Segmenting Offset Realignment

Contributed by: Kelly Moore

A.K.A "Krash"

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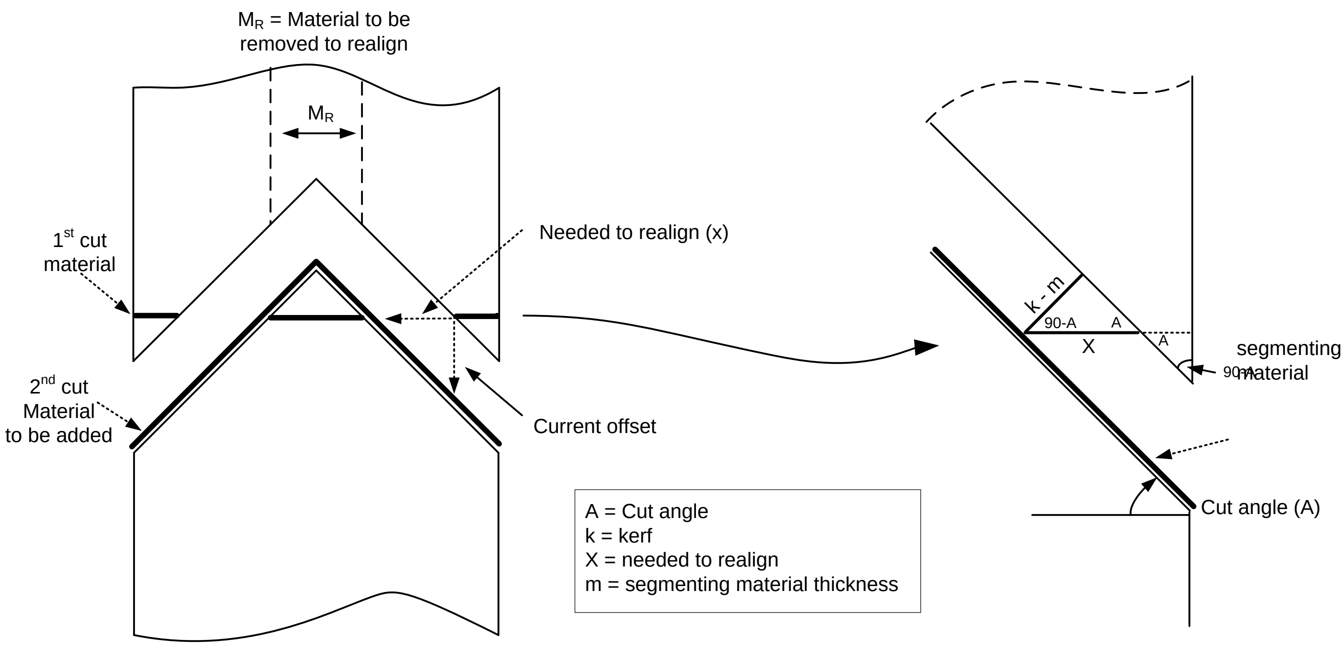
Segmenting Offset Realignment

By Kelly Moore aka (Krash)

Those of us who do segmenting are very familiar with this phenomenon. It comes from making a second V cut through a previously cut and segmented V cut. Since the material removed by the saw blade kerf thickness is greater than the material being introduced, in this case thin aluminum, the first line of material gets offset. Up until now, it was thought that this was a remnant of the operation with no solution but to match your saw kerf to your added material. It is still beautiful and the design can stand on its own, verified by the many pen sales with happy owners. But, if there were a convenient way to realign the segments, it would provide another opportunity to improve our little obsession. Long thought to have no useful value in life, that old high school math can be used to solve this problem. Put on your thinking caps and let's go on a trigonometry field trip!



The formula that gives us the value of X in the above right diagram is $\cos(90-A) = (k-m)/x$

$X = (k-m)/\cos(90-A)$

- If A = 30°

$X_{30} = (k-m)/\cos(90-A)$
$= (k-m)/\cos 60 = (k-m)/0.5$
$= 2 \times (k-m)$

- If A = 45°

$X_{45} = (k-m)/\cos(90-A)$
$= (k-m)/\cos 45 = (km)/0.707$
$= 1.414 \times (k-m)$

- If A = 60°

$X_{60} = (k-m)/\cos(90-A)$
$= (k-m)/\cos 30 = (k-m)/0.866$
$= 1.15 \times (k-m)$

This is the width of the material that needs to be removed to correct the offset on one side. So, to correct both sides, twice this amount needs to be removed.

Material to be removed: $M_R = 2 \times X_A$. So, the needed vertical cut (M_R) is:

- For A = 30°, you need 4 (kerf – m) thicknesses.
- For A = 60°, you need 2.3 (kerf – m) thicknesses.
- For A = 45°, you need 2.8 (kerf – m) thicknesses.

You can see that if your segmenting material (m) is the same thickness as your kerf (k), the formula goes to zero so there is no need to take any material out vertically to align the 1st cut lines.

