

NOOSA MEN'S SHED



BUILDING A BETTER AND HAPPIER TOMORROW

The Secretary
Noosa Men's Shed inc.
PO Box 964
Tewantin, QLD. 4565
Ph: 0402595094
Email: secretary@noosa-mens-shed.org.au
Incorporation No: IA42131

Woodwork Shop Manual Updated November 2023

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The Role of Leaders in the Workshop

This brief overview is presented so that all members understand the role of leaders in the wood workshop.

Leaders main responsibilities are to :-

Make sure the wood shop environment is safe for users.

Make sure mandatory safety rules are followed and to encourage sensible discretionary safety equipment compliance.

Provide basic training in the use of workshop equipment. Some leaders may restrict their training roles because they are not expert in all operations. They are expected to know their limitations.

Make adjustments and maintain equipment with which they are familiar.

Assist members with technical advice on ways of approaching tasks.

Record incidents and accidents and lead efforts to minimise same.

Tag out defective equipment that cannot be repaired on the spot.

Ensure the premises are always left clean for following groups with waste bins and dust bags empty.

Manage sales of NMS timber making sure that sales are recorded and money is collected.

Authorise the use of recycled materials, once they are certain such materials do not pose a hazard to personnel or equipment.

Decide when and if, a member's private project may be stored between sessions. NMS does not have the space to be indulgent in this matter.

Make sure equipment is used in a proper manner for appropriate tasks.

Deal with members of the public who come to the shed seeking help with projects. Issue quotes and ensure timely deliveries of work contracted. Record client details including phone number.

It is **not** the role of leaders to be full time production foreman for NMS enterprises. They, along with all other members, are entitled to work on private projects, shed projects or charitable endeavours as may make their time in the shed personally satisfying.

The success of the operation of the wood shop need never be measured in terms of items produced or profits made for the shed. Rather, its success should be measured by the satisfaction members feel from their participation in woodwork. The environment should not be competitive as much as co-operative. If a member turns out a commendable piece of work it should be recognised warmly but remember a more modest achievement by another may be harder won.

Progress will be reviewed from time to time. Rules may change. Let us move ahead with modest expectations and goodwill toward all- especially the volunteer leaders.

General Operation of the Workshop

The Woodwork Co-ordinator is responsible to the Management Committee for Workshop Operations.

Safe working conditions are of paramount importance. Some safety rules are mandatory while others are recommended. Each person is ultimately responsible for their own actions.

All accidents and safety incidents must be recorded for insurance purposes and to permit follow up investigations.

It is recommended members bring their own personal safety equipment for eye and hearing and dust protection. Closed footwear must be worn.

The workshop can be used for shed projects, contracts, charity assistance projects and member projects. The facilities are not to be used for private profit.

The Wood Workshop is be managed on a day to day basis by Leaders who constitute a subcommittee for the purpose.

A Leader must be present to open the shop and check machine safety before each session. The leader of the day should remain on the premises until the session is completed. Two people must be present for machine operation to occur.

Members must be inducted before using equipment. A record of induction completion is held in the shop and must be checked if a leader believes someone may not be appropriately authorised. The purpose of induction is to build safe working habits not to teach woodwork.

Users may be held responsible for the cost of damage caused by negligence.

Damaged and defective tools are to be tagged out and not returned to service until maintained and checked by a leader.

Walkways/ambulance access, defined by painted lines, are to be kept clear.

After each session, the shop is to be cleaned. Allow 15 minutes at the end of each session. Dust bags approaching half full and waste bins must be emptied.

Personal projects are not to be stored on the premises without the permission of a leader and then should be labelled and placed in a storage area where they may be held, briefly, at member's risk.

Reclaimed materials should not be used across machines without approval of a leader. If they are approved, old finishes must be removed, followed by visual inspection and checking with the metal detector.

There are restrictions on the use of certain hardwoods within the workshop. Aged, dirty, coated and recycled hardwoods pose a bigger risk to machines than clean new timber. Discuss your requirements to process hardwoods with the day leader.

Tools may not be removed from the workshop without authority. If authority is granted, the tools must be back at the next scheduled session.

NMS timber from new stock must be paid for at the price set by the administrator. Shed policy is to keep prices as low as possible but adequate to fund stock replacement. Once a price has been agreed, the leader should enter the sale in the sales register and provide the buyer with an envelope marked with

the buyer's name and the price. As soon as practicable, the buyer will place cash in the envelope and mail it in the red lock box on the wall near the front door. Sales are reconciled to the register monthly. Some free timber, usually offcuts, is available in under bench storage locations. Ask if in doubt.

