

Setting up a small lathe workshop

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As the June 2021 lockdown set-in and *Sydney Northern Beaches Woodturners* closed, I found myself on the *Hare & Forbes Machinery House* website with my finger poised above the *BUY* button for a mini lathe that my teacher *Ken Cooper* had drawn to my attention.

It looked like a good price for a reasonable quality, mini variable speed lathe suitable for a newcomer to the hobby.

I was hesitant to take the plunge though, knowing that a lathe is but one of several components of a lathe workshop and I was not sure if I felt like undertaking such a project. This, especially in the light of having to execute a *major* revamp of my cluttered 7.5 sqm storeroom.

I continued to prevaricate and decided to sleep on it. My wife Joy had other ideas however, and creeping up behind me, she

reached over my shoulder and hit the *BUY* button on my iPad saying, “see, it’s not that hard!”. We’ll get back to her later!

I was now the proud owner of a mini wood lathe. I probably would have bought it anyway, but Joy seemed even more excited than I was. This has just now made me think that perhaps she had an ulterior motive, namely, to get me to stop following her around during my retirement, now exacerbated by the lockdown! Hmmm...

Before I continue, I’d like to stress that this article has been written from the perspective of a relative newcomer to the hobby, as I only started turning around 18 months ago.

I have yet to learn what most of the experienced members of my club have forgotten and I have penned this solely

because I found the process of setting up a small lathe workshop extremely educational and thought that sharing the experience may prove to be useful to other newbies like myself.

With that disclaimer out the way ... I opted to collect the lathe from the *Hare & Forbes Machinery House* Northmead warehouse, and walking around its impressive shop floor, I added a shop vac, air-filtration unit and scroll chuck to my purchase. I was pleasantly surprised, when these items came to less than \$1,200 (see Equipment Table in The Appendix).

I will discuss each item separately but first want to speak about the two most important pieces of equipment which have been the absolute epicenter of my project, namely, my *LUNGS*.

As a beginner, I came to appreciate very quickly the inherent dangers in using razor sharp tools to shape wood spinning at up to 2,000 plus revolutions per minute.

However, the risk around this can be mitigated through a common-sense approach and for this I thank Ken and other club instructors for setting me on the right path from the get-go.

The risk that has concerned me most, however, is the barely visible fine dust particles suspended in the air. Air-filtration units are typically aimed at ameliorating (but not eliminating) this, and it can take several hours, depending on the volume of the room.

As an asthmatic I am also particularly sensitive to dust and arguably I should have chosen a different hobby! However, with the right approach, I believe this can be overcome which included adding a

Trend Airshield Pro to my arsenal. More about this later.

I won't bore you with how I reorganized my workshop other than saying that it was substantially cleaned up, leaving me with a good deal of space albeit measuring just 2.9m x 2.6m. The size of a large bathroom.

Originally, I planned a permanent extension to the existing workbench to accommodate the lathe until the obvious solution of using an adjustable lathe stand dawned on me. This not only adds flexibility in being able to move the lathe around, but also allows for a lathe bed extension later. Thus, I made one final purchase, actually two as I decided after the clean-up, that I now had room for a small band saw as well.

I told you we'd get back to Joy, so before drilling down into the equipment I have a story which is simply too good not to share.

It's totally beyond the scope of the topic at hand, but hey, we're all locked down so consider it a bit of light relief!

Joy is a beautiful person in every sense of the word and is very petite at 4 foot 10 inches and a quarter.

A couple of years ago after watching some guys having heaps of fun chucking radio control delta winged gliders off Long Reef Headland, I decided to get one for myself.

It eventually arrived in a LARGE box measuring approximately 2m x 1m. I made the HUGE mistake of accepting Joy's kind offer to fetch the parcel for me from the local Post Office.

When she went to collect it, all that emerged from the post-office was a large cardboard box with two thin little legs and feet in Birkenstocks, and two big brown

eyes peering over the top of it. The box was light and with only a couple of blocks to walk to our home, what could possibly go wrong? A lot as it turned out!