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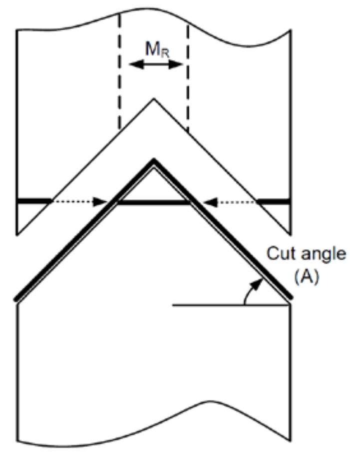
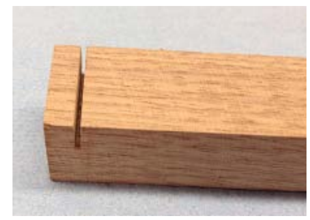
OK, whew! You survived the math. Now, how do we apply these formulas?



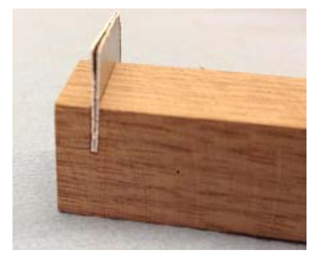
- For A = 30°, $M_{30} = 4$ (kerf – m)
- For A = 60°, $M_{60} = 2.3$ (kerf – m)
- For A = 45°, $M_{45} = 2.8$ (kerf – m)

We need to somehow measure the kerf thickness of your blade and the thickness of the material you intend to segment so that we can get a value for (kerf-m).
If you have a micrometer that can measure inside and outside dimensions, you can certainly use that to measure your kerf and inserted material thicknesses. If you don't have one, another way is to reference your measurements to a fixed size, in this case your kerf width. This is the approach I will use in the following example.

1. The first thing to do is to take a scrap piece of wood and make a cut so that you have an example of your saw kerf. If you use multiple saws or saw blades, use a single piece of wood to display all your various kerf widths and save it for the future. My example shows a single bandsaw kerf cut.



2. Take the material that you want to segment and see how many pieces will fit into your kerf cut. I am using aluminum roof flashing. Two pieces fit in pretty close which means that my aluminum is ~½ the thickness of my kerf.



Your material may be different so estimate its thickness in relation to your kerf. For instance, if only one piece of your material fits but is loose, it might be 3/4 kerf or 2/3 kerf. If 3 fit, it would be 1/3 kerf.

3. OK, now let's use one of the formulas. I plan on making 30° cuts so I will use this formula.

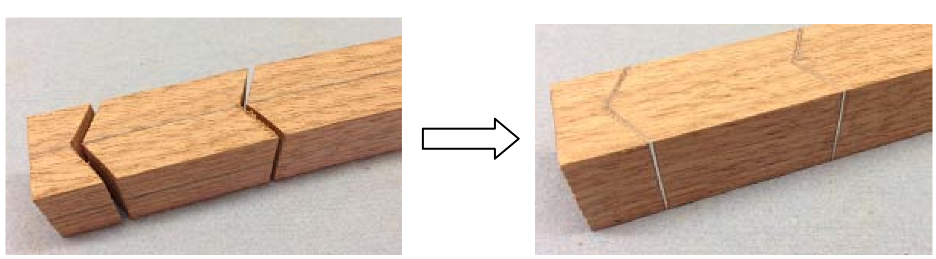
- $M_{30} = 4$ (kerf – m)

Since 2 pieces of aluminum fit into my kerf cut, each piece of aluminum is ½ the width of the kerf, or ½ kerf.
So, plugging that into the formula, we get

- $M_{30} = 4$ (kerf – ½ kerf) = 4(½ kerf) = 2 kerf

So, to correct the offset, I need to vertically remove the equivalent of 2 kerf cuts.

4. Make your first set of cuts. This example will use interlocking scallops. I am making two and applying the offset correction to one for comparison. Other segmenting styles that cut into each other may apply also. (Since this is not a segmenting or style tutorial, I will not explain my steps. There are other tutorials in the library that go into these steps in more detail.)



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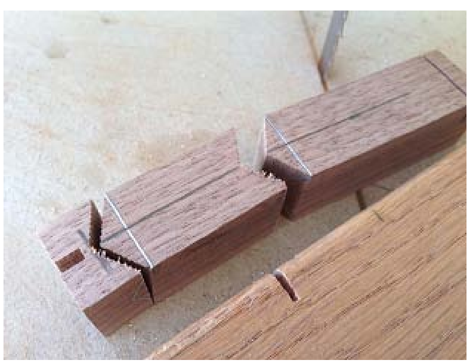
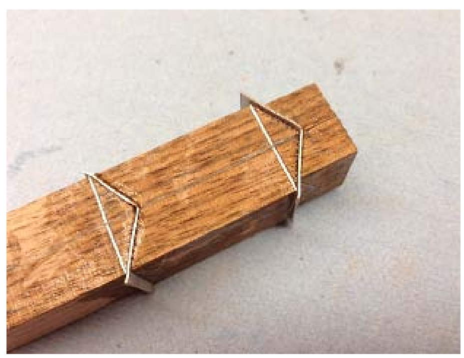
5. Now the correction. Since I thought it might be hard to remove the 2 kerf cuts after making the V cut, I decided to remove the material before. I made a pencil mark where the first V-cut point was so I wouldn't accidently cut into it. This helped a lot because it kept everything together.

6. Execute your next set of segmenting V-cuts. The double width kerf cut can be seen at the top of the blank. Once the top V is completed, I finished parting the top two halves and lightly sanded to remove any saw marks.

The two halves are then glued together and the remaining segmenting completed as normal. You can see that the top section is now thinner because of the removed material.





7. The finished product turned down for comparison. The correction is obvious but not perfect. But, with practice, I believe one could get very consistent alignment.

Correction

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