

## MUSING IN MY WORKSHOP 1

My experience with bandsaws -- Alex Bendeli

**Preamble:** The current lockdown situation has been the perfect opportunity to tackle the various "little" jobs that were on the back-burner for a while. I am not a prolific "art" turner but use woodturning as a tool. Here, I refer to the evolution and gadgets with my bandsaw(s) rather than works of wood art (likely in future articles). I am sure there are many other ways of doing things but this has worked for me. The gadgets I describe here also make my hobby life easier.

When I joined the Woodturners Guild late in 2000 and buying a lathe, I also bought a new (cheap), generic 10" bandsaw standing on 4 spindly legs that was available from a variety of tools shops. I struggled with it for years as it never was reliable in terms of cutting straight or circles, drifting everywhere and chewed up a few roller bearings, a new bearing assembly, vibrating and noisy to the point that I stuck a heavy acoustic rubber mat on the doors' internal surfaces to dampen some of the vibration noise, the upper bearing rack would not rise or fall parallel to the blade and thus affect the bearing clearances causing premature wear on the rollers. Despite lots of advice and constant adjustments, it never really was satisfactory. It was good enough for rough, short, thin and imprecise work. Eventually in 2014 I sold it for a song along with several spare blades that cumulatively were worth more than the bandsaw.

I immediately purchased a Laguna 14-Twelve bandsaw after reading good reviews and checking it out at the WWW show. It is well engineered, has a large throat with a resaw capacity of 12", boasts a double set of ceramic bearings (instead of the usual ball bearings) above and below the table. The drive wheels are well balanced and after assembling and tuning it, I was able to cut straight thin slices 1~2mm in the first few months of use. It was quiet and steady compared to the previous one, has rear dust port and the throat rack travels straight and parallel to the blade and it has a quick release handle to ease the tension on the blade + crown if not used for extended periods. I use a largish fridge magnet (usually found in letterbox drops from various tradies) with a label "CHECK TENSION" and I stick it to the un-tensioned blade as a reminder to re-tension it before use. This article is not a review or critique of the Laguna, as a matter of fact, my correspondence with Laguna was always answered. I just describe my experience in obtaining a great performance out of an already great machine, as I am sure every tool has its own idiosyncrasies.

**Blade positioning** on the rubber crown of the top wheel has several differing views. Some say teeth should clear the rubber so that teeth just hang over the front edge of the rubber. The manual recommends that the middle of the blade locates on the crown of the rubber wheel. I note that Alex Snodgrass recommends in his YouTube videos that the crown should be just behind the teeth gullet to reduce blade fluttering but that is difficult to do with a narrow 1/4" blade. Personally, I adjusted the blade so that the middle of the 3/4" blade was supported on the middle of the crown of the top wheel. It is a nice feature of the Laguna to be able to observe the blade location while adjusting the tracking knob.

With the electric plug removed from the power socket and the bearings (above and below the table) moved out of the way and approximately near where they might finally be secured in position, I then turn the top wheel by hand and observe through the blade-tracking window on the side of the frame if the blade runs on the crown position. I keep trimming until the blade is steady and does not waver. We can apply the AC power and without the bearings in final position for now, we can visually check the continual running position of the blade on the crown and possibly slightly trim so that the blade does not move too far back and contact the bearings.

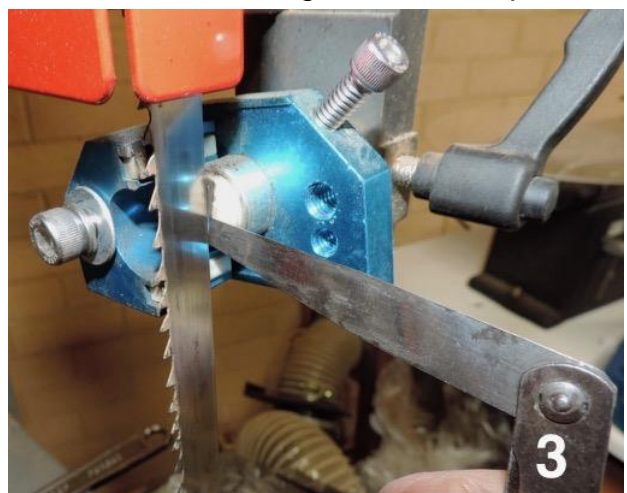
The Laguna has a tension scale and a side window to observe the setting. The manual suggests that it is only a guide especially if using generic blades whose steel properties differ and therefore the tension scale is not accurate. I checked the tension as per manual but with the extra hint as suggested by A.Snodgrass by resting your palm on the base of the open top compartment and with the thumb push the blade towards the frame. A blade deflection up to 6mm is adequate.