Despite carrying a box bigger than herself, she decided to knock off a couple of chores on the way home such as, get her nails done, pop into Woolies and the chemist. She eventually arrived at the front door of our apartment carrying a couple of grocery and pharmacy bags and as she put the key in the front door, a vague thought popped into her mind... *the box!*

Suddenly, it all came flooding back to her namely that she has a partner who likes model planes, who had ordered something from Hong Kong, which had arrived in a large box and which she had offered to fetch and indeed had fetched. But what had happened to it?

She then did what she always does when it dawns on her that she may be 'in trouble'... she collapsed in a paroxysm of laughter on the pavement until tears were running down her face. Once she sobered up, I received the phone call, which started with "you know how I was meant to fetch your parcel from the post office...?", a question in the same vein as "do you know how you asked me to park your car...?" (a story for another time!).

It is impossible to get cross with Joy at the best of times and she sounded pretty upset as she recounted her sad tale. I must admit I did see the humour in it, after all how is it humanly possible for someone of her size to lose such a large box without having the vaguest idea of how, when, and where.

I naturally retraced her steps but to no avail and the only explanation that we could come up with was that she had either been abducted by aliens (which

would explain a lot of other things too) and had left the box in their spaceship; or more likely, she put had it down at one of the shops and someone had run off with it. Go figure?

Best not to tell her I told you this story ... now back to fitting out the workshop.

The Lathe



Specs : Hare & Forbes Machinery House

MODEL	WL-14V	
Swing Over Bed	(mm)	356
Between Centres	(mm)	470
Spindle Nose Thread		M30 x 3.5 Pitch
Spindle Nose Taper	(MT)	2
Spindle Speeds	(rpm)	2 Steps, Variable Speed 450-1800 & 900 - 3850
Tailstock Taper	(MT)	2
Motor Power	(kW / hp)	0.55 / 0.75
Voltage / Amperage	(V / amp)	240 / 10
Floor Space (W x D x H)	(mm)	1000 x 350 x 460
Floor Space With Option Stand (W x D x H)	(mm)	1050 x 620 x 1220
Shipping Dimensions (L x W x H)	(mm)	920 x 500 x 300
Nett Weight	(kg)	46

From what I can tell, a variable speed mini lathe for less than \$500, is a good place to start. I also like the fact that it has a dedicated adjustable stand and can accommodate an extension bed should you wish to turn longer spindles.

Another aspect I like is the relatively large swing of 356mm which means being able to turn quite decent sized bowls.

I have had a few tries and the first thing that struck me is how quiet this lathe is, in fact it is barely audible.



Not having too much wood available during lockdown, I was forced to laminate a few pieces of scrap pine and Tasmanian oak together and then made this simple little Honey Dipper as my first project, which I got out of a nice book, *Learn to Turn* by Barry Gross.

So far, I am very happy with the lathe and my sense is that it would also be a great addition even for more seasoned turners.

The Dust Extractor

This is where things went a bit pear shaped ... at first! I opted for a simple shop vac as opposed to anything with cyclone attachments or external filters

given the small size of my lathe and workshop. So, I purchased a relatively inexpensive *Scheppach HA-1000 - Dust Collector*.



Specs : Hare & Forbes Machinery House

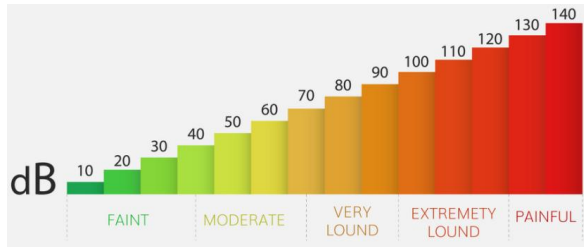
MODEL		HA-1000
Type		Dust Collector
Airflow	(CFM)	109
LPHV - Low Pressure High Volume	(Yes / No)	No
HPLV - High Pressure Low Volume	(Yes / No)	Yes
Inlets / Diameter	(No. / mm)	1 x Ø100
Motor Power	(kW / hp)	1.1 / 1.5
Voltage	(V / amp)	240 / 10
Floor Space (W x D x H)	(mm)	350 x 350 x 650
Shipping Dimensions (L x W x H)	(mm)	700 x 420 x 420
Nett Weight	(kg)	14

As you can see from the specifications this device houses a 1100-Watt motor which sits atop a 50L drum.

