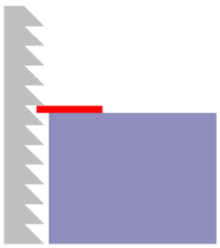
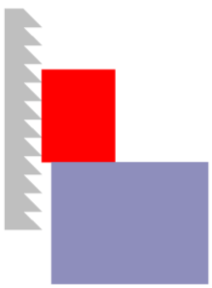
Precision Cutting Sheet Metal On a Horizontal Bandsaw, Version 1.2

By R. G. Sparber

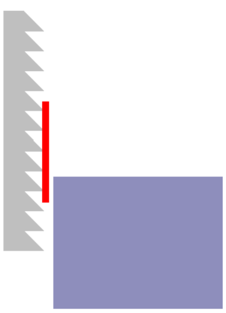


If your goal is to tear the teeth off of a bandsaw blade, quickly feeding sheet metal into a vertical bandsaw will likely get you there.

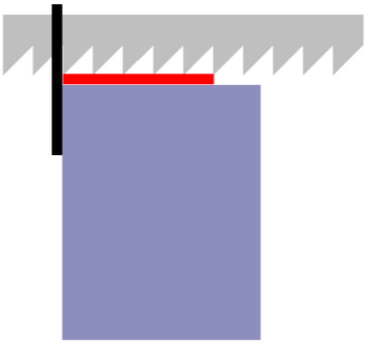
If you feed in very slowly, you can cut the sheet metal with no damage to the blade. The trick is to only remove a few thousandths of an inch of metal per tooth. Not so easy to ensure when hand feeding.



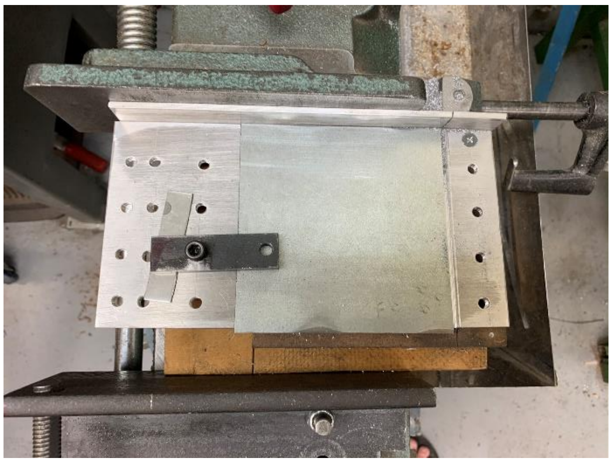
The way to limit how much metal each tooth removes is to have many teeth cutting at the same time. That is fine when the stock is thick enough, but



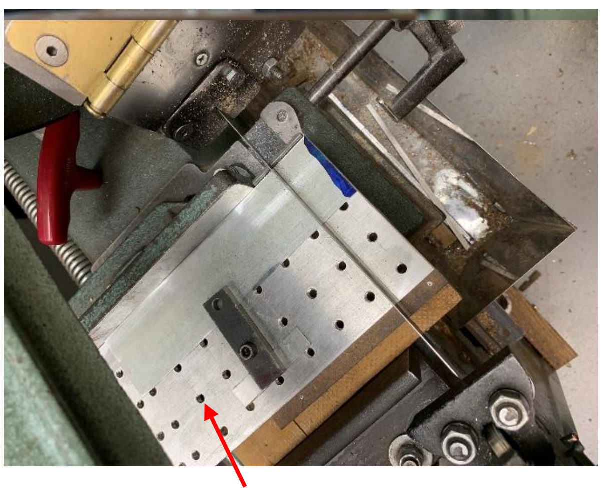
impossible if you are cutting sheet metal. The strip of metal would just slide between the blade and the cut-out in the table. Well, maybe there is a way…



By changing to a horizontal bandsaw, we can have multiple teeth in contact with the surface at the same time. We just need to have a fixture. The black, vertical bar is a fence that stops the stock from being pushed off of the table. The fence has a slot in it to permit the blade to pass.

