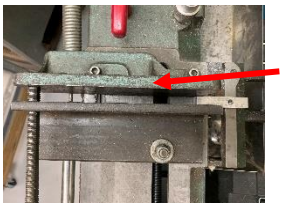
Precision Horizontal Bandsaw Alignment of the Fixed Jaw, Version 1.4

By R. G. Sparber

Conclusion



This procedure enables the user to adjust the fixed jaw on their horizontal bandsaw to make cuts that are as close as possible to square with the saw blade.

The Standard Method

A tried and true method of aligning the fixed jaw (black bar) to the blade is to use a square. The square is pressed against both the flank of the blade (red line) and the loose fixed jaw. Then the jaw is locked in place.

This can give very good results but since the blade is not moving, cannot detect dynamic error caused by a lack of repeatability or a cut that is not straight.

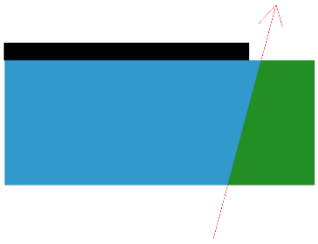
Background

For any machine tool that removes material, the foundation of accuracy is repeatability. If the machine's cuts are repeatable, error can be removed. This fact is key to the broad subject of Soft Jaws[2]. Within the repeatability of the machine, reference surfaces can be cut with the highest possible accuracy. Now, typically, this approach has been applied to milling machines, lathes, and surface grinders. But why not apply it to a horizontal bandsaw?

---

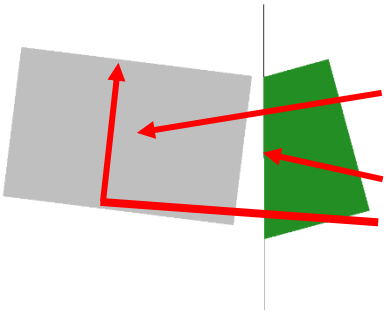
[2] https://rick.sparber.org/Articles/sj/sj4.pdf

Theory

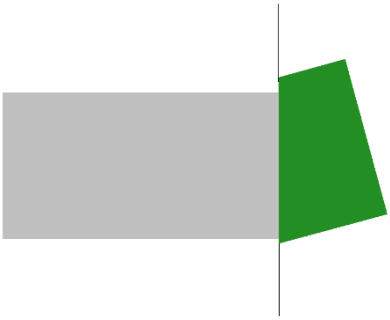


Say I have been blessed with a horizontal bandsaw that cuts a perfectly straight line with perfect repeatability. When the test stock is pressed up against the fixed jaw (black bar), I make this out-of-square cut with the blade (red arrow showing path and direction of cut).

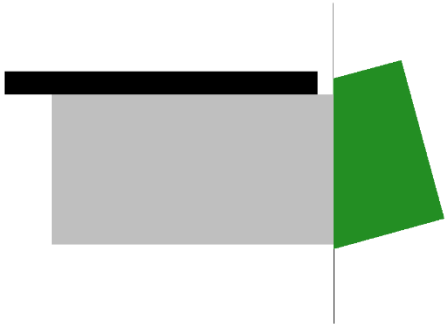
Now, look at the cut with respect to the saw blade. I feel silly stating the obvious, but the saw cut is where… the saw will cut. In other words, given a perfectly repeatable machine that cuts a straight line, the saw cut becomes the perfect reference surface for defining where the saw ***will*** cut.



An object with a perfect right angle, like an ideal square or 1-2-3 block, can contact my reference surface and have a secondary reference surface that is perpendicular.

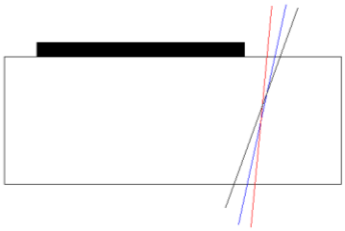


Once my precision right angle has made contact with my reference surface,



I can adjust my fixed jaw so it contacts the secondary, perpendicular surface. Alignment complete! The fixed jaw is as perpendicular to the saw blade as possible for this machine.

What could possibly go wrong?



Returning to my basic assumptions, lack of repeatability is a killer. Look close enough, and all machines have some degree of variation. It is essential that there be some amount of clearance in the machine or moving surfaces would seize up. If the variation is due to wear, adjust or replace parts. If it is the minimum possible, accept it for this machine. Still not happy? Buy a new machine or adjust your expectations.