When I switched it on for the first time, I was startled by the loud high-pitched sound this bad boy emits and remembering the small size of my workshop, I was somewhat dismayed.

Furthermore, I live in a block of units and while the residents are really nice and friendly, I'm not sure how they would

have reacted to this noise over an extended period. For the record, the decibel reading of this machine is 85db.



As you can see, 85db is 'very loud' and the literature suggests that sounds around 70db or less are generally considered safe, but at or more than 85db there is a risk of hearing loss if exposed for long periods.

At this point my heart sank as it effectively made my workshop unworkable.

One of the key elements about woodturning similar to many hobbies, is the need to solve problems. Sure, enough workable solutions to the shop vac noise problem (read: reduce decibels to under 80db) came to me, one obvious and one less so.

The obvious one was to insulate the device and a *AHA* moment came when I realized that the cavity beneath my existing workbench would comfortably accommodate the vac, even after lining it with inexpensive multi-use Insulation Foam Board from Bunnings.

I added a similarly insulated wood panel as a door, making sure to allow for airflow.



This took the decibels down from 85db to 77db, which may not sound like much but it does make a big difference, especially in muffling the high-pitched whining sound these things make.

The less obvious solution was to use a variable speed controller, easily found on eBay for less than \$30 and which allows one to dial down the speed to roughly 60% (I'm guessing). Opening up the device pictured below, I discovered a potentiometer which allows the variability range to be adjusted further with a small screwdriver.



I did not make any changes but it's interesting to know it's there. I also asked various people with electrical know-how whether lowering the speed may cause

the shop vac to overheat, but the consensus was no although some thought it could shorten its life. As it's not a super expensive item in the scheme of things, I am prepared to take this chance.

Winding back the speed definitely eases the high-pitched sound of the motor and drops the decibel another 1db or so.

I'm so tempted to say that perhaps attaching such a device to my chatterbox of a wife sounds appealing, but I wish to live a bit longer so I will keep this thought entirely to myself!

You may be wondering about the placement of the hose, and I simply cut a couple of holes in the side of my workbench to accommodate the 4" hose and fed this and also the electrical cable through.

The good thing too about its placement, is that it's pretty near the lathe and I was thus able to shorten the 2-meter hose and as we know, shorter hoses are more efficient than longer hoses when it comes to vacuums.



In addition to the device, I added a Sherwood *Big Gulp* Dust Extractor Hood from *Timbecon* and used a 90-degree PVC elbow to takes some stress out of the hood to hose connection.

I plonked this on an old tripod that I had lying around and *viola* it sits nicely behind the lathe and does the job.

At *Sydney Northern Beaches Woodturners'* wonderful club facility, we have a universal dust extraction system for the lathes which is ducted to each machine and the only sound we really hear is the faint hissing of air at each inlet when the dust hose shut off valves are open.

This system is kept on while the shed is operational. Now few people typically spends 100% of their time when at the club actually turning, but the system still runs as at any one time, someone is sure to be turning.

At home, though, I certainly do not want my shop vac to be on all the time but given that it is now encased in a soundproof compartment under my workbench, the on/off button is not readily accessible. Switching the device off at the wall-plug is also not feasible.

This led to another solution which enables me to have the shop vac on only when dust/waste is actually being created.



This is via a foot pedal which I acquired from *Jaycar Electronics*, and it is very effective. It only cost a few bucks and was easy to add to a twin plug-box and mount on an appropriately shaped piece of wood.

So, in summary, I addressed the shop vac noise problem by: (i) insulating at the source; (ii) varying the speed; and (iii) using a foot pedal.

The other way to manage noise is of course by way of ear protection, but that means no music while I work! More importantly, wearing ear plugs won't help the neighbours.

A final point to make about shop vac dust collection, is that while the specs says the Scheppach system enables filtration down to 0.5 – 1 micron, the reality is a lot of dust escapes and is not captured.