Consumables like standard wood glue, nails and screws will be provided by NMS. Special materials must be member supplied.

Requests for additional facilities will be discussed within the leaders group before recommendation to Management Committee. The Committee will endeavour to progressively improve workshop facilities within budget limitations.

Verbal abuse, horseplay and disruption of any kind is prohibited.

Disagreements will be referred to the Co-ordinator in the first instance. If resolution is not achieved, the matter will be decided by the Management Committee whose decision will be final

Safe Working Guidelines

The safety of member's is everyone business and responsibility. Organisations that have a specific person nominated to be the safety officer often find that the majority see safety as that person's responsibility. We are all in this together. We need to accept personal responsibility for working safely and be prepared to help others as appropriate. Following are some safety matters to consider :-

The wearing of safety equipment in the workshop falls into two categories. That which is mandatory and that which is recommended but self- managed. Some mandatory situations include :-

The wearing of face and eye protection when drilling metal at the drill press, using the high speed bench grinder or working with unbalanced wood at the lathes.

The use of hearing protection when a nearby member is using the planer, router or other high noise level tool.

Wearing of appropriate footwear i.e., closed toe shoes.

No loose clothing around rotating machines. Tye back long hair.

There are also a range of mandatory precautions that do not involve personal protective gear and clothing. For example:-

The need to use clamps or a vice, when drilling any small component at the drill press.

The use of push sticks and push blocks when working close to any power saw blade, planer blade or router table cutter.

Not turning on equipment that is being used by others.

Not attempting heavy lifting without assistance and appropriate aids.

Not using a tagged out or a defective tool.

Restricting the storage of dangerous and flammable materials to small quantities suitably contained. Five litre maximum is a general guide.

Many safe practices are recommended but are left to individuals to decide whether they are necessary in particular circumstances. Examples are:-

The wearing of special purpose safety footwear.

The full time wearing of dust masks and face shields.

The full time use of hearing protection.

The full time use of eye protection.

In Queensland's climate, it may be difficult to wear all protective measures when doing non-hazardous work. Common-sense has to play a part in the everyday use of NMS facilities. Members are encouraged to err on the side of caution.

Members are also asked to provide their own protective equipment and always have it to hand when attending the shed. It is too difficult and expensive for the shed to provide 'sole use equipment' to all members.

Safe working at major machines is covered in instruction given to members during accreditation. Unless you are competent to work a machine or hand tool, do not do it. It is ok to ask someone else, who is experienced, to help you with your task.

All incidents, near misses and accidents are to be recorded. Leaders will join forces to conduct investigations with a view to incident reduction. Member insurance cannot be accessed if cause and effect are not reported in a timely manner. On occasions, this may require the completion of a shed insurance company approved report under the guidance of the secretary

Other issues to consider are shed hygiene, the need for maintaining clearways, regular emptying of the dust plants and dust build up and routine maintenance of machines to ensure they are in sound condition. Leaders will work with you to ensure the shed is safe and is left in appropriate condition for following groups. You are encouraged to learn how to perform routine servicing of a piece of equipment and help look after it, so that the job of the leader's group is not so onerous.

Operation of the Carbatec Jointer

The NMS Carbatec jointer is a combination machine made for both jointing and thickness planing. It is set up for jointing only, as a matter of convenience. (Thicknessing will be done on the adjacent Laguna planer.) The maximum width of stock that can be dressed at the jointer is 250 mm.

Jointers are used for straightening an edge and providing a flat, square, surface on timber. This facilitates subsequent operations by virtue of having true surfaces from which to progress. The cutting is done by high speed rotating knives. Jointing should be the first stage in preparing a piece of timber purchased rough off saw.

The Carbatec jointer features a spiral cutter head made up of many small knives. These knives have four sharp edges and can be removed and rotated periodically to present a new sharp edge. Advantages of spiral cutter head systems include quieter operation and smoother cutting. Depth of cut of the jointer is changed by unlocking then raising or lowering the in-feed table while the out-feed table remains fixed in position. Dust and waste material is captured by the associated extraction system.

Hearing protection and safety glasses are recommended.

Long sleeves must be rolled up to the elbow.

The area around the jointer should be kept clean and clear.

Any reclaimed stock to be jointed must have all surface treatments removed and be free of foreign objects. A metal detector must be used and a leader must check and authorise continuing the operation.

