

# USER REPORT

## JET 22-44OSC Oscillating Drum Sander

by Alan Bendon

Every so often, a tool or machine comes along that makes a fundamental change in the way in which woodworkers can apply their skills to the cutting, shaping, jointing or finishing of wood.

The router was such a machine, so was the drum sander, the major difference between the two being that while routers are now common in practically every kind of workshop from professional to weekend warrior, the drum sander has yet to reach its full potential.

This therefore seems an unlikely time for a further fundamental change in the design of a drum sander. But there's no question this is exactly what the JET 22-44OSC represents.

In terms of the results it produces, this model is almost as far removed from its peers as the drum sander itself was from the machines that existed before its introduction.

### Size

Those familiar with the way these machines are sized will immediately recognise the '22-44' part of the new model's name since this is arguably the most popular size of all drum sanders.

The 22 refers to the width in inches that can be sanded in a single pass (determined by the dimensions of the drum). The 44 is a reminder that since the machine is open-ended — ie. the drum is cantilevered at the drive end but free above the worktable at the other — it is possible to sand a maximum of 44" (1117.6mm) in two passes.

The additional three letters — OSC — refer to the unique feature of this specific model.

Instead of simply spinning in the same way as every other drum in every other drum sander on the market, the drum in this sander can also be made to oscillate back and forth along its axis. The result is extraordinary. The sanded surface is very much smoother than when using the machine without oscillation.

The effect is far greater than might be expected from using an abrasive strip with a smaller grit.

The reason for this is that no matter what grit size is used, if a drum simply rotates, the abrasive on it must leave tracks at right angles to the drum on the workpiece. These tracks just get smaller and smaller as the grit size is reduced and must eventually be removed by another form of sanding.

The standard method of using a drum



sander is to employ a large grit abrasive strip to sand across the grain (as far as possible) when trying to remove material, and a strip with smaller grit to sand *with* the grain when finishing.

The JET 22-44OSC adds another step. Instead of moving the workpiece to a bench for further treatment with, for example, a portable sander, the machine is switched off and a button is pressed to engage the oscillating mechanism.

The workpiece may now be passed through the sander again, this time achieving a smooth surface while still maintaining its flatness and keeping its opposing surfaces parallel.

Other benefits are also claimed for the oscillation feature but I'll come to those later when I describe the actual operation of the machine.

### Out of the Box

The machine is delivered in a single box. Since the net weight of the box's contents is 159kg, some kind of handling equipment will generally be necessary to get the machine off the truck and into its final location.

The first task is to bolt together the five pieces of the cabinet.

Handling gear will again be necessary to lift the 120kg Main Unit onto the assembled stand. Then the rest of the machine (including the conveyor belt), can bolted in place.

Before starting the machine there are a couple of things that should be checked.

The first is that the drum rotates freely without any untoward noises that might indicate damage in transit. While the importers say this is highly unlikely, I believe it's worth making sure. The long cover is released by pressing the central knob, then hinging it back to reveal the drum. An abrasive strip is already installed on the 5" drum (Photo.2).

The other thing to check is that the drum is correctly aligned. (Again, the importers say that it is rare for a machine to need immediate realignment.)

To check the alignment, the abrasive strip is removed and the drum raised to allow a steel straight edge to be placed between it and the conveyor belt table.

Moving the straight edge from the in-board to the outboard end will show whether the drum is parallel to the table. In practice, I've found that following the manufacturer's advice to have the drum a smidgin high at the outboard end produces the best results. (This is particularly

necessary when the machine is used to sand wide boards, doors or panels in two passes since it avoids leaving a slight ridge at the join between the two sanded areas.)

If the drum alignment must be adjusted, the four bolts that secure the drum frame to the body of the sander must be loosened.

When this is done, the frame sits on two pins which act as pivots, a third support being provided by an adjustable pin. Turning a knob lengthens or shortens this pin and therefore tilts the frame back and forth on the body. Since this frame surrounds and supports the inboard end of the drum, when it tilts, it either lifts or lowers the outboard end.

By a process of alternately turning the knob, then checking the drum alignment with a straightedge, the drum can be made parallel to the conveyor table.

It is a very simple and effective mechanism, but requires patient use to get it exactly right.