My take on this is that the primary aim of a shop vac is to help manage the mess thrown off a lathe, but to capture some of the very fine and 'dangerous' dust that hangs in the air, requires something else. This brings us to the...

Air Filtration Unit

This is the HAFCO AF-400 Two Stage Air Filtration unit which the blurb describes as useful for reducing nuisance dust, particularly in small workshops up to 113m³.



It has both an outer and an inner filter (hence two stage) providing filtration down to 1 micron. It comes with a remote and allows for three fan speeds and a timer function so that it can continue running once one has left the workshop.

Specs : Hare & Forbes Machinery House

MODEL	AF-400	
Filtration Type	2 Stage	
Filtration Particle	(Micron)	1
Air Flow Capacity	(CFM)	409
Noise Level	(dB)	62 - 69
Room Volume Efficiency	(m ³)	113
Motor Power	(W / hp)	110 / 0.15
Voltage / Amperage	(V / amp)	240 / 10
Floor Space (W x D x H)	(mm)	430 x 511 x 275
Shipping Dimensions (L x W x H)	(mm)	600 x 500 x 330
Nett Weight	(kg)	15

My works shop is 22m³ which suggests that this unit is more than adequate.

Just for fun though I decided to do a calculation to derive exactly how much airflow in CFM my workshop needs, using the following formula:

$$\begin{aligned} & \text{Volume of workshop (L x W x H)} \\ & \qquad \qquad \qquad \textit{times by} \\ & \text{Number of air changes per hour} \\ & \qquad \qquad \qquad \textit{divided by} \\ & \qquad \qquad \qquad 60 \\ & = \text{Cubic Feet per Minute} \end{aligned}$$

Note that air changes per hour is a measure of the air volume added to or removed from a space in one hour, divided by the volume of the space.

According to HVAC convention, a typical residential living room requires 6 - 8 air changes per hour and I opted to use 8 for the purposes of my calculation, even

though my workshop would require less, being much smaller.

From the formula we thus get:

$$\begin{aligned} & 791 \text{ ft} \times 8 \text{ ACPH} / 60 \text{ mins} \\ & = 105 \text{ Cubic feet per minute} \end{aligned}$$

The HAFCO 400 spits out 409 CFM at high speed and 260 CFM at low speed and is thus more than adequate for my space with surplus capacity.

Another way of looking at it, multiplying the rated low speed of the HAFCO filtration unit by 60 equals 15,600 Cubic Feet per Hour of airflow. Dividing this by the volume of the room tells us that the air will change 20 times per hour. Remember my workshop assumption of 8 ACPH.

Another important consideration with an Air Filtration unit is where it's mounted with air circulation being paramount.

Thus, while mounting it parallel to the floor/ceiling is obvious, the unit's manual states that it operates at its optimum when hung from the ceiling (hooks and chains are included), located away from corners of the room or any heating or cooling vents. A minimum ceiling height of 2.3 metres is required.

To optimize the effect of this unit the operator needs to be in the circulating airstream. Remember dust in the air equals dust in your lungs and it is thus always better to capture as much dust as possible at the source.

Importantly the dust that escapes tends to be suspended in the air and this is why it is advisable to leave the air filtration unit on for a couple of hours after the source of the dust has been turned off.

From what I can tell, air filtration systems still have their limitations, and the

marketing blurb once again talks about reducing rather than eliminating dust.

This brings me to what I consider the *piece de resistance* for those folks who really wish to protect their lungs. This is the ...

Trend Airshield Pro Respirator

My family often teases me about the sometimes-pedantic *belts & braces* approach I take to life which I cannot deny. To labor the point, despite the dust collector and air filtration unit, it appears almost impossible to capture all the dust coming off a lathe, as evidenced by the dust film that eventually settles everywhere. The Airshield is thus my first line of lung defense as according to this baby's specs, its twin PS2 filters, keep out 98% of airborne dust.



Earlier air respiratory devices have quite cumbersome power units which typically strap around the turner's waist and pump air into the helmet via a hose.

This baby is a self-contained unit with the power source in the helmet itself,

generating up to 180 litres of air flow per minute. The Ni-MH battery lasts for eight hours and the device weighs less than a kilo. It naturally also acts as a face shield and its visor has a replaceable protective film in the event that it gets scratched. Hearing protectors are also available.