The dust extraction system must be running with the correct blast gate open to take away waste.

Before turning on the jointer make all necessary adjustments.

Check that the fence is square to the table. Use a set square.

Set the depth of cut to about 1 mm. Multiple passes are frequently needed. Make shallow cuts on harder stock.

With narrow stock, vary the position of the fence so as to avoid all the wear being in one section of the cutter head.

Do not joint timber shorter than 300 mm.

Do not joint timber thinner than 13 mm unless you employ an overblock.

Never operate without the guard in correct place.

Never put your hand over the cutter area.

Use the left hand to hold down and the right to push through. Use push implements with smaller stock.

Walk the timber through. Avoid over reaching and leaning over the cutters.

Do not back work out of the cut.

Long and heavy stock requires the use of in and out feed support rollers or help from an assistant.

Joint in the direction of the grain or tear-out may happen. Shallow cuts help avoid tear-out.

With cupped stock, joint with the humped side up. Once a flat surface is achieved run the timber through the thickness planer to parallel both sides. Multiple passes are frequently needed.

Laguna Thickness Planer Operation

The Laguna thickness planer differs from the jointer in as much as the cutter head is above the stock. The cutter head comprised six rows of carbon steel cutters. The machine will handle material up to 400mm in width. With long jobs it may be necessary to support stock either side of the machine. This can be done with rollers or helpers. The Laguna has over rollers to help a second operator return stock to the main operator easily.

As its name suggests, a thicknesser removes waste to produce boards of a desired dimension. The wider the board, the smaller the cut that should be made to minimise machine overload.

Depth of board entering the thicknesser is accommodated by raising and lowering the cutter head. Depth of cut is similarly controlled. Always check the thickness of the board to be machined at both ends. Lead off by inserting the thickest end. This helps avoid stock jamming part way through.

There is a standard height gauge on this machine. Ask during induction about method of use.

Dust and waste material is captured by the associated dust extraction system. Make sure the blast gate is open and the extractor is running.

Hearing protection is necessary. Eye protection is recommended.

The area around the machine must be kept clear and clean.

Any reclaimed stock to be thickened must have all surface treatments removed and be free of foreign objects. The metal detector must be used and a leader must check and authorise. Damage will still be the responsibility of the user. (There are 102 cutters in the spiral head each costing \$9.00. One medium nail will usually break a dozen cutters on the way through.)

Before turning on the machine make all preliminary adjustments.

Stand to the side to feed to avoid kickbacks.

Do not thickness boards shorter than 400 mm.

Adjust depth of cut for each pass. 1 mm is enough to remove in any pass. Harder woods and wider boards, require shallower cuts.

To plane thin stock, use a backing board.

To plane multiple smaller pieces run them through butted together. (Avoids sniping.)

Joint warped boards first then place the flat side down.

If the stock jams do not shut down but wind up the head until the wood feeds forward again. If overload causes the machine to shut down wait for a couple of minutes before attempting a restart. Check the circuit breaker.

Sniping of the ends of boards is a common fault in thickness planers. If adjustment of the under rollers clearance (skilled task) cannot resolve the issue, simply make allowance and sacrifice a portion of the board

With narrow stock, vary the position of the infeed so as to avoid all the wear being in one section of the cutterhead.

Maintenance of the planer is not a task for the average woodworker. Some components like chains and screw adjustments need greasing or oiling at regular, close, intervals while other tasks such as changing the gearbox oil need happen every second year or 2,500 hours of use. Working on the Laguna planer is best left to one or two leaders who have experience of similar machines. Adjustments of cutter heights, rollers and spring tensions are not straight forward. They are time consuming and require skill to perform. (The workshop manual for this machine contains some glaring errors partly because of translation difficulties.)

Changing knives requires knowledge. It is vital not to use impact drill drivers to fix and remove holding screws as excessive tension breaks the screws and makes them almost impossible to remove. They should be installed and removed with the hand tension tool provided by the machine manufacturer.

Note

NMS also has a 20 inch wide Carbatec planer. Instructions for care and use are as for the Laguna unit.

Table Saws Description and Operation

Laguna Saw

Table saws are designed to rip timber lengthwise, crosscut, bevel and cut angles with precision. Typically, they feature a rise and fall, tilting blade. Power is usually delivered to the saw via a transmission belt beneath the table. Primary features are blades, guards, anti-kick- back pawls, riving knives, fences, miter gauges, emergency stops and dust extraction. The quality in the build and design of a saw will provide the basis for accuracy but adjustment is sometimes required. Setting up a saw bench requires a degree of expertise but once set, they tend not to require much attention.