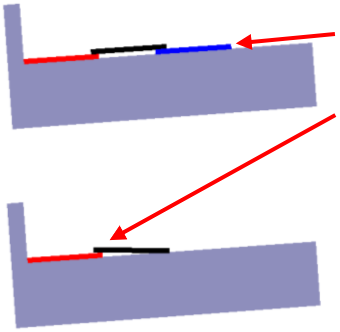


My fixture consists of an aluminum plate with a fence on one side.

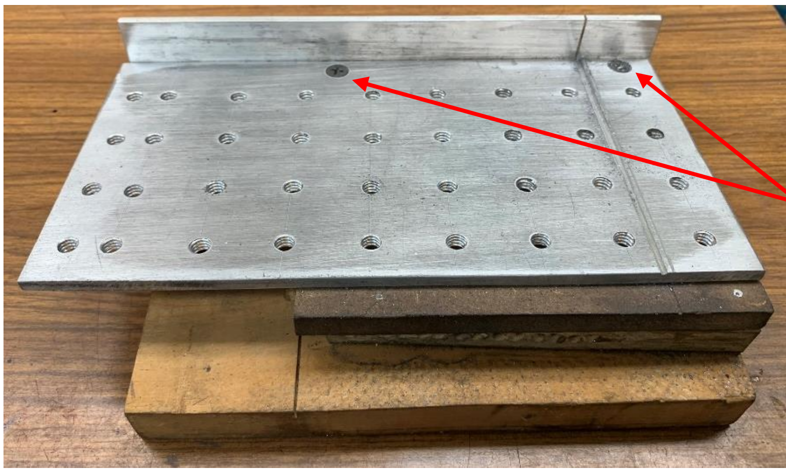


The plate is mounted to a board and set to an angle that approximately matches the angle of the blade. My goal was to have many teeth cutting at the same time. I did not try to select an angle that would have 3 or 4 teeth cutting at the same time, but that would have sped up the process.

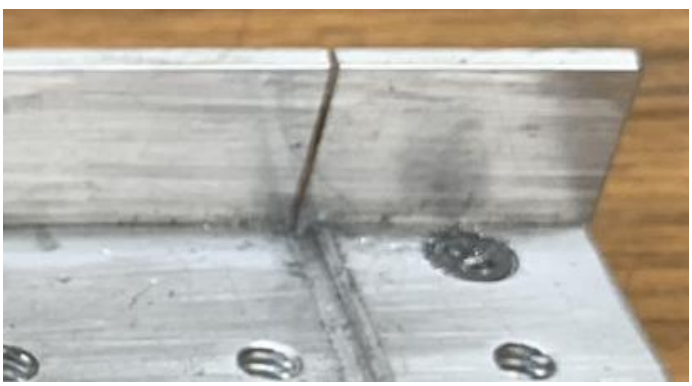
I drilled and tapped an array of ¼-20 holes on 1-inch centers. This lets me place my hold-down clamp where needed. The clamp steadies the sheet metal. My fence presses on the edge of the sheet metal to resist the cutting force. The holes to the right of the blade do come in handy if most of the stock is on that side.



Notice a scrap of sheet metal under the hold-down clamp. This ensures that the clamp lays flat on the stock for maximum grip. Otherwise, the clamp would tilt and only press on an edge. Not the best clamping action.



The force of cutting tends to push the plate into the fence and down on the tilted wooden platform. I, therefore, only needed
two woodscrews to secure it. Be sure to countersink them, so the top of the heads is flush with the plate.



The most critical part of this attachment is the vertical cut in the fence. I align my scribe mark in the sheet metal to the left side of this cut when my scrap is to the right.

The alignment of this cut couldn't be simpler. I just assemble the fixture, place it in the saw's vise, and cut the slot about 1-inch from the right end. Those out of alignment cuts in the plate are due to the evolution of the fixture.

When installing the fixture, I loosely place it in the vise, lower the blade, and slide the fixture around until the blade enters the slot with no scraping on the sides Then I tighten the vise. Alignment procedure complete.

Test Results

I cut three test strips. In each case, they were scribed at 2.000-inches, cut, deburred, and measured. The first measured 1.9985, so is 0.0015-inches short. The second strip measured 2.000-inches. And the third strip came in at 2.0015, so it is 0.0015-inches too long. This kind of accuracy depends on precisely placing the scribed line and then aligning this line with the notch. I use an Optivisor.