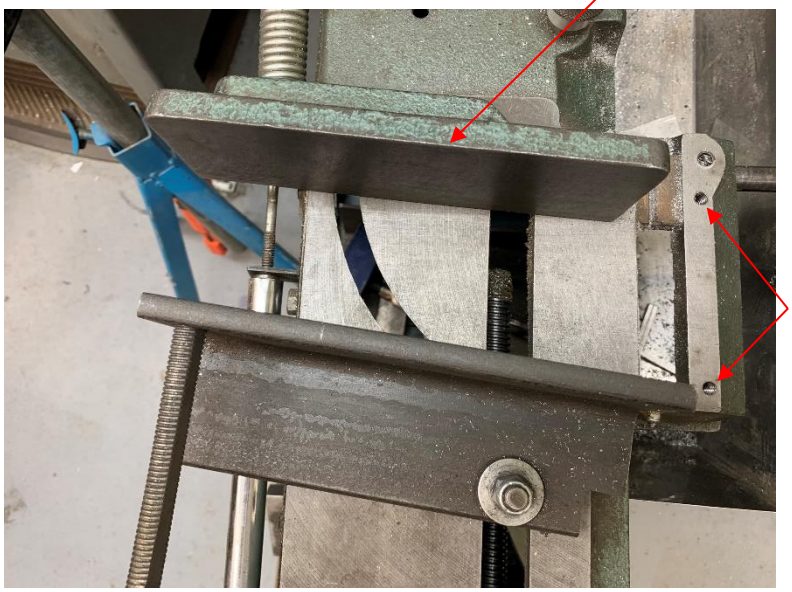
My second assumption was that the blade cuts a straight line. Initially, I found that the cut was not straight but this was fixed by tightening the blade[3]. Look close enough, and the line will not be straight. This too limits how close to perfect you can get.

Before tearing into your machine looking for problems, slow down the feedrate and take another test cut. You might be surprised at how much this reduces imperfections.

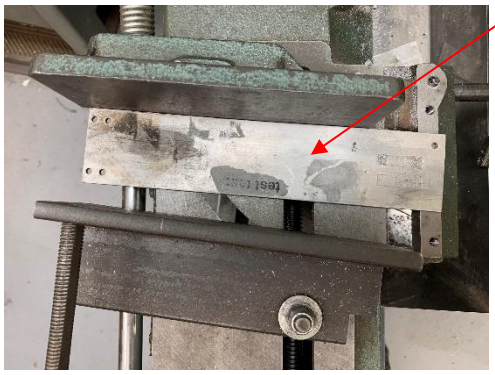
[3] https://rick.sparber.org/SlackBlade.pdf

The Procedure

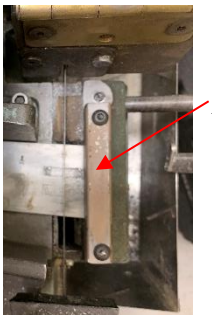
I have intentionally shifted my fixed jaw so it is nowhere near true just to demonstrate that it doesn't matter.



Note these two ¼-20 tapped holes.

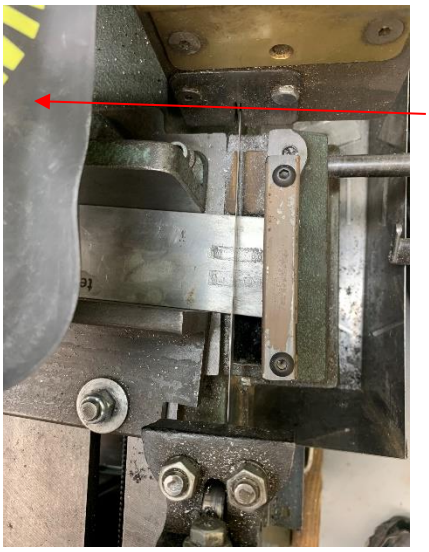


I placed a piece of scrap 1/8 inch thick, 2 inches wide stock against the fixed jaw.

