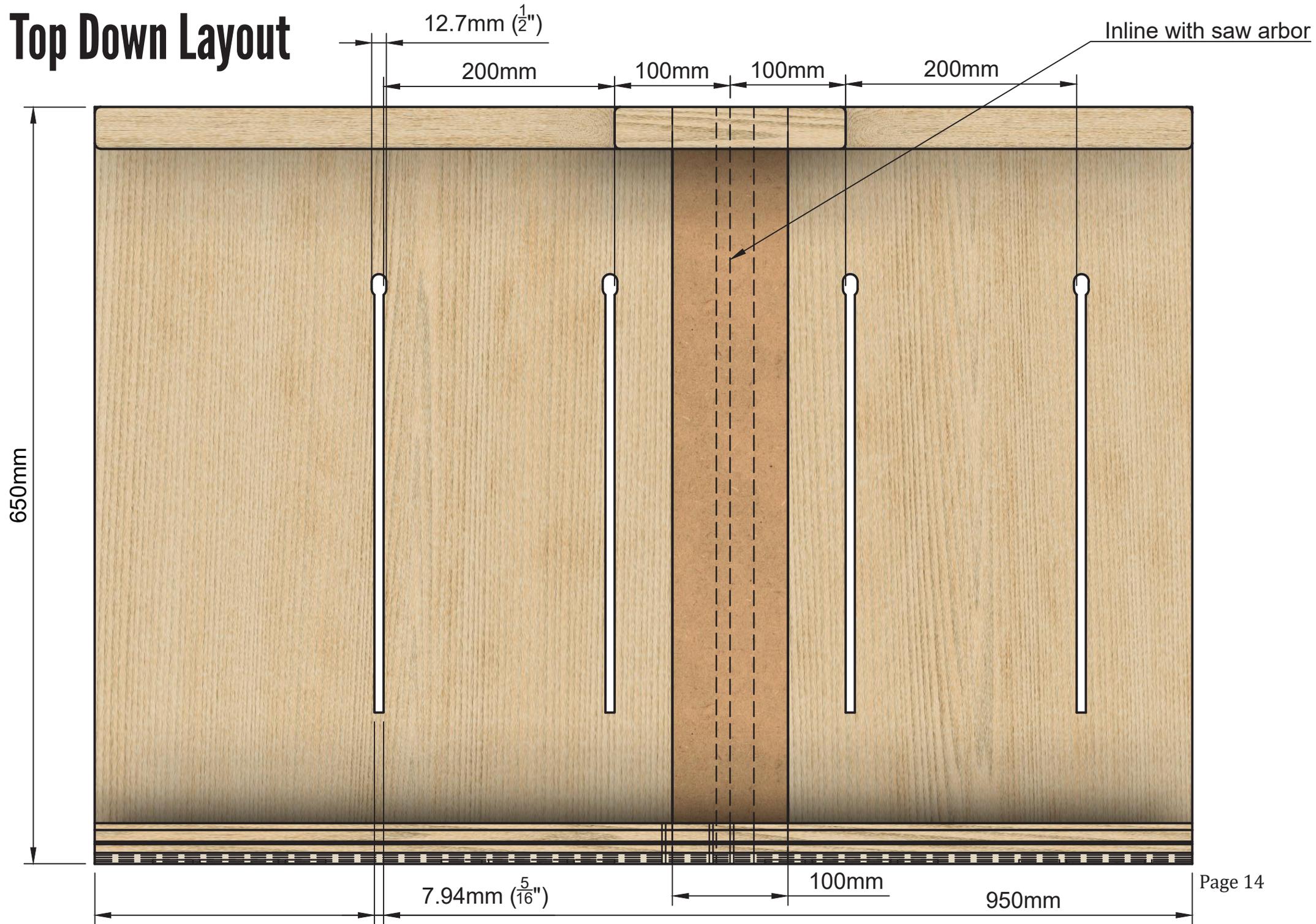
1 [UBeaut Traditional Wax](#)

