

# The Machining Process

## Australian Hardwood Flooring Manufacturers

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I would love to start an article in this series without there being a forest locked up with no scientific evidence to support the reason why.

Now NSW have shut down 8400 hectares to 'save the Koala' because some uneducated people, who spend no time in the forest, protest and get media attention while they make statements without any proof that timber harvesting is affecting the population of the animal. Why do we, the hard-working people who do more to look after forest health than any of these protestors, have to be the fallout for these falsehoods and lies? This needs to stop, and we need governments with the guts to say enough is enough!

The three Fs of our world – farming, fishing and forestry – seem to be getting the blame for all things environmental and have to cop ridiculous decisions that close or affect our industry negatively, which impacts our ability to house and feed the country. When will the country wake up? It just riles me so much; I think I need to take a blood pressure pill...

Anyway, on to this edition's manufacturing article – the machining process... Once we have stacked, air-dried then kiln-dried and reconditioned our timber, it is now ready to be machined into flooring.

The first step is delivering the timber into the planer. For large manufacturers this is done using an infeed system that can involve a large tilt hoist that lifts the pack up on an angle; that you increase row by row sliding the timber onto your landing deck then onto 'ending' rollers while letting the rack sticks slide down onto a conveyor to be taken to a small unscrambler and semi-stacked into a cradle; or as simple as a hand feed process where an operator individually feeds each piece into the planer directly himself. The difference is purely driven by the volume an operation has to machine each day. Other

systems include vacuum lifter and rack stick sweepers through to high tech robotic systems. Regardless, they do the same thing – continually feed each piece back-to-back into the planer.



Tilt Hoist Infeed

The planers (or moulders; I will call them a planer) can vary significantly, from older and slower 4-head machines, usually running around 10 to 12 meters per minute (MpM), to 6-head planers running around 30 MpM through to 9 and 10-head planers capable of 60, 80 and 100+ MpM. Again, volume drives the speed and size of the planer as well as the handling equipment around it. These machines are set up and run by a tradesman called a Wood Machinist. Which is actually my trade in another life. Yes, I ran flooring through a 'Stetson Ross' Planer back in 1987 (man that makes me feel old), which is very similar to look at to a modern-day Coastal planer, and it was originally designed for pine framing back in the 70s and 80s. Fortunately, we upgraded that beast to a Weinig 22B in 1988, which I instantly fell in love with as it was such a better and more user friendly machine to run.

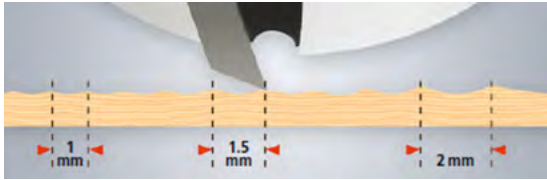
But I digress... the planers and their machinist doing the setup control the finishing and profiling of the flooring product. Planers have two constant fixed points, what we call the Fence and the Bed, which are the points to which we set everything. The only change made to these is the amount of 'cut' we put on them depending on feedstock size. The outside heads and the top heads are moved in and out, or up and down, to machine different sizes as well as the pressure pads and chip breakers. Pressure pads are always behind the planer head, while chip breakers are in front of the head doing a few things – applying pressure, breaking the chip from the cutter head as well as directing the shavings into your hood and into the dust extraction system.



A 22B planer used at Parkside Wondai Mill

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Now, there is a simple formula to determine the finish or surface quality that the flooring product ends up with. The finish is determined by the distance between cutter marks or pitch marks. This can be seen in this diagram (thanks to Weinig – All About Tools).



The smaller the pitch mark (Fz) the better the finish. What determines the pitch mark are three things – the feed speed (V), the spindle RPM (N), and the number of cutters on a cutter head (Z). There is a formula we use to determine this:

$$f_z = \frac{v \times 1000}{n \times z}$$

However, put simply, one knife at 6000 RPM at 10 MpM will give you a 1.6 mm pitch mark, which is generally the target for a beautiful smooth finish, meaning less sanding for all you finishers out there. Parkside run 12 wing cutters x 6000 RpM at 100 MpM, which gives us a 1.4mm pitch mark. The other critical points in determining the finish are grinding angles and cutter angles and these are specific to species and feed speeds, where each company will have their own formula for working out what angles work best for them, and then ‘jointing’ of top and bottom cutter heads on the machine to bring every cutter into the same cutting circle, as well as give a new finish each time you joint.

There are many cutter types and configurations out there, starting from High Speed Steel (HSS) and Hand Ground profiles cutters, to Pre-Ground solid profiles made from Tungsten Carbide. Diamond is used by some for end matching cutters, but we will get to that in another edition. The setting up of the cutter head is now done off the machine for most companies, and this is where the accuracy and quality of grinding is paramount to determine the final finish and profile accuracy of the timber. Never underestimate how important your tool room is in delivering the best possible product you need to compete in the market, as the standards out there are only getting better and better. A well run tool room is as important as a well maintained planer.



Parkside Wondai Tool Room



But, the key to maintaining profile consistency is the constant checking of the profile itself by either the Wood Machinist or another person able to take these many measurements. We find that once it settles, usually after 30 minutes or so and ensuring clearances and profile shapes and sizes are correct, it stays that way for some time. The minimum checks should be at least every 15 minutes, but we are checking constantly. At 100MpM a lot of product can go through in 15 minutes before its picked up; these checks should then be recorded on a Size Check Sheet like the one below so you can prove the product is accurate throughout the run and ensure the customer gets a product that is easily laid or installed without issue.

A check sheet like this should be completed for every flooring run.

Parkside Overlay Machine Check Sheets

Time	Machinist ..... Overlay Size ..... Date .....									
	Width	Thickness 14mm	Tongue Length Top 5.5mm	Tongue Thickness 3.6mm	Under Tongue 4mm	Groove Width 4mm	Groove Length Top 7mm	Under Groove Thickness 4mm	Under Groove Depth 5mm	Square Check
7.00										
7.15										
7.30										
7.45										
8.00										
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So, when you receive a pack of flooring, know that there is a large amount of work in the planing / machining process and we haven't yet got to end matching or grading yet...

Until the next issue. 📌

Cheers

Ross