Most tables have miter gauge slots either side of the saw. These serve a vital function in controlling work safely and accurately. The slots can be use with a miter gauge or with more complex sleds for special work. The fence slides along a rear rail support and should facilitate accurate stock cutting.

The Laguna saw in the workshop is a left leaning, 10 inch blade unit coupled to a 3 hp motor that must be connected to the power supply via a 15 amp plug. Special features include a quick release mechanism for guard and riving knife interchange and a saw blade stop to assist in blade changing. A push stick retainer is incorporated into the fence. The motor has thermal overload protection.

The motor housing need regular blowing out of accumulated dust to prevent overheating and to prevent dust clogging the raise and tilt mechanisms. The blade height and blade tilt mechanisms should receive attention monthly, this involves cleaning then lubrication with multi- purpose grease. To gain access to the mechanism, remove the motor cover by extracting the four retaining screws.

The height of the saw should be set about 10 mm above the work piece. Leaving the saw blade fully wound up at all times is not good workshop practice.

Keep hands out of the zone of the saw by at least 100 mm. Use push sticks and a feather board where necessary, e.g., when ripping narrow boards.

Avoid free-handing on the saw. Maximise the use of the miter gauge, push sticks and feather boards.

Use a miter gauge for all cross cutting.

Do not use the fence and miter gauge together. (Exceptions need explanation during induction.)

Use a stop block attached to the fence with a clamp when cutting multiple pieces to length. (Demonstration required.) Check measurements with a steel rule. (Demonstration required.)

Loosen and retighten the adjustment wheel knobs when saw setting are changed.

Position your body to the side of the blade line and make sure you are well balanced.

Keep the area directly behind the saw blade clear when ripping to avoid injury from kickback to yourself and others.

Wait for the blade to stop before picking up stock. Do not reach behind a turning blade.

To tailor out a very long piece of stock use rollers and the run out table, or seek assistance.

It is advisable to use eye, dust and hearing protection when using the table saw.

Never turn on the saw for someone else.

All periodic accuracy adjustments need to be made with the help of a leader who has first read the instruction book for the saw.

Drive Belts

Modern saws, including the Laguna, feature a small multi groove neoprene drive belt that is easily damaged if the saw bogs and the motor continues to run. In these circumstances friction causes the belt to melt through. Bogging may be because the blade isn't sharp, the task is too difficult for the saw or user technique is incorrect. As soon as blade slowing is detected, stop the motor and seek guidance. Belts are expensive and often are difficult to replace. Special care is needed with non through cuts because the blade can have difficulty clearing the sawdust. Go slow!

The Stop Saw

The Stop Saw, installed in late 2023, is like the Laguna saw in many ways however it offers a higher level of safety and improved dust collection. Designed in USA, this 10-inch saw has an excellent record for cutting injury prevention. The central feature is a safety cartridge located beneath the table that can release a stop pin into the blade gullet should the blade contact the operator. The saw blade carries a small current which, when earthed, enables a charge to burn through a fuse in the cartridge to release the stop pin. The saw stops in microseconds and the blade retracts below the table surface. Injuries are almost always minor. The design has a proven track record. Once the cartridge is fired the blade and cartridge require replacement. This is expensive but better than the alternative.

Much has been written about circumstances where a stop saw has activated unexpectedly. Most stories are little more than rumours however, there is evidence that wet wood, especially chemically treated wood, can trigger an event. Non wood conducting materials will also trigger the safety feature. To avoid confusion about what may be safe and what is not our rule is **to use the saw for dry timber stock only.**

The Stop Saw has some small amount of computer power to sense abnormal conditions. It detects unusual circumstances and advises the operator through a series of red and green light flashes on the switch panel. An auto-precheck is conducted before each start up and the saw cannot be operated until the steady state green light is displayed. Start and stop can then be initiated via the red paddle. There is no need to turn the power switch off after each cut, just use the stop start paddle. If in doubt about any issue, please advise a leader or read the instruction book kept adjacent to the saw.

Note also that the Stop Saw is less powerful than the Laguna saw having a 1.75 hp motor. This means take things slowly. Do not persist if the saw is struggling with the task at hand. Stop and consider if there is a better way. Ask if you don't know.

