DOVETAIL PLANNER AND SPACER CALCULATOR FOR THROUGH DOVETAILS ON A BANDSAW

A note on units

You can use whatever units you like so long as you are consistent. However, the spreadsheet is set up to use decimals, not fractions, so metric units work best - mm unless you are making giant furniture.

Instructions

Preparation

1 Use the correct bandsaw blade and check the kerf of the blade:
Always use a good quality and sharp bandsaw blade 4tpi for thick boards or 6tpi for thin ones.
To check the kerf, the best way is to have a piece of timber with parallel sides. Measure the width accurately , then make 4 (or more) lengthways cuts.
Put the pieces back together and remeasure the width. Divide the difference by 4 (or whatever) to get the kerf.
If you add a small amount (0.1 - 0.2 mm) then this will reduce the risk of a loose fit, but will mean fitting takes longer.

2 Make sure all the boards are exactly the same width and measure it accurately.
If you want to have unequal boards, it is best to start with the same size and then cut down.
(Failing that, then make the narrower board up with a piece of equal thickness, stuck on with double-sided tape).

3 Measure the thickness of the boards accurately, making sure they are flat and even.

4 Decide on your dovetail angle and make a jig to match.
8 degrees is a good general purpose angle as it is about 1:7 and is easy to find on most bandsaw tables.
Make the jig as indicated in fig 1. For normal work (e.g. drawers etc), an overall length of about 10" (250mm) is fine, and a thickness of about 3/4" or 20mm. Write the angle on the jig. The notch sould be small enough to allow the spacers and caps to fit (see fig 6).

5 Finger joints (dovetail angle = zero) can be made but read the "Tweaks" section in the "How To" first.

Design the dovetails and calculate the spacers

1 Put the measurements into the Calculator form - i.e. widths, thicknesses, the kerf and the dovetail angle.

2 Plan your dovetail layout, entering the following data:

* Number of tails:
  Any positive whole number. All the tails will be the same size. If you want to be clever and do different sizes then read the "Tweaks" section in the "How To".
* Pin widths:
  The first column is the width of the two half-pins and the main pin at the base of the pin (the wide end).
  If you are going to cut down the pin board later (e.g. for drawers) then also enter an amount for that reduction.
* Trim tolerance:
  This is optional, but recommended, to ensure that the tails are slightly proud of the pin board and can be trimmed flush.

Look at the picture and make sure that is what you are expecting! If not, change the inputs accordingly.

Cut the spacers

(Each spacer is numbered. If the dovetail pattern is not symmetrical there will be two versions of the last spacer.)

1 Make spacers of the indicated width from similar thickness board as the angle jig and as long as the cut-out diagonal section.
Accuracy is important here: tune the spacer width as accurately as you can and particularly ensure the edges are smooth and parallel.

2 For all except the last spacer, fix a cap to the top as indicated in fig 2. Note that the cap must allow the pices to fit (see fig 5).
Write the number of each spacer on both sides.

4 Cut a small "filler" piece to the length indicated.
Place the angle jig against the bandsaw fence and put the filler piece in the notch, followed by an end spacer.
Adjust the fence so that the blade just touches the corner of the spacer (see fig 3).
Remove the filler and slide the spacer into the notch of the angle jig.
Cut a notch in the spacer about 1" (25mm) long (see fig 4). This ensures the notch is accurately positioned.
Repeat this for the other end spacer (if there is one). There are no caps on the end spacers.
On each end spacer write "End" and (if the pattern is not symmetrical) the words as indicated in the spreadsheet.
e.g. "Edge A towards fence" indicates that this is the spacer to use when Edge A of the board (see diagram in spreadsheet) is nearest the fence.

