

How square is square?

If you are into furniture or box making, you're into square. But, how often have you at least suspected that your table or mitre saw is not square - or found out the hard way that it is not. And lets face it, squares are not always square. Here is a simple way to fine tune your mitre or table saw and put the matter to rest - once and for all.



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Mitre Saws

Most enthusiast wood workers have a mitre saw so we'll start with these. If the saw is not first set up accurately to cut 90° then all angles to the right and left will be incorrect. Including the all important 45° cut. Before starting use a square to ensure that the blade is set vertically to the saw table. Ensure it is not fouling any teeth. Set the mitre saw to 90° and lock the table.

1. Start with a scrap piece of 16mm MDF with one straight edge. About 200mm x 200mm, or whatever the capacity your saw can handle. Larger is better because it magnifies any error. Mark this straight edge X, place it against the rear fence and cut about 5mm to waste off the right hand edge. Mark this CUT #1. (Pic 1)

2. Rotate the work piece anti-clockwise so that cut edge #1 is against the rear fence and cut 5mm off the right hand edge. Mark this CUT #2. (Pic 2)

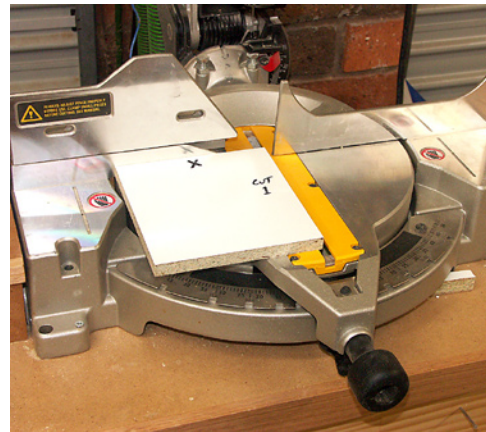
3. Place cut edge #2 against the rear fence and chop 5mm off the right hand side, mark this CUT #3

4. Now disconnect the power, fully lower the blade and lock it, raise the guard if you need to. Place cut #3 against the rear fence and slide the work piece to the right so that edge X is up against the left hand side of the blade. If the saw is square, edge X will be parallel with the blade. (Pic 3) Any parallelism error is magnified by 4 times! (So you will be pretty lucky if there is no error).

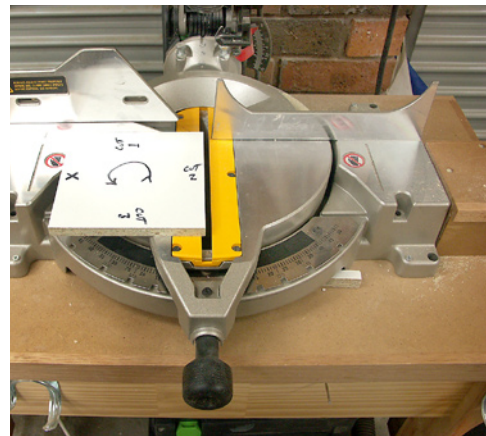
The fix

I'll describe how to fix a DeWalt because its what is pictured here, the same principles apply to others. (Incidentally I found my saw was not square when preparing the photos because I had never really checked or used it for fine work, preferring my table saw).

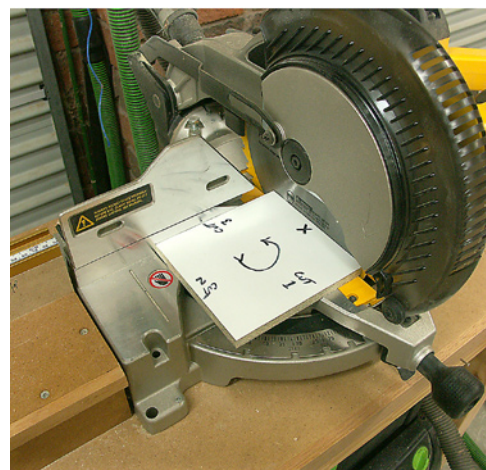
Loosen the two outer quadrant plate screws (there's another under the mitre clamp, but its best to have loosened this before you start), loosen the mitre clamp knob and gently rotate the base one quarter of the error between the timber edge X and the saw blade. (Repeat the above exercise until edge X is parallel with the blade). I nailed it first up, so its not so hard. Make sure you tighten the outer quadrant screws and the mitre clamp knob before cutting any timber. When you reckon its right, tighten the third quadrant screw under the mitre clamp knob.