The Stop Saw has excellent dust extraction from both bottom and top of the blade. Make use of this capability by always turning on the local dust extractor.

Band Saw Description and Operation

Bandsaws feature an endless loop blade, joined by brazing, running around two pulleys. Usually one pulley is crowned and adjusts around the vertical plane so that the saw can be consistently tracked. Tension on the blade is adjustable. Tension is applied by adjusting the top pulley up or down. Too much tension and the blade may break while too little may lead to the blade coming off the pulleys. Correct tension adjustment comes with experience but as a rough rule the blade should deflect 10 mm at the centre under light pressure. Some bandsaws have tension release levers to enable the tension to be released when the machine is not in use.

A setting technique that works quite well is to run the blade with low tension while observing from the front. The blade will be seen to form a sine wave which is eliminated as the tension is increased. When the blade runs without oscillation the tension is correct. Often articles on band saws talk of compensating for bandsaw drift. Drift is usually a function of blade problems like being blunt or lacking set. There is no substitute for a sharp blade, correctly tensioned, to enable true cutting.

Bandsaws usually feature adjustable tracking guides above and below the table. Often these are in the form of roller bearings but may also be wear blocks. The rear roller comes into play when work is fed into the machine. The blade contacts the roller and helps maintain tracking. The usual non load clearance between blade and roller is around 1 mm. Side of blade rollers or blocks, are set close to the blade but back from the gullet such that the teeth of the saw do not contact the guide system when the saw is under load.

Bandsaws are designed to cut curves in wood. They are also used for re sawing timber to produce thinner slabs. Narrow blades allow the cutting of smaller radius curves without binding. As blade width increases so does the radius of non-binding cuts. Wide blades are usually used for re sawing. As with most saws, fine work is accomplished with more teeth per inch.

Resawing large slabs requires the use of blades having few teeth to the inch. These latter blades are able to clear sawdust from the cut quickly. Blades with few, large, teeth can be difficult for beginners to use because of the potential for 'snatching' especially if the stock is not competently secured. For example, secured by use of a slide and jig system. Seeking guidance from a more experienced member is always a good idea!

The NMS's main shop bandsaws feature foot operated brakes which allow the operator to stop the saw quickly after a cut. The brakes are important and must be used. The logic is that the upper and lower wheels in big bandsaws have large mass and momentum prevents them stopping quickly. Use of a brake ensures that when you walk away, on completion of your cut, the blade is stationary and safe.

The larger saws have connected dust extraction. It is desirable to use dust extractors for most jobs. The smaller bandsaws in the shop lack brakes and dust extraction ability.

Stock passing through a bandsaw must have a flat surface in contact with the table or the fence or both. It is dangerous to attempt unsupported cuts called 'free-handing'. In NMS shed free-handing is not permitted.

Adjust the blade guard and guide to a position about 10 mm above the work.

A sound rule to avoid injury with a band saw is to establish a hands-free zone around the blade of about 75 mm. To work inside that zone, use a push stick or a push block. A feather board can also be employed. It is also worth remembering that when blades break, they can inflict injury. If a blade breaks, shut down the saw immediately and advise the duty leader.

When cutting a curved shape, initially, steer the work from the near end. In the event there is a need to back out of a curved cut stop the saw than back the piece out. It is not possible to cut a smooth curve

without simultaneously advancing the stock as you turn. When doing this watch the blade and keep it running straight without sideways distortion.

To cut a really tight curve you may need to do a series of relief cuts. Circles can be cut by use of a simple jig

To cut through a cylindrical object, like a dowel, use a V block jig.

Do not attempt to clear small pieces from adjacent the blade while it is running.

Cut at a moderate rate. Avoid forcing the work into the blade.

Until you are very familiar with bandsaws saw do not make tension or tracking adjustments or attempt to change blades. Ask a leader.

is recommend that you use safety glasses and avoid long sleeves/loose clothing.

Hearing and dust protection should be considered.

Miter Saws Description and Operation

There are three miter saws in the NMS. Two, a small Makita and a small Bosch are similar to the saws most people have had experience of in home workshop environments. These have a capacity of 150mm maximum cut (100 mm on 45-degree cuts) while the larger saw used for breaking down bigger boards and performing wide cuts is a 12-inch Makita Slide compound saw. which cuts boards up to 335 mm wide. All saws can make quick, accurate, crosscuts, miters and bevels.

Before use make sure the guards are in place and functioning correctly.