Fig 1

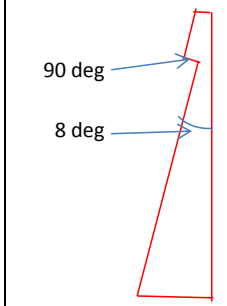


Fig 2

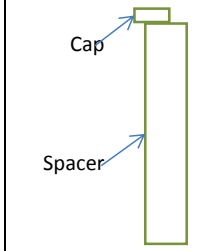
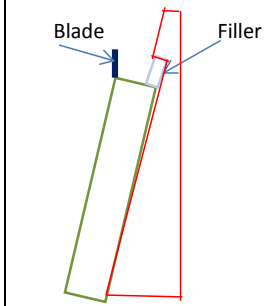


Fig 3



5 An alternative method for the end spacers is described in the "How To".

Label and prepare the boards

1 Label the boards clearly (preferably stick on labels or use masking tape).
Label the edges of the boards "A" and "B".
For tail boards which have different joints at each end (e.g. drawer sides), label the ends clearly.
All labels should be on the outside (face side) of the boards as these will be uppermost.
Label a test set of boards (same dimensions as real boards, except shorter) similarly.

2 Mark the shoulders on each board a gauge (cutting gauge is best as it is across the grain).
The gauge should be set to the thickness of the other board plus the trim allowance.
For tail boards, the trim allowance **must** be that specified in the spreadsheet.
For pin boards it can be whatever you like to finish at the correct size.

Do a test!

1 Cut a test set of boards (as below) and check for fit.

2 Keep this test set as it can be used to double check the real boards before cutting.

Note: The tail boards, after cutting, will not fit in the same way against the spacers/jig - this can make it look as if the cut will be wrong. To fix this do not cut away all the waste on the edges of the tail board when checking the fit.

Cut the boards (simple version - one joint)

Cut the pins first:

1 With fence on the left and table angled 8 deg (or whatever) negative (i.e. fence side is lowest):

1.1 Place all spacers (not angle jig) against fence (lowest number nearest fence) with the caps overlapping.
Use appropriate end spacer (i.e. "Edge A towards fence" if edge A of the board will be on the left)

1.2 Adjust the fence so that the blade just rubs aginst the end spacer but will not cut it or lift it if the blade is moved upwards.

1.3 **Remove the end spacer.**

1.4 Place the pin board, outside uppermost, with the correct edge to the fence side, into the notch formed by the cap of the last spacer (see fig 5). **[Check with test board before cutting - always do this after a change of fence position or board]**

1.5 Slide the assembly forward and cut down to the shoulder.

1.6 Remover the last spacer and repeat cut. Repeat until last cut is with no spacers.

2 With fence on the right and table angled 8 deg (or whatever) postive (i.e. fence side is lowest):

2.1 Place all spacers (not angle jig) against fence (lowest number nearest fence) with the caps overlapping.
Use the other end spacer (i.e. "Edge B towards fence" if edge B of the board will be on the right)

2.2 Proceed as above.

Now cut the tails

3 Leave the fence right and level the table.

3.1 Place the angle jig against the fence and place the spacers against that. Use the appropriate end spacer, with the notch on the left.

3.2 Adjust the fence so that the blade just clears **the notch** in the end spacer (see fig 6).

3.3 Remove the end spacer.

3.4 Cut as previously, removing one spacer at a time. Always slide the assembly as a whole when cutting and removing (see fig 7).

4 Put the fence on the left, with the table level.

4.1 Proceed as above, using the other end spacer, with the notch on the right.

Tip: To ensure you are cutting with the board the right way round, leave the end spacer somewhere on the table to indicate which edge should be against the fence. And check with the test piece too!

Multiple joints (this is where the real time saving is)

Note: Often this will arise when making a set of similar drawers. That is what is assumed here. Quite likely there will be two different joint patterns - one each for the fronts and backs, so you will need two spreadsheets and two sets of spacers.