**Modifications:** Over the last few years I was not making intricate precise wood boxes and puzzles but harvesting half logs into turning blanks and cutting straight following a pencil line and not using the fence. If a blank was not a perfect circle, it did not matter because turning on the lathe will round all corners. As time was progressing and with blade changes, I found that the clearance gap between the ceramic blocks was gradually getting wider. I had to readjust them otherwise the blade would tend to drift, bend and not cut evenly.

So, having time during the lockdown, I decided to investigate and “fine tune” its performance. I realised that the mounting blocks for the bearings were not maintaining their position. I would adjust the clearance to optimum but after several cuts, the gap would widen. I envisaged that the pressure applied by the supplied knob screws (1) might not have been enough to keep the blocks in place. I also noted that the mountings had an oval slot for the knob screws that allowed for the gap adjustment. I summarised that if the tightening screws were located in their oval slot and if not enough clamping force, the mountings would drift out of their position.

I contacted Laguna for advice whether if that was a design issue or was it my machine. They responded very quickly and their local agent (Carbatec) called me assuring that it is not an issue and they use the same knobs in their updated machine. I suggested that maybe their round knob should be replaced with a 3 or 5-lobed knob to exert more pressure. Although I do not suffer arthritis, it may be possible that I might not have been exerting sufficient torque to secure the knob screws. I replaced the knob screws (1/4 UNC and 5/8” UNC) with machine bolts I had in my mixed bolts drawer. The final adjustment of the ceramic bearings should be carried out after positioning the blade on the rubber crown.

I found that after tightening the bolts with a spanner, the gap was held and I could cut for much longer time and with greater certainty with the gap maintained. Having proven that idea, I ordered and replaced the screws with stainless



steel pan head Allen hex bolts (2,3). These facilitate more grip and tightening torque using an Allen key which easily reaches in the lower confined spaces under the saw table. I also used plain and spring washers under the screw heads.

I set the gap between the ceramic blocks and the rear and sides of the blade using a 5 thou feeler gauge (3). There is nothing magical about the 5 thou gap, I just picked a value that came as close as possible to the ceramic surfaces but without touching them. The gap has not shifted at all. The 5 thou gap seems reasonable enough because on many of my cuttings there were very few sparks caused by friction of blade to guide. There is the occasional spray of sparks due to friction between blade and bearings. When the blade is deflected or pushed hard against the ceramic back bearing, you know to ease off. Sparks would also occasionally fly from the side bearings if one takes tight turns and causes the blade to flex sideways but otherwise, straight cuts proved to be sparks free. So, my guess 5 thou is a reasonable compromise.

The ceramic blocks have not worn at all over the years but slightly blackened due to metal, blade rust, resin and burnt dust depositing on their front surface. These bearings can withstand a lot of heat but I prefer them not to contact the blade's offset teeth else the ceramic will crack (expensive to replace!).

It is essential to readjust everything after a blade change or after adjusting the tracking on the top wheel to ensure the teeth do not come in contact with the bearings. A good practice when using a new blade is to use (obviously with power disconnected!!) a honing stone on the back edge of the blade to round off the edges so that they do not cut into the bearing (whether ceramic or ball bearing). I also use a metal grade fine sandpaper and rub it on the blade surface and smoothen any roughness around the welded section of the blade as ceramic does not like impacts.

**Blade drift.** Adjusting the blade drift (cutting parallel to the fence) is essential and there are several versions as to how to set it. The drift can be a combination of factors due to blade characteristics and position of the fence. I used the methods in the manual but it was not always perfect and required several passes to get it "right". I followed colleagues' recommendations but that was not as accurate (or maybe I did not understand the technique) as the drift was noticeable and the cut would slowly taper into the wood or the wood tends to pull away from the fence.

A. Snodgrass method using a steel ruler edge against the right side of the blade touching the gullet (i.e. the flat section between the teeth and not affected by the teeth offset) and lining up the fence parallel to it. That is difficult for narrow blades and he recommended a FAST gadget that is basically a straight edge with a magnet and a slot clearance for the teeth offset. Different FAST gadgets are required for different blade widths. The FAST gadget is about 150mm long so the 300mm ruler is more accurate over a longer length.



I decided to follow A. Snodgrass' technique but I placed the 300mm ruler on the LEFT side of the blade (4), the ruler is still parallel to the blade and I can bring up the fence and adjust it by a few degrees until it touches the ruler along the full 300mm. One can judge far better this

alignment because the fence has to touch the whole length of the ruler whereas Snodgrass' method leaves a gap (blade thickness) to judge the parallelism between fence and ruler. The results after drift adjustments are in (5).

