# TB235 (Rev1) - Using XY De-skew

Note: XY De-skew is only available in CNC10 version 2.68 and later.

XY De-skew corrects for machine tools that have the X and Y axis manufactured out of square. It is very useful to correct out-of-square mechanicals on large format CNC routers and other machine tools. The procedure is simple. All you have to do is measure the diagonals of a square that was cut on the machine. Calculate the skew with a simple formula. Then enter the size of the sides of square and the measured skew into parameters P270 and P271 and the control corrects for the out of square. Now cut a new square and make a new diagonal measurements to verify your deskew correction.

Use a sufficiently large L x L square and program a drill cycle with INTERCON to make dimples in a ?soft? material like Aluminum, wood, or plastic at the corners of the square 2mm deep. A effective point tool for dimpling can be shop made out of a broken carbide end mill, simple use a grinder to fashion the tool into the new pointed shape. I'd recommend a 400mmx400mm square minimum size for a router. The Larger you go the more accurate and easily you can measure the skew.

Al,Wood,Plastic   Make dimples 2mm deep
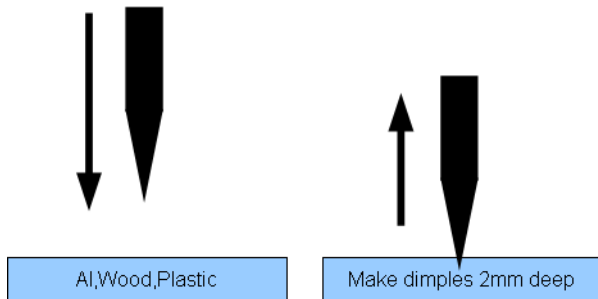
The dimples "drilled" into the material will now look like this. The spindle is not running while making the dimples.

Dimples at corners of "square"
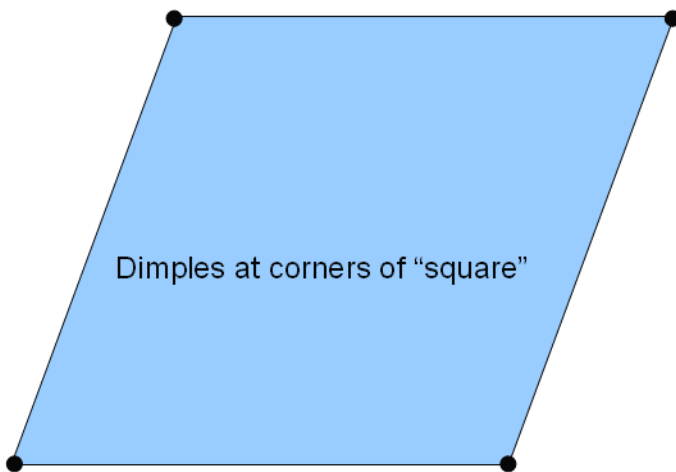
Now use a pair of calipers to measure the diagonals. D1 and D2. D1 has a "/" orientation. D2 has a "\" orientation. (Note: An inexpensive set of 24? veneer calipers were used to measure a 400mmx400mm ?square?. With a little practice you can very accurately measure center to center of the holes. On large routers even a good tape measure can be used on a very large test square to measure D1 and D2)
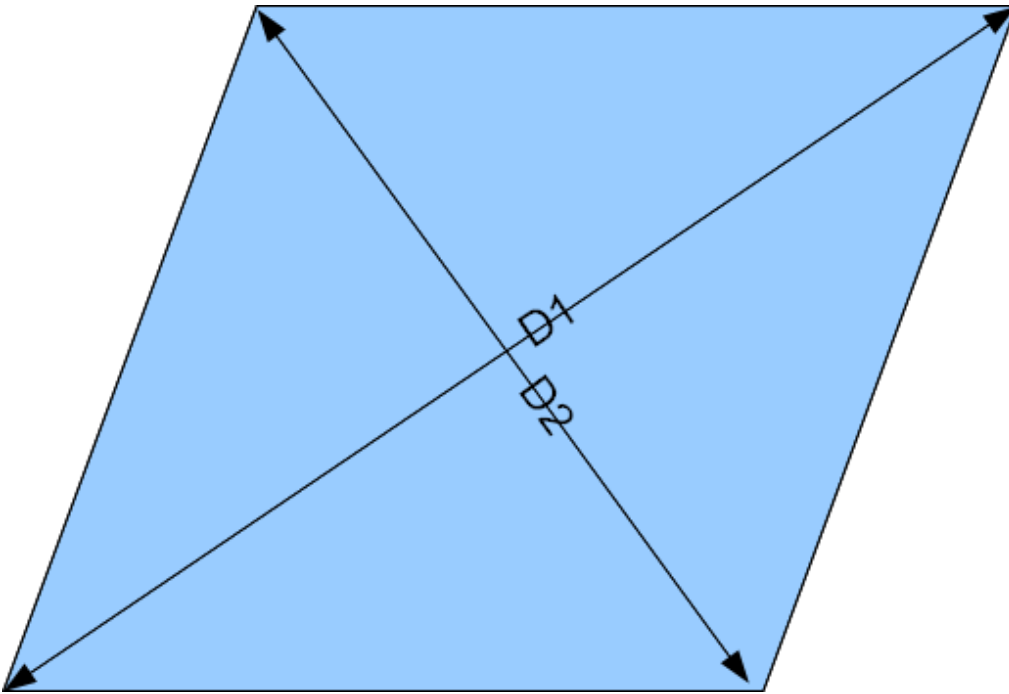
Now calculate the skew amount and enter into P270=S. Use this formula:

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S = (square(D1) - square(D2)) / (4.0 x L)
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Note that S will be negative if the "square" is leaning to the left, and positive if it is leaning to the right.

Go to the parameters screen and set P270= S and P271=L De-skew is now active. Make a new dimple test square and measure D1 and D2 if it is the same you have a square (D1=D2) If you are still getting a difference between D1 and D2, S has not been calculated correctly. Reset P270 and 271 to Zero. Drill a new set of dimples and measure again and recalculate S. Or a "homing in" method can be used were you decrease or increase S and drill a test square and measure to see the effect in a few iterations it easy to get a perfect square.

The advantage of the dimple method is that it allows you to quickly and easily "drill" the corners of the next test square on the same piece of material with the same setup. Saving time a materials. To do this, simple offset your X0 or Y0 position to dimple a new test square.... just offset a little from the last one to make it easy to check the effect of the latest de skew number you have entered. A magic marker comes in handy to mark the dimples as you go "S=.034" dimples set. Etc... Often 2 or 3 times are required to "home in" on the exact S value that will produce a perfect square. I'm sure there are other methods to achieve the same result as well. And of course the larger the square you can make and measure the better your accuracy will be.

Note: We are assuming that the "turns ratio" of the machine has been set correctly BEFORE setting the De-skew. Check the turns ratio by simply making an accurate measurement of L. If we program a 400mmx400mm square, even if the machine is not square the sides of the rhombus will still be 400mm. If your measured L doesn't match your programed L. Stop. And set the turns ratios properly before setting De-Skew.

Document History

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