2 I make my [shellac from flakes](#), but any (non-paint) finish is fine

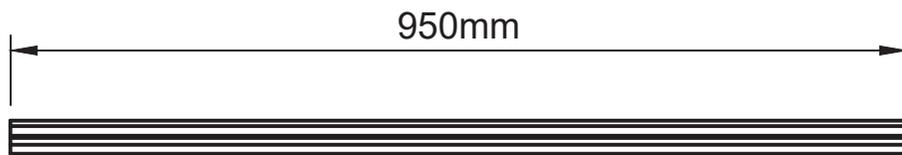
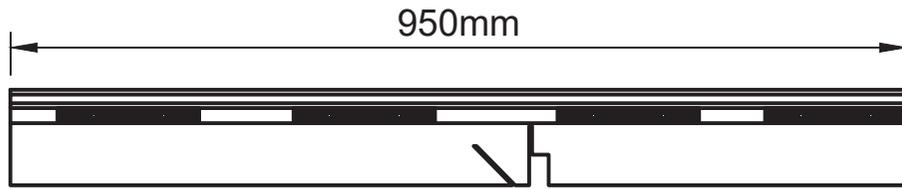
Fence Cutout Detail



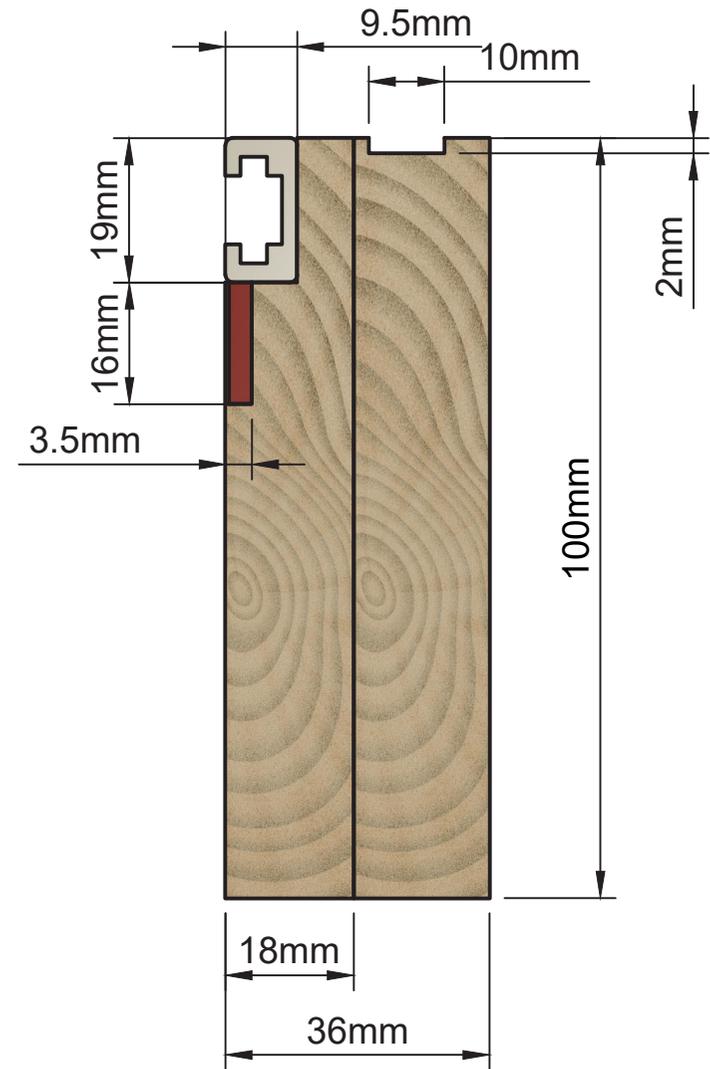
Top Down Layout



Front Fence Profile

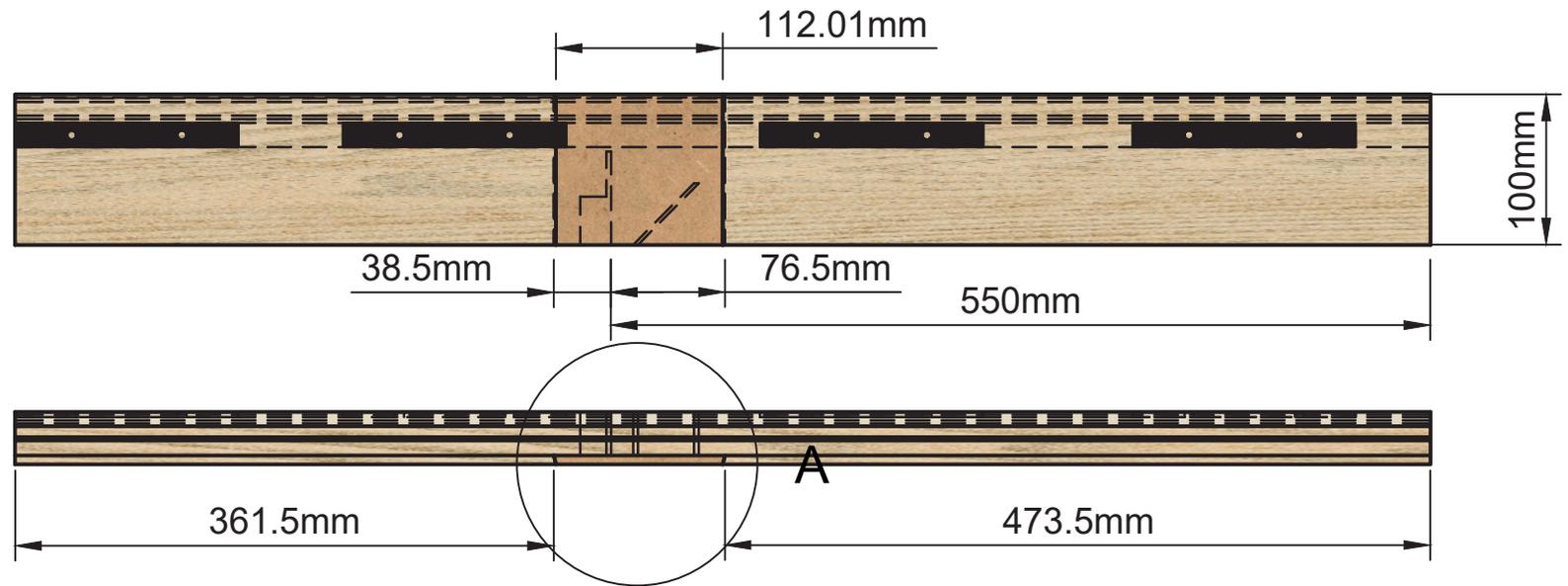


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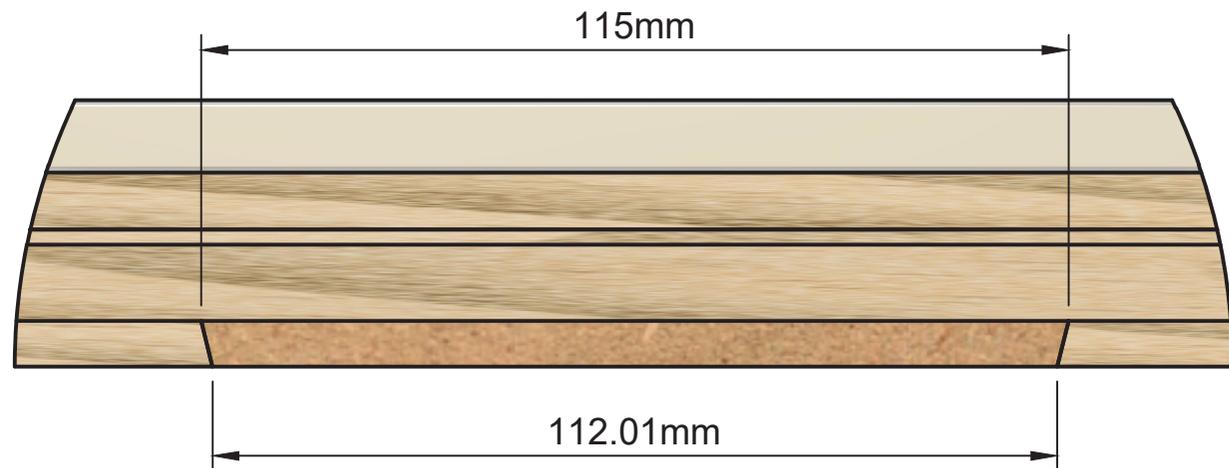