**Extras:** I have added a blue piece of pool foam (6) to obtain a larger diameter grip to rotate the throat height adjusting wheel. The wheel has a free rotating handle but I find grabbing a soft larger diameter handle to rotate the wheel is much easier/quicker compared to grabbing a smaller diameter.



Two engraved labels (UP and DOWN) (6) indicate the handle rotation direction as a reminder which direction to turn if I have to alter the throat height during a cut to get some extra clearance. Do not forget that when cutting, the upper guide block has to be raised just clear of the wood to be cut. This position gives plenty of blade support just where the cut happens and minimizes blade twisting. I am sometimes horrified by users who expose the whole capacity of the blade (say 12") to cut a short 4x2" piece of wood, let alone expose more blade teeth for accidents to happen. I also marked which direction the tension wheel had to turn for loosening or tensioning the blade.

I also have stuck on the column a \$5 LED light (6) that I can flick to give a soft light near the blade. I found it adequate in most case (obviously not as good as the optional dedicated lamp).



**Sawdust collection.** I noted that a lot of sawdust was accumulating under the supplied aluminium table insert despite the vacuum chute and built-in brush in the bandsaw's lower case. The suction port is located inside the lower case so it will keep that volume reasonably clean but there is hardly any suction under the table and the insert around the blade. Sawdust will be dragged through and deposited on the bearings and surrounding screws. I know that because I had to vacuum under the saw table every time I wanted to adjust the gap. I

decided to make a replacement Perspex insert (7) to observe dust accumulation under the insert. To suck dust from under the table, I used a 38mm OD (I guess 30mm ID) discarded vacuum cleaner hose attached to a leftover 56mm OD (I guess 2" ID) PVC plumbing pipe connected to a contraption using a 100mm PVC pipe in which I made an oval hole (8), cut a longitudinal slit in the 100mm pipe to expand it and slip over a standard 100mm dust extraction straight coupling (black) where I also cut an oval hole. The lot was joined to the Laguna's inbuilt



suction port (6). The vacuum hose is just visible behind the blade and bearing mount in (9). The vacuum hose is jammed and clamped under the table with a tie wire. The tie and hose must be removed if the head is tilted for cutting other than 90 degrees. Also added, is an additional clamping by a 1/4" UNC in the unused tapped hole in the bottom block holder.

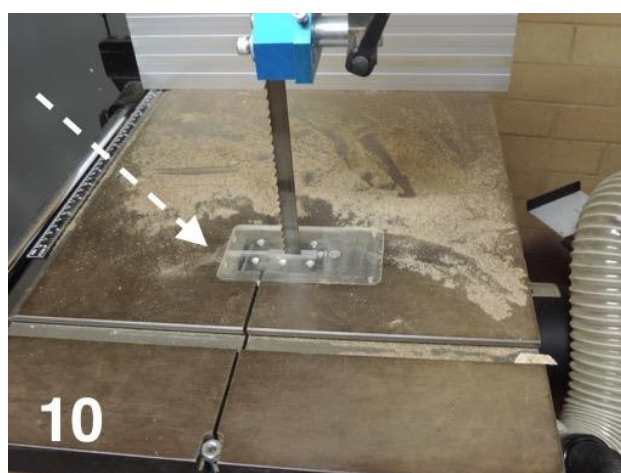
The result was that the underneath was very clean after a lot of cutting. The top surface of the table was still dusty but that is unavoidable as

some sawdust more often than not escapes from the cut slot during operation and accumulates on the surface. Most of the sawdust is dragged to the lower casing and sucked by the built in port. Note the resulting sawdust on the table (10) but is clear around the insert. Interestingly, there is also some sawdust dragged and deposited in the top casing as can be seen in the corners of the door (11).

I was going to describe some gadgets in the next issue of "Musings in my workshop" but I thought that since there is plenty of reading time during lockdown, I might as well include them here.

**Gadgets:** It is not possible to cut a circle SAFELY if the outside (bark side) of the log was resting on the table. Any slight rolling of the rounded surface will cause the blade to jam and kink and damage it. I use two circle-cutting methods depending on the size of the wood to be cut. For blocks, I initially select a circular Perspex template (12) to include/discard features & cracks on the wood. I guess the centre and size of the finished blank, use a compass to mark the circumference and its centre. This is marked on the flat side of the half log that is normally cut by a chain saw. I measure and then transfer the centre location onto the bark side of the log using a ruler against the fence and one of the flat sides of the pre-cut log (13). It is not possible to draw a circle on the rounded shape of the bark side thus the need to cut while the flat surface of the log is on the table.