I have tried this device out and found it very comfortable and the noise of the fan is minimal. I am not sure that I could wear it for more than a couple of hours at a time without a break, but I have enjoyed wearing it during my turning periods.

This is the most important investment I have made out of all my woodturning gear.

And now for the *Grand Finale* ...

The Band Saw

Ken Cooper's advice is that when it comes to band saws, *bigger is better*. I simply did not have the room for anything bigger than a 10" and I also avoided the temptation of buying a cheapie. Hence the HAFCO Woodmaster BP-255 was my choice, again from *Hares & Forbes Machinery House*.

Specs: Hare & Forbes Machinery House

MODEL	BP-255
Wheel Diameter (Ø)	(mm) 255
Throat Capacity	(mm) 245
Height Capacity	(mm) 152
Table Size	(mm) 360 x 320
Frame Type	Steel
Motor Power	(kW / hp) 0.375 / 0.5
Voltage / Amperage	(V / amp) 240 / 10
Blade Code	(Suits) W950A, W950B, W950F
Blade Size (L x W x T)	(mm) 1826 x 12.5 x 0.65
Floor Space (W x D x H)	(mm) 750 x 650 x 1430
Shipping Dimensions (L x W x H)	(mm) 1000 x 450 x 400
Nett Weight	(kg) 38

In hindsight, I probably could have squeezed the next model up, the 12" BP-310, into my space but I am still extremely happy with the one I bought.

Out of everything, this is my favourite workshop addition!

I knew very little about band saws at the start of this journey and was thus somewhat daunted by this device when it arrived.



Having said this, assembly could not have been easier and as you can imagine I could not wait to run my first piece of wood through it, which of course came out crooked!

So, I did what every self-respecting rookie does these days, and consulted Professor YouTube and sure enough, I came across

several wonderful clips on how to set up and maintain band saws by one *Alex Snodgrass*.

I relied on this one which you can find at:

<https://www.youtube.com/watch?v=bxVvKsbuwZQ>



As is often the case, when something is explained clearly by an expert the mystery evaporates, and it proved to be quite straightforward. In essence the following key points were made by Mr. Snodgrass:

- The gullet of the blade (the rounded space, cut into the blade plate, between the teeth), should be situated on the centre of the top wheel;
- The top horizontal ball bearing guides should be just behind the gullet and laterally as close as possible to the blade without touching (i.e., they should not spin when the blade moves);
- The top rear ball bearing guide should also be as close as possible to the back of the blade without touching; and
- Ditto for the bottom components.

I stress once again, that I speak very much as a beginner but after following the

above advice, the machine not only now cuts beautifully but also hums like a sewing machine.

By the way, it came with a 6TPI x 12.5mm blade which I changed to a narrower 6mm blade as it facilitates finer work but still seems pretty versatile.

Where to from here ...

I guess we need some tools before we can start turning and this is something for another time.

Suffice is to say that I have come to realize that the selection and particularly sharpening of skewers, gouges, parting tools and scrapers is an entire field of endeavor on its own ... and one which I have yet to master!

So that's about it for now. I hope that you have found this article useful in some way.

Setting up a small lathe workshop has been an absolutely wonderful project which I have enjoyed immensely and has certainly kept me out of trouble during these tricky times.

Joy seems very happy too!

APPENDIX

Table of Equipment

Supplier	Item	Model	Cost
Hare & Forbes	Lathe	WL-14V HAFCO	\$490
Hare & Forbes	Lathe insert	30 x 3.5mm SCI-30	\$18
Hare & Forbes	Scroll Chuck	100MM WSC-100	\$150
Hare & Forbes	Lathe Stand	WLS-1824 TS WL-14V	\$150
Hare & Forbes	Dust Collector	Scheppach HA-1000	\$160
Hare & Forbes	Airfilter	AF-400 HAFCO	\$241
Timbecon	Airshield	Trend Pro Respirator Kit	\$499
Hare & Forbes	Band Saw	BP-255 with Circular Cutter	\$525