Pic 1
The start. Straight edge of work piece (X) against the fence.



Pic 2
Step 2, rotate anti-clockwise so that Cut#1 is against fence, make and mark Cut#2 Cut#2. Step 3 is similiar, refer text.



Pic 3
Step 4, with power off and Cut #3 snug against the fence check that edge X is parallel to the blade. If its not read the text under "fix".

How square is square?

Table Saws

A square saw fence is even more important with large panel saws. It was the machinist installer of my Gabbett Mini-Max sliding half panel table saw who demonstrated how to test for square and showed me the fix.

Because you can use large panels (which magnify the error) you can tune the cross cut very accurately. You will never bother with a square again! Most larger panels are cut on sliding tables with the fence in front of the work piece, but the reality is that its easier and more convenient for smaller panels to be fed to the saw with the fence behind and pushing the work. We'll describe it this way because its how most home workshops work, and its the same for static tables (contractors saws and smaller panel saws) with mitre gauges or sleds.

1. Use a large 16mm MDF work piece (about 800 x 800) with one straight edge. Mark this straight edge X, pull it back snug against the front of the table saw fence (sled or mitre gauge). Push the fence & work piece forward to the blade and cut about 5mm to waste off the right hand edge. Mark this CUT #1. (Pic 3)

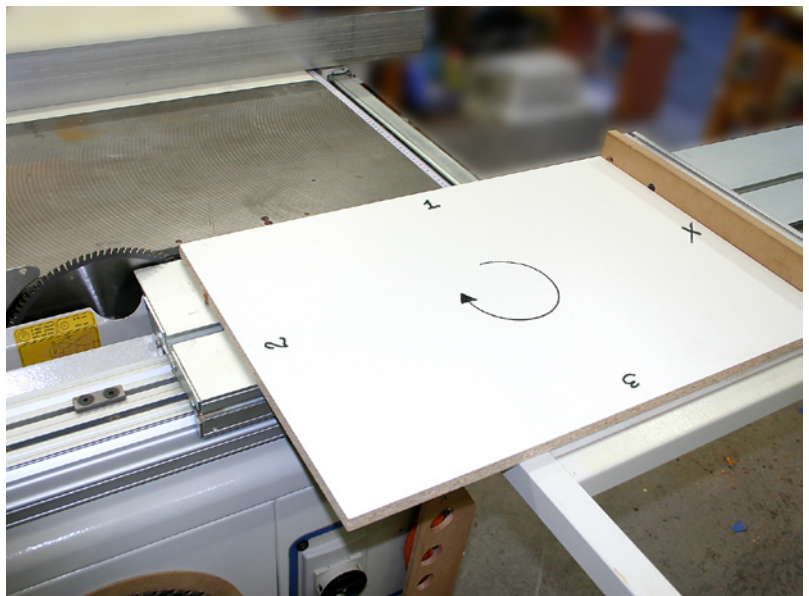
2. Rotate the work piece clockwise (not anti-clockwise!) so that CUT #1 is against the fence and saw 5mm to waste off the right hand edge. Mark this CUT #2.