Use sharp blades that cut with ease. If a blade appears substandard tell a leader immediately. Forcing a blunt blade can distort and burn a cut even bog a machine. 60 and 80 tooth blades make clean but slower cuts. 20 tooth blades are good for ripping while 40 tooth blades are for general purpose. Blades used at the shed may be a compromise between speed and clean cutting. Most cuts will be clean enough if they are not rushed.)

Place the work flat side securely on the table and against the fence. If the stock is bowed place the outside of the bow toward the fence. Always clamp small timber and slightly twisted stock. Cotting round stock needs a properly configured holding jig.

Use the saw for wood and wood like products only.

Make sure the blade is not touching the workpiece before turning the saw on.

Allow the blade to reach full speed and move it into the stock slowly and steadily.

Cut only one workpiece at a time.

Never make free hand cuts i.e., stock away from the fence.

Keep fingers at least 100 mm away from the saw.

After completing the cut **let the saw stop** before raising it from the job and picking up work.

When using a sliding saw pull it toward you before starting the blade, run it up to speed, then ease the blade down and back toward the fence to make the cut.

Accuracy of most settings can be checked with a good square. If the saw needs adjustment, in any plane, ask a leader to organise the changes.

To cut a series of pieces of the same length, clamp a wooden stop block to the fence or fence extension. Measure from the stopped blade to the block, cut a trial and remeasure before proceeding.

Where dust control is provided, it must be used. Otherwise clean up after your job is done.

Special Notes Makita-12 inch slide saw

This is a powerful saw. The most common mistake when using miter saws is failing to secure curved and twisted stock properly with the clamping system provided. Incorrectly positioned stock may be picked up by the saw blade and moved with considerable force damaging the machine or injuring the operator. When using a slide saw, kickback can also occur when the blade binds in the workpiece and the blade is driven rapidly back toward the operator. Loss of control and serious injury can result. If the blade starts to bind, cease cutting and release the control switch.

This slide saw has most of its controls in handy reach. It also features a laser light system to assist in positioning material to be cut.

Special warnings

1. To avoid on off switch breakage do not pull the trigger switch hard before releasing the associated lock off button.
2. Before bevel cutting, make sure that no part of the tool especially the blade, contacts the fences when fully raising and lowering the handle, in any position and moving the carriage through its full range of travel.

The upper fences may be removed unless sawing higher workpieces. Avoid over tightening screws. Do not remove lower fences.

If you wish to use as a 'dropsaw' you must first lock the sliding movement with the stopper pin.

Instruction in basic use will be given during induction. Subsequently, ask a leader if in doubt.

Scroll Saws Description and Operation

A Scroll saw is useful for cutting intricate curves usually in thin stock. The blades are similar to those in coping saws and work by quick reciprocating up and down motion. Blade tension is released to change blades and tightened to perform the cut. Some but not all machines feature variable speed. These are fairly safe tools to use but care is still necessary close to the blade.

- Use of eye and dust protection is recommended.
- Change blades when the power is off.
- Use the right blade for the job.
- Insert the blade with teeth pointing down.
- Use the hold down foot lightly on the work piece.
- Stock must be flat on the bottom. Support a large work piece to avoid blade pinching and breaking. Hold it firm against the table.
- Keep hands away from the blade.
- Do not start the machine while the blade is in contact with the stock.

- Make relief cuts before cutting sharp curves.
- Very small stock is not safe to cut if it can't be firmly held.
- Turn off the machine before backing stock out of a cut.
- Use a v block to cut cylindrical stock.
- Release the tension after finishing with the machine.
- Clean up the work area

Drill Press Guide

The pedestal drill presses feature multi speed, belt drive systems to turn chucks that accepts bits and cutters. Work-tables are height and tilt adjustable. In general, the smaller the bit the faster it can be turned during drilling and softwoods can be drilled at higher speeds than hardwoods. A schedule is provided near drill presses giving a guide to rotation speeds. To alter speed, open the top cover and move the belts on the drive pulleys as required.

Some rotating tools that might be encountered in the NMS wood shop are twist drills, brad point drills, Fostner bits, hole saws, spade bits, circle cutters, countersinks and plug cutters.

Safety glasses or shields must be worn at the drill press if drilling metal. Loose sleeves and gloves are not permitted.

Do not exceed recommended drill speeds for the size of drill and type of stock. Bits rotated too quickly overheat and are quickly ruined.

Centre punch stock to be drilled.

Make sure the tool is secure in the chuck by tightening with the key in multiple holes.