Once the drum is perfectly aligned, the four bolts are again tightened to hold the drum in the correct position.

Replacing the abrasive strip takes only a few moments.

A finger is used to pull up the clip on the outboard end of the drum and the end of the strip is inserted. As can be seen in Photo.2, there is plenty of room for a finger between the end of the drum and the supporting frame. (The outer edge of the clip can be seen under the end of the abrasive strip in Photo.2).

The strip is then carefully wound onto the drum, keeping it tight against the drum surface, until the trailing end is inserted into another clip on the inboard end.

As shown in Photo.3, there is less room for fingers at this end of the drum and although I've never had any trouble pulling up the clip, it appears the manufacturers must have received enough complaints to warrant them making a special tool for the purpose. One of these TUF tools is now provided with every machine.

With the checks made and (if necessary) the abrasive strip replaced, a dust extractor is connected (a 100mm port is provided) and the machine switched on.

### General Sanding

The drum is switched on and off by press buttons on a small console at the right of the machine. This also houses the variable control drive (a separate motor) for the conveyor and a rotating control that varies the feed speed from 0 to 3 metres per minute.

The noise output figures are given as 69.7dB(A) when idling and 84.4dB(A) in operation.

In practice, this means that while it's possible to talk comfortably beside the machine when it is idling, it's advisable to wear ear protection when it is running and always when it is sanding.

The abrasive material is available in various grits ranging from as low as 60 through to over 300.

The lowest grits are, of course, intended for occasions when a good deal of waste is to be removed. Even then, however, 80 grit is the lowest I have ever needed and for most work, including the removal of bandsaw marks, I use 120 or 180grit.

The depth of cut is varied by rotating a large handwheel on the frame over the inboard end of the drum (Photo.3). The minimum thickness that the machine can handle is 0.8mm (which is extremely useful for custom made veneer) up to 100mm.

The maximum depth of cut advisable is the subject of some argument.

The input power of the JET 22-44OSC motor is rated at 1.3KW (1.75hp). That's a lot of grunt and the machine can be pushed to take quite heavy cuts, particularly if the conveyor speed is reduced to give the abrasive more time to do its job.

When this is done, however, there is the possibility that the upward force on the drum will tend to lift it slightly more on the outboard than the inboard end (where it is firmly tethered by the frame).

This means the drum will no longer be precisely parallel to the conveyor table and the cross section of the board will no longer be a rectangle.

It also means that more heat will be generated, possibly damaging both the abrasive and the workpiece.

If the pressure is increased to the point where the load on the motor requires it to draw its full power, the JET Sand Smart system cuts in. This is a motor load monitor that defends both the motor and the workpiece by automatically reducing the feed rate (ie. the conveyor belt speed).

Should the machine be so heavily overloaded that the motor comes close to stalling, a thermal over-load switch takes it off line. It is then necessary to wait until the overload sensor cools before a push-button switch can be operated to re-start the motor.

These problems can be avoided by taking the advice of the Instruction booklet to sand by using repeated small cuts at a high feed rate.

This is a relevant point at which to mention that keeping the abrasive clean maximises the efficiency of the machine and reduces any tendency to overheat.

The drum cover is raised and a cleaning stick used (as described in the instructions) to remove clogged material.

### Oscillation

The oscillation of the drum is switched on by pushing in a large red button above the inboard end of the drum (Photo.6).

My first reaction was surprise at the lack of vibration. I had expected it to increase as soon as the oscillation was switched on. Instead the operation remained remarkably smooth.

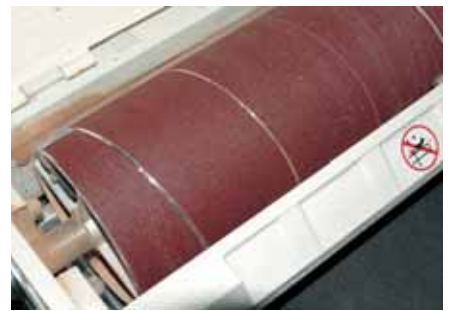


Photo.2: The machine is delivered with an abrasive strip already on the drum



Photo.3: If your fingers don't fit a special tool is provided to operate the clip at the inner end of the drum



Photo.4: A large handwheel adjusts the height of the drum over the conveyor table and therefore the depth of cut



Photo.5: The drum drive on/off switches (lower left), separate conveyor motor (right) and conveyor speed control (top left)

While this must be mainly due to the design of the drum sander, the large well braced steel cabinet probably also plays an important part.