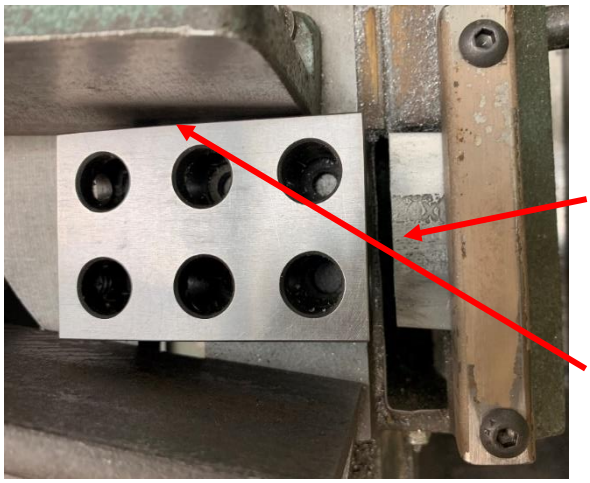


A length of ½ inch square tubing and two ¼-20 screws create an outboard clamp[4].

[4] You may be able to clamp the stock using two small C-clamps. It is essential that the stock not move.

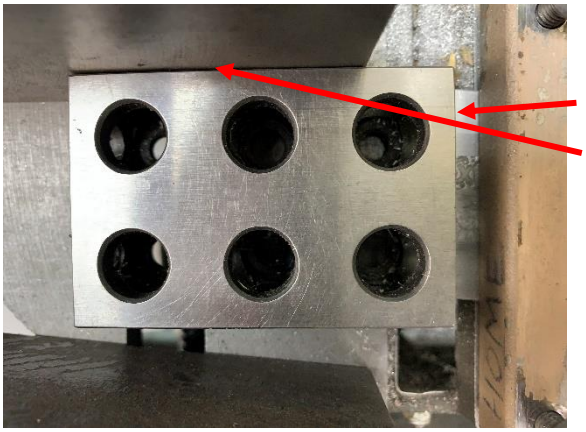


With the movable jaw pushing on the edge of the stock, I lowered the blade in preparation for cutting. I'm using my AirShim[5] to slow the downward feedrate. This is necessary in order to minimize both the burr on the bottom edge plus error due to excessive feed rate.



Even though the stock was way out of alignment, the saw cut will be aligned with the blade to within the repeatability of the saw and straightness of the cut.

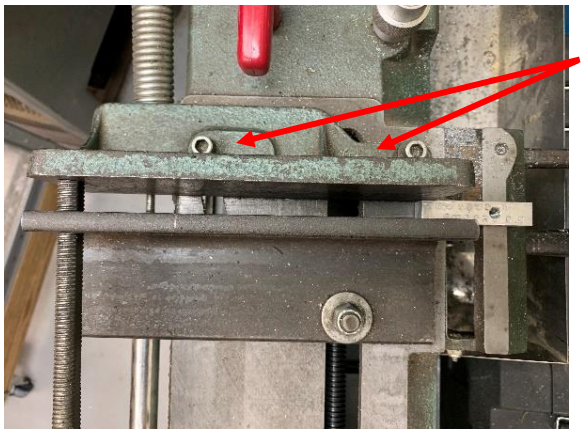
After removing all swarf and any burr on the cut face of the stock without unclamping it, I can press a 1-2-3 block against it. The block will be aligned with the saw cut and
the face towards the fixed jaw will be precisely perpendicular to the blade.



Here I have pressed the end of the 1-2-3 block against the cut edge while also pressing the loose fixed jaw against the flank of the block. You will have to imagine my fingers doing the pressing since they were busy operating the camera.

Tighten the fixed jaw screws and take a test cut to verify nothing moved[6].

[5] https://rick.sparber.org/PneumaticFeedrateControl.pdf
[6] If the jaw moved, see https://rick.sparber.org/FixedJawShift.pdf



You could drill and ream two 1/8th inch diameter holes through the fixed jaw and underlying table. Then press dowels through the holes. This will provide very accurate alignment[7] if the fixed jaw must be moved and then put back. However, over time, the bandsaw will wear and it is possible that the position of the blade path will shift. This will cause the ideal position of the fixed jaw to move. Then one of these pins would be in the wrong position.

I welcome your comments and questions.

Acknowledgment

Thanks to Karl Harnish for pointing out a confusing section of this article. Thanks to John Herrmann for pointing out areas needing further explanation plus suggesting that the fixed jaw can be pinned. Thanks to Dennis Macintyre for pointing out that machine wear could shift the fixed jaw's ideal position.

If you wish to be contacted each time I publish an article, email me with just "Subscribe" in the subject line. If you are on this list and have had enough, email me "Unsubscribe" in the subject line.

Rick Sparber
Rgsparber.ha@gmail.com
Rick.Sparber.org

[7] If desired, additional pins can be added at 30° and 45°.