If the work holding plate is moved, make sure to relock the appropriate fittings. Failure to do this can place pressure on the 'rise and fall rack' with the result it bends or breaks.

Use a clamp or vice to hold stock while drilling. Most accidents happen when stock rotates unexpectedly!

Drill into cylindrical stock using a 'v' block.

Long stock should be drilled with the excess to the left of the operator sometimes supported against the post.

Use sharp drill bits.

Support the underside of stock with a backing board to prevent tear-out and drill damage.

Keep hands and fingers 100 mmm from the rotating bit.

When drilling deep holes raise and clear the bit frequently.

Ease up pressure when the bit is almost through. This precaution limits tear out.

If the drill binds, turn off power and wind the chuck backwards by hand to clear.

Turn the drill off before moving away.

Keep the area around the press clean and clear to prevent slips.

Router Description and Operation

Routers turn cutting bits at very high speed to perform smooth finishing and a range of decorative cuts. Cutters come in a range of shapes to enable different profiles to be achieved. They are depth adjustable and at rest, the bit retracts within a protective base. They are often referred to as plunge routers as they are pressed downwards to engage the bit into the work piece. While highly regarded for their versatility, routers tend to cause concern for new users.

Safety glasses should be worn and hearing and dust protection is recommended.

Work in a clean, clear, area.

Use sharp undamaged bits.

When making bit changes and adjustments switch off the router and disconnect the power cord.

A bit shaft must engage in the collet by at least 15 mm but never bottom out in the collet as this can cause collet damage.

Tighten collet nuts securely with the correct tool.

Make sure the work surface is free of screws, nails and knots.

Clamp work securely.

Use jigs and guides where necessary.

After turning on, wait for full speed before engaging the bit in the job.

The depth of a straight cut in a single pass should never exceed the width of the tool. For complex bits follow maker's instructions.

Hold the router firmly with both hands and be prepared for torque twisting.

Feed the cut against the direction of bit rotation.

Never lay the tool down while the bit is still spinning.

Bits should be stored in a bit holder to prevent damage and help keep them sharp.

Understand the difference between a bit with a bearing and a bit without a bearing.

Free-handing is possible but requires skill and practice.

Router Table Description and Operation

Routers mounted in a table are fairly straightforward to use when creating decorative surfaces such as edges. These tables usually employ a standard router mounted beneath the table with a series of clamps. Surface guides and hold downs, when properly adjusted, make accurate work possible. Provision is made to connect a dust extractor to pick up dust and waste wood.

Use eye and hearing protection. Dust masks are recommended. Avoid loose clothing like long sleeves.

When changing bits, follow the normal use of router procedures including turning off the router and disconnecting the power.

Check the router is secure in its table clamps. Use the correct collar plate for the cutter. There should be no big spaces that the job can drop into.

Set the top of deck fence and guards correctly for the bit being used before turning on the power. Adjust the fence such that it clears the bit easily and aligns appropriately. For ease of operation the NMS unit does not allow for half fence adjustments.

Clear the area around the machine.

Make sure the work surface is free of nails, screws and knots. Recycled materials must be checked with the metal detector.

Guard the top of the bit.

Do not shape stock with painted surfaces.

Properly support long items. Use rollers or get assistance, where necessary.

Feed the work piece against the blade rotation.

Always use a miter gauge and clamp for end shaping.

Turn on the dust extractor before commencing operations. If the exhaust port blocks, stop and disconnect power before clearing the blockage.

Follow the 100 mm rule and keep hands that distance from the bit.

Use push sticks, blocks and feather boards, where necessary, especially with narrow stock.

Do not use on stock shorter than 300 mm.

To make a freehand cut, use a starting pin and a bearing on the bit.

Ask for help if in doubt about anything.

Lathes Description and Operation

Lathes are used to make bowls, table legs, lamp stands, pens and the like by rotating timber between the head and tail stocks to permit carving. Speed of rotation varies with the job so it is usual to see multi pulley belt drives and electronically variable drives that provide numerous speed options. The NMS lathes are of both kinds.

A danger with lathes is that improperly secured and out of balance stock can fly off and strike people and property in the vicinity. Safety glasses and /or face shields are required particularly when wood is out of balance.

Avoid loose clothing like long sleeves.

Dust extraction systems are not always present with lathes so it is recommended to use dust masks,

A range of cutting tools is needed to achieve results. These need to be kept in good condition and sharp. NMS uses the Robert Sorby sharpening system and the recommended profiles of shed tools are not to be altered.