When oscillation is turned on, the drum moves back and forth 70 times per minute through a stroke of 19mm. This means each single stroke (in either direction) takes about 0.43 seconds.

In that time, the abrasive will have travelled about four metres.

The relative motion of the abrasive



**Photo.6:** Pushing this large red knob in while the machine is switched off engages the drum oscillation



**Photo.7:** The large well braced steel cabinet probably plays an important part in damping out vibrations

and the workpiece surface is, of course, further complicated by the feed speed of the conveyor.

The reason for mentioning these figures is not to attempt an analysis of the operation of the machine, but to show that the sideways movement of the abrasive is quite small by comparison with the other movements that affect the abra-

sive and the workpiece.

Despite this, the oscillations have a major impact upon the smoothness of the sanded surface.

In addition, the oscillations are also claimed to dissipate heat, reducing the possibility of damage to the workpiece and increasing the life of the abrasive.

While this sounds logical, in the ordinary workshop it can only be tested subjectively and I found it difficult to be sure of any difference in surface temperature when a board was sanded with and without the oscillatory motion turned on.

### The Mechanism

As can be seen from Photos:8&9, there is very little external evidence of the oscillating mechanism aside from the knob that activates it.

As much as I would like to have taken off the covers to see what the mechanism looks like and precisely how it works, I decided that maybe JET Australia might not be enthusiastic about having to put the machine back together again after I'd finished.

Given the newness of their innovation, it's hardly surprising that JET provides very little information about its mechanism. There are a number of indicators, however, that it must be fairly simple.

First, the stroke is short, second, the frequency of oscillation is relatively small, third, the amount of vibration the oscillation causes is negligible and final-



**Photos.8&9:** Six screw heads and two longitudinal rails are among the few external signs of the oscillating mechanism



ly, there is no provision in the Instruction book for any special maintenance, not even lubrication.

Intriguing though it may be to learn just how the machine performs its unusual function, it is, after all, academic.

The only thing that really matters is that the system works and that it will make sanding even less of a chore wherever the JET 22-44OSC is installed.

The r.r.p. of the 22-44OSC is \$3500. W

## Teaching a Drum Sander to Oscillate

The Taiwanese manufacturing boom started in the 80's. The intention was to mass produce popular designs of existing US brand machines and offer them at dramatically reduced prices, so making them available to a wider socio-economic market.

In woodworking, that meant everybody could afford a good range of machines without breaking the family budget.

Slowly, most of the US brands began to have their machines manufactured in co-operative new factories in Taiwan.

JET Equipment & Tools in the US, was an early partner with these manufacturers, establishing an office in the heart of the industrial city of Taichung, employing young graduate engineers and initiating a high level of quality control over machines that bear the JET brand.

Some 18 years ago, two local engineers — *Barry Chang* and *Alan Huang* — were employed by JET as General Manager and Senior Development Engineer (respectively).

There are now around 15 permanent staff in JET's Taiwan office; most are graduate engineers, the remainder, administrative personnel who handle shipping and accounts.

The engineers spend most of their time on the factory floor.

Often dressed in shirts or coats emblazoned with the JET logo, they are a reminder of the constant quality control given to the machines being made to JET specifications.

### History of the JET 22-44OSC

Performax sanders were originally manufactured in Minneapolis (USA) but were later purchased by the JET Holding Company, WMH Tools, and became subject to the engineering review process that JET applies to all of its products.

At the direction of the US engineering group, the drum sanders were re-designed, the resultant range of products being acknowledged as superior to the original, even though they were sold for only half the price.

During one of the regular meet-

ings of engineers from USA, Europe and Taiwan, it was suggested that a drum sander might be modified to replicate the sanding action of industrial wide belt sanders and therefore produce a much smoother finish.

The Model 22-44 was chosen for this development and the challenge assigned to *Alan Huang*.

It took around two years to perfect the new machine.

All the specialised tooling, procedures, castings, patents etc. are financed and owned by JET so their intellectual property is protected during the market introduction stages and beyond.



**Barry Chang**



**Alan Huang**