With fence left and table at negative dovetail angle:

1 Cut all the back pin boards using the "back" spacer set as for the "one joint" instructions.

2 Cut all the front pin boards using the "front" spacer set.

Fig 4

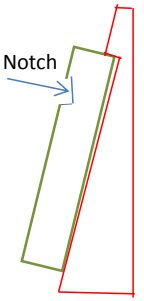


Fig 5

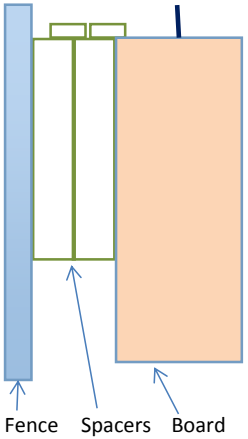
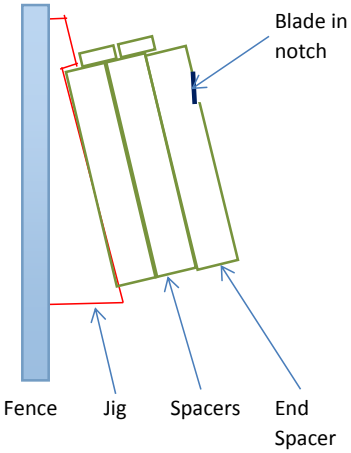


Fig 6



With fence right and table at positive dovetail angle:

Repeat as above (with the other end spacer, as appropriate)

With fence right and table level

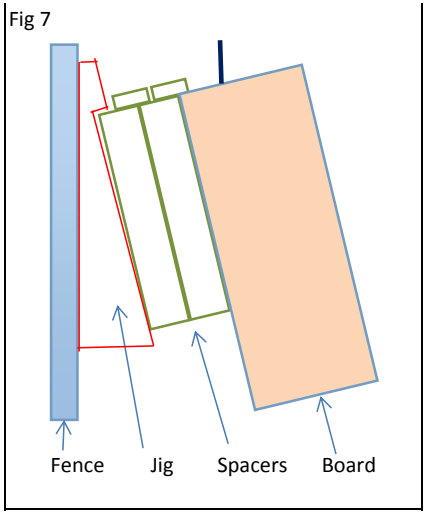
1 Cut (one side of) the back tails of all the drawer RHSs using the "back" spacer set (this will probably be edge A against the fence).
2 Cut (one side of) the front tails of all the drawer RHSs using the "front" spacer set (this will probably be edge B against the fence).
3 Repeat for the drawer LHSs, but note that the other end spacer will be needed in each case.

With fence left and table level

1 Cut the back tails of all the drawer RHSs using the "back" spacer set (this will probably be edge B against the fence).
2 Cut the front tails of all the drawer RHSs using the "front" spacer set (this will probably be edge A against the fence).
3 Repeat for the drawer LHSs, but note that the other end spacer will be needed in each case.

Tip: Although it seems complicated, so long as you ensure that the correct edge is against the fence for the end spacer used, it will be OK.

Fig 7



Remove waste

1 Mark all the waste first before cutting.
2 The space between pins can mostly be cut out with a bandsaw - either chopping or slanting cuts depending on sizes, but always do this **face down** to avoid cutting the pins.
3 Remove remaining waste with a coping saw, then with a chisel, as for hand-cut dovetails.
Note: Do not remove the bottom corner of the backs of drawer sides - see notes below.

A note about drawers and boards of unequal width

Typically drawer backs will be narrower than the sides, so that the bottom, running in grooves on the sides, can go underneath the back.
Also the top of the back may be lower than the sides by a few mm.

1 As described in the opening section, start with the boards the same size.
2 Enter the amount of the cut-out for each edge in the calculator. Make sure that the bottom half pin is wide enough to include the groove.
The groove will need to fall within a tail at the front.
3 Make all the cuts as usual.
4 Do not remove the waste at the bottom edge of the drawer sides (tail boards).
5 Cut the groove on the insides of the drawer sides and the back pin board.
N.B. if the ends of front tails are to be exposed, make sure that the groove is stopped short of the front.
6 On your bandsaw, cut the bottom off the back pin board, using the top edge of the groove as a guide - i.e. cutting just to the waste side of the top of the groove.
7 Use the top of the groove to reference a mark around the shoulders of the tail board with a marking gauge.
8 Mark the waste and then remove, cutting on the waste side, with a bandsaw etc.
The resulting half pin on the back should then locate above a "finger" containing the groove on the side.
The top is simply trimmed as required and the sides feathered to match.