3. Place cut edge #2 against the front fence and saw 5mm to waste off the right hand side, mark this CUT #3. (Pic 4)

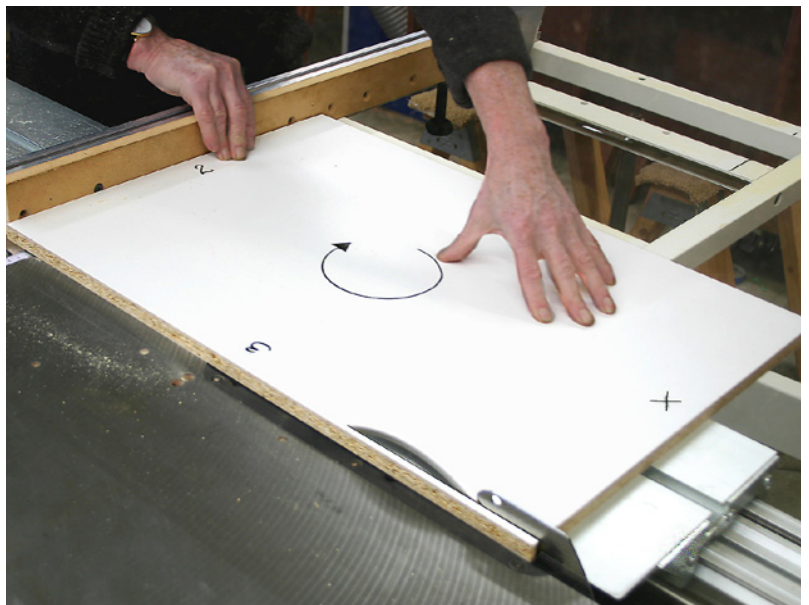
Now, what follows is the biggest difference to the chop saw sequence, and in fact it these steps that make the process so accurate.

4. Place cut #3 against the fence and saw a 20mm test strip off the right hand side (Side X). Mark the leading upper face of this 20mm cut-off (A) and it's trailing edge (B). Pic 5.

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Pic 3
The start. Straight edge of work piece (X) against the fence. Cut 5mm to waste and mark this edge CUT #1



Pic 4
Keep rotating the work piece clockwise and cutting 5mm to waste. This shows CUT#2 against the fence with CUT#3 happening. This is the third and last "waste" cut.



Pic 5
A 20mm test strip is cut off edge X. Before cutting, mark it A on the leading face and B on the trailing face.

How square is square?

Continued from previous page
Table saw tune-up.

(Point 4 continues)

Snap (or cut) the piece in half and bring end face (A) around so that it lies beside end face (B). Both faces are up at this stage. (Pic 6)

Flip both pieces of cut-off on their sides (so that you are looking down on fresh cut edges - not face material). End face (A) is alongside (and facing) end face B. (Pic 7).

Bring the pieces together. Any large error of cutting squareness will be visually apparent because one end of one piece will be higher than the other (magnified four times). Pic 8. You can run your thumb across the two surfaces to detect smaller errors. The pencil points to end face A and indicates where you will see any error.

The fix

Adjust your outside fence stop on a sliding table, or mitre gauge (on a static table) for one quarter of the error and repeat the entire test process until you get both A and B ends of your flipped 20mm off cut to the same height .

If end B is higher than end A you move the outside edge of the fence away from you (toward front of saw). If end A is higher than B, move the outside of the fence back toward you. In Pic 8, end A (under the pencil tip) is higher than end B so we will move the left hand, or outside edge of the fence backwards.

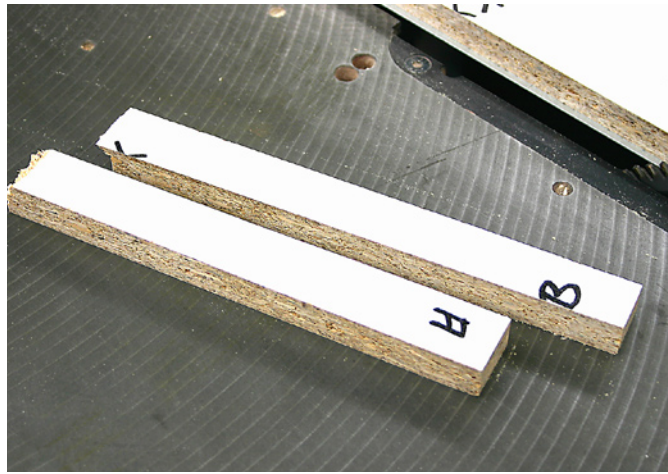
Be very subtle with your adjustments because the process magnifies any error 4 times. Even a large error requires the most minute adjustment. - If you are careful, you will get it dead square with two or three tests. If you over adjust each time, you will quietly go nuts as you turn a large piece of wood into sawdust. When you nail it, mark the sweet spot on your fence table clearly and precisely.