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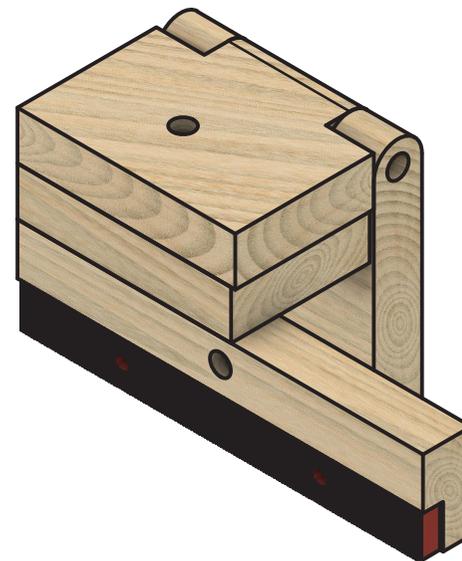
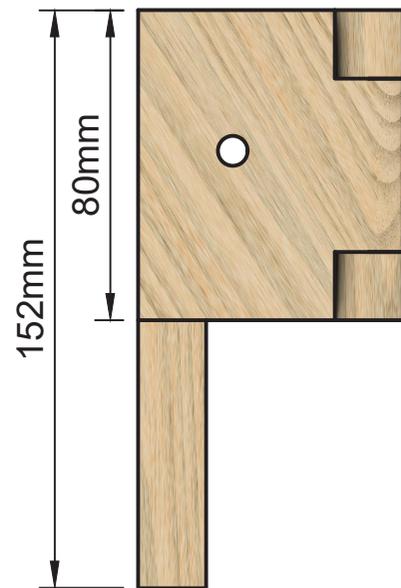
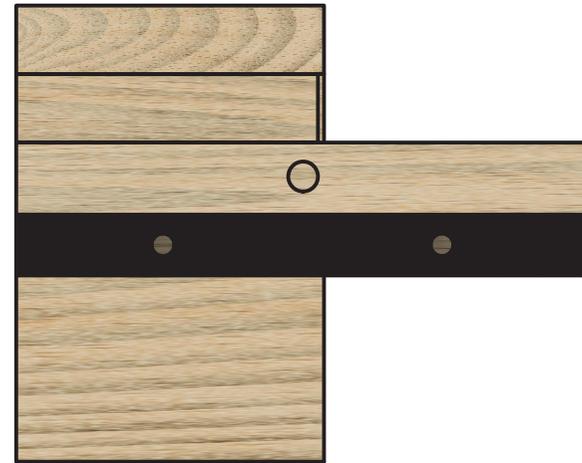
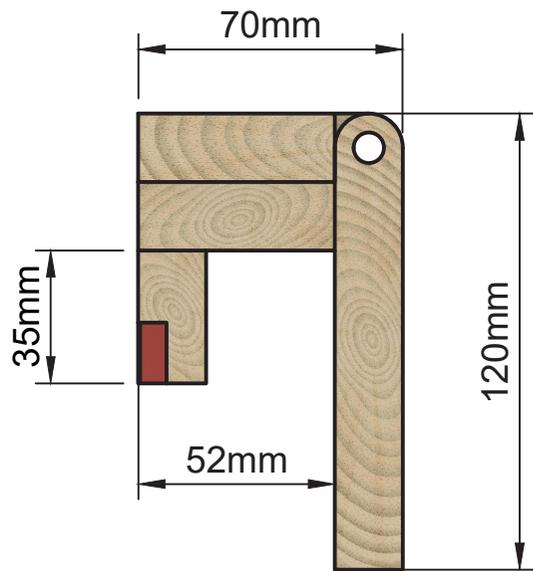
Front Fence Top Profile



A (1:1)



Flip Stop



Auxiliary Fence