John Vreede wrote:

To cut stainless steel, you need to restrict the number of teeth in the cut, otherwise, the teeth just rub and it work-hardens the stainless and will dull the blade.
The minimum is 3 teeth in cut, and if you're cutting 0.040" (1mm) thick sheet, that works out at an angle of 7.6 degrees (near enough 1/2" in 4") at the start of the cut.

The angle gets lower as the cut proceeds so that it just gives more teeth-in-cut. Better to set the angle like this than parallel to the surface of the table. Will cut way faster too.

I think it's a mistake to angle the table so that the blade is parallel to the table at the end of the cut. Not supposed to have more than 24 teeth-in-cut and much less than that for stainless. Cutting 4" wide with 10-14 blade (12TPI av) will have 48 teeth-in-cut This will cut very slowly for mild steel and aluminum but will not work for stainless as it workhardens if the teeth just rub the surface.

3 teeth-in-cut sawing 0.040" sheet metal with a 10-14 blade, it makes an angle of 7.6 degrees to the work surface at the start of the cut. It will complete the cut in about 1/2 the time, too, as you are aware.

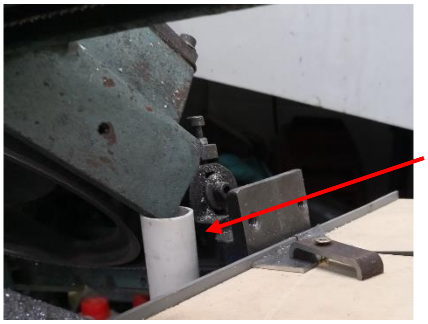
I made a table out of plywood with the ~8-degree angle of the blade to table as proof it could work. I opted to put the table on top of the vice jaws so I could get the full 8+" and made it wider on the outfeed side, so it is easier to clamp there.

The table is clamped in the vice on a bit of 2x4" screwed and glued to the under-side. It is tipped up the required amount with a piece of 18mm (near 3/4") timber under the back edge that rests on the top of the moveable jaw. I didn't shave any angle on the 2x4, it just clamps against the back edge ok.
The plywood is 15mm thick, and the 20mm steel strip for the fence just screwed to the 15mm edge. The steel strip is almost cut through, so the plywood sheet is about half cut through too. The 2x4 extends under the outfeed table part, so it's in no danger of falling apart.

If the table was 3/4" thick and the fence strip 1" wide it would hang together better. You'd need to experiment with the thickness of the tip-up strip to maintain the 8 degree angle.

What do you think of my little clamps? [RGS: Wonderful idea!] *No need for a packing strip under them! They're 5/8" wide, sawn off a 2 "x2" x1/8" with an oversize hole drilled ~1/3 of way along, so can reverse to get best fit to a predetermined hole pattern, but I just used wood screws straight into the ply. You'd need to make them wider to not be too weak with a bolt through the into your table. (I've seen similar clamps cut from sections of 4" steam pipe with a slot instead of a hole to clamp to the milling table.)*

MDF as the table material would raise around the clamp screw and not be so good as ply, if just used by itself but you could glue your tapped metal platen to some ply or MDF to get the same effect as my table, but with the benefit of the tapped hole pattern



See the bit of conduit ~4" long that slots over the sawframe stop to prevent the table being cut in half. Its doesn't work that well as it has to lean backward to capture the corner of the sawframe casting, but it's better than not having it.

[RGS: my version is https://rick.sparber.org/DepthOfCutStop.pdf]

Make the fence for the 3/4" ply base from 1 "x1" x1/8" aluminium angle so it bolts or screws on from underneath for a stronger edge. Available from any hardware store.

Acknowledgement

Thanks to John Vreede for all of his outstanding insights.

I welcome your comments and questions.

If you wish to be contacted each time I publish an article, email me with "Subscribe" in the subject line. In the body of the email, please tell me if you are interested in metalworking, software, or electronics so I can put you on the best distribution list.

If you are on a list and have had enough, email me "Unsubscribe" in the subject line.

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