Geoff Birtles is a semi-retired marketing professional, writer, designer and long time hobbyist woodworker with particular interests in furniture, jigs and small box construction. He can be reached on gbirtles@bigpond.net.au

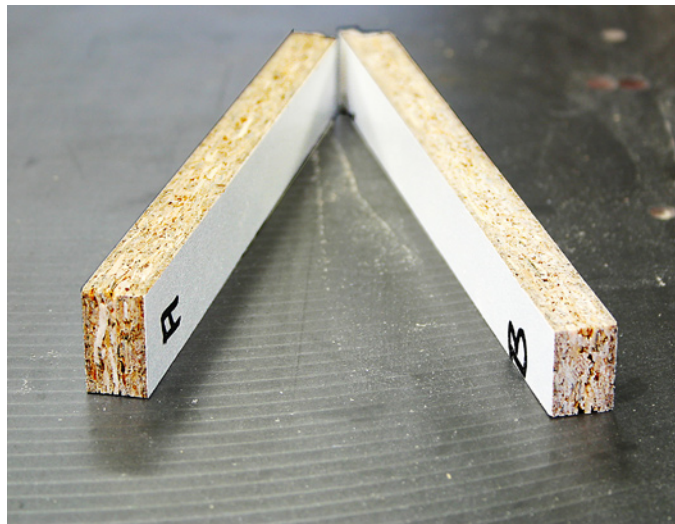
Acknowledgements

Some material in the Mitre Saw section is sourced from DeWalt's excellent instruction book that accompanies their chop saws. Gabbett's machinist/installer was most patient and helpful in demonstrating the Table-Saw techniques on my Mini-Max.



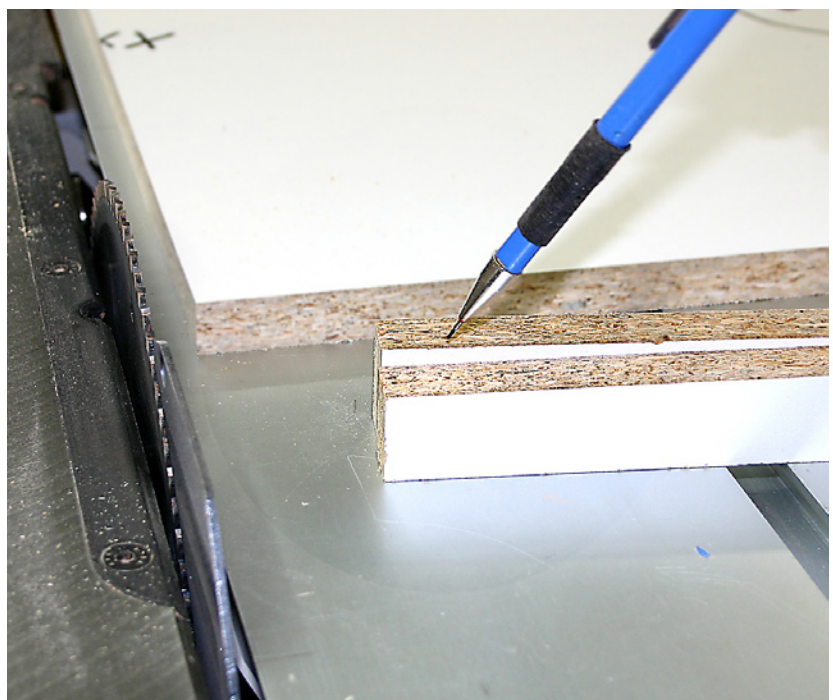
Pic 6

Snap (or cut) the test piece in half and bring end face (A) around so that it lies beside end face (B).



Pic 7

Flip both pieces of cut-off on their sides so that end face (A) is alongside (and facing) end face B.



Pic 8

Bring A and B together. Any large error of cutting squareness will be visually apparent because one end of one piece will be higher than the other (magnified four times).