I drive a thin 1.5x30mm nail (with head cut-off) in the marked hole on the bark side and fit over it the required template size and insert a turned template holder that secures the template on a horizontal level. These thin templates are a great guide for marking and estimating the size of blanks. I had devised and cut a series of 3mm



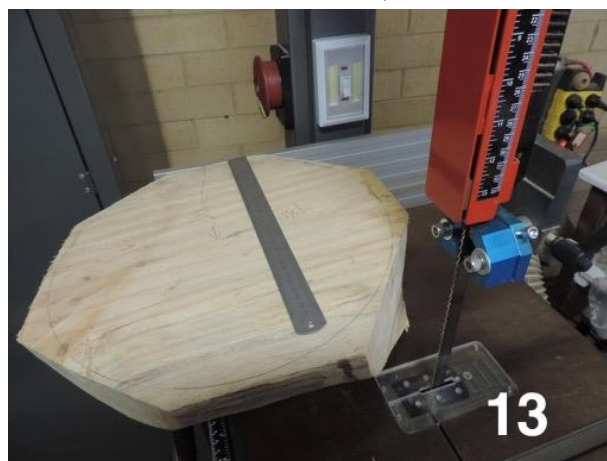
MDF melamine coated discs from offcuts that I had (14). BUT, I have to admit that I subsequently found that same method of circular templates were made available at our club. Goes to show you that your idea may not sometimes be necessarily an original!!!!

I then proceed to cut the log using the template's outer diameter as a guide (15).

The template holder is a turned piece of wood with a perforated steel plate at one end and a fixed 4mm nail at the other end (16). For large templates over 80mm diameter, it is difficult to sight the central hole on the dark bark under the template so I drive the thin nail in the bark for about 5mm deep and use the holder as described below.



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The steel plate has a 1.5mm dia clearance hole for the 1.5mm nail (17) and it covers a deep cavity (18) full of 2mm steel ball bearings that I had in my workshop. It is easy to drive the nail 5mm into the centre on the bark side leaving the exposed 25mm over the bark. I then just drop the template over the nail and secure the holder onto it. The trick is that, when the holder is slid over the nail, the balls slide aside, let the nail in but regroup by gravity and press along the long 25mm axis of the nail that is mostly inserted in the holder. This keeps the nail vertical and the weight of the balls keeps the template in place and horizontal.



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For smaller templates, it is easy to sight the hole so I can either continue to use the 1.5mm nail method or just drive in the 4mm nail into the bark/wood with a bit of palm pressure.



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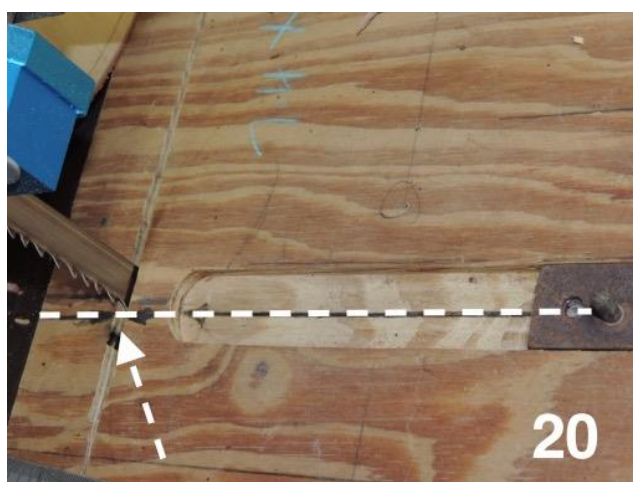


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For large, short pieces of wood, MDF, plywood, I have a second (and alternative) jig that does not use templates. It consists of a large piece of plywood with a wooden guide that slides into the bandsaw table mitre slot and a sliding steel bar with a 5mm pin welded to the steel bar (19).



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The steel bar has various drilled and tapped holes to approximately define the cutting radius while the knob shown in (19) is for fine adjustment and locking the steel slider bar to the final radius. After marking the centre of the job and drilling a 5mm clearance hole, adjust the steel bar so that the pin is the correct radius you want to achieve.

Place the pre-drilled job to cut (eg plywood or the flat end of a pre drilled thin log) into the pin, take a straight cut up to the arrows marked on the jig (19, 20).

The straight cut next to the blade is a guide for future location and should terminate when the arrows on the jig line-up with the blade (20). Once in



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I  
at

position and lined up, the blade would have already made its first straight cut through the job. Keeping the jig in position, start rotating the job (centered on the pin) and the blade will cut a circle as you rotate the wood (21).

I mention that I use this jig for thin material because it is difficult to juggle a heavy blank of the jig while keeping the jig steady (unless one also clamps the jig to the table).

This article is predominantly about a bandsaw, and this is a woodturning newsletter, so.....

Question: Being a woodturning club, spot the woodturning activity in this project!

Answer: The turned wood pieces are (A) The template holder (16,17,18) and (B) The tightening handle under the plywood jig (19). The handle might be an article in a future newsletter.