Avoid using wood with significant unfilled splits and knots.

Rough out your work piece on a bandsaw or similar, before mounting it on the lathe securely.

Rotate the stock by hand to ensure it clears the tool rest.

The tool rest should be a little below the centre of the work piece and about 5mm from the surface as stock diameter reduces. Cutting takes place on or above the centre line.

Start the lathe at low speed or by hand rotation and check for out of balance before ramping up speed. Stand to the side while ensuring stock is balance and secure.

Hold turning chisels firmly and securely on the tool rest. Stay at slow speeds until the stock is cylindrical and balanced.

Make contact cautiously at first becoming more aggressive as cutting progresses.

Never use your fingers to check roundness while the lathe is running. Stop the lathe or rest the blade of the tool lightly on the work as it turns.

Remove the tool rest before sanding or polishing on the lathe.

Sand on low speed on the back of the stock on the down stroke.

Keep tools off the lathe bed and on the same side as the operator.

Lubricate bearings that require lubrication.

Keep the immediate area around the lathe clean and clear of people and objects.

Robert Sorby Pro Edge Gouge Sharpening System

The Sorby sharpening system is intended to allow trained operators to produce correct grind profiles on a range of gouges quickly with excellent repeatability.

Sharp, correct angle, gouges are essential for good turning results.

The system uses different grade abrasive belts in association with accessories that permit correct grind profiles to be achieved.

Initial grinding is carried out with 60 or 80 grit abrasives until any profile anomaly is corrected. During this process it may be necessary to water cool tips to prevent overheating. Once the gouge profile is corrected, finer abrasive belts can be employed depending on sharpness needed.

NMS has accepted that the profiles on shed owned gouges be standardised to the Sorby recommendation. Anyone wishing to use tools with alternative profiles must provide their own.

Belt and Disc Sanders-

There are two sanding systems within the workshop.

The smaller unit comprises (a) an endless belt driving over head and tail pulleys one of which is adjustable for belt tensioning and tracking and (b) a disc sander that rotates at high speed adjacent to a small adjustable table. There are two dust collection ports connected to the dust extractor. Most injuries with this type of machine come from contact with the moving abrasive.

Eye and dust protection are recommended.

Turn on dust extraction and open the appropriate blast gates. Other blast gates in the same system should be closed.

After turning on and before use, check that the belt is tracking properly and that the disc is running smoothly.

Keep hands clear of abrasives and allow the machine to come up to speed before introducing the work piece.

Do not sand objects that are too small to be safely held or supported. Hold work firmly or you will lose control.

When sanding with the disc, hold the work on the downward side of rotation. Use the support gauge if practicable.

Do not apply heavy pressure as the abrasives work best when allowed to run freely on the work surface.

Do not use for sanding materials other than wood as the abrasive surfaces damage and blind easily. Avoid wet glues and green timber having a sap or gum content.

Clean the abrasive surfaces periodically with the rubber provided.

The Larger Carbatec sanding unit

This sander features a long oscillating belt with end of belt access. It also has an adjustable guard fence, slide miter gauge and an end stop. The belt can be used horizontally or vertically.

For horizontal sanding, lock the platen in the horizontal position using the lock knob. If the backstop is needed the dust port must be swivelled away. The guard should be adjusted to suit the task at hand.

For vertical sanding the platen is locked in the vertical position and the backstop and miter gauge may be used but guard is not employed.

The manufacturer recommends regular use of the belt guard to minimise exposure of the moving belt to only that needed for the task in hand.

To contour sand, it is necessary to swing away the hinged dust port to access the extension table. Use with the dust extraction running but reposition the dust port once access to the drum is no longer needed

For effective dust extraction close blast gates elsewhere on the system.

Use of personal protection measures is highly recommended.

Hollow Chisel Mortiser

The hollow chisel mortiser is a woodwork machine used to cut square or rectangular holes in timber such as a mortise and tenon joint. The machine combines the use of a four sided chisel with a drill bit to clear out material making a straight clean joint. The operation is similar to using a drill press.

Members must not use this machine without appropriate training. This is best done one to one so ask the co-ordinator for training.

Keep the area around the mortiser clean.

Make all adjustments with the power turned off.

Wear safety glasses or a face shield.

Avoid loose clothing like long sleeves near anything that rotates.

The central drill bit should be 2 to 3 mm beyond the chisel for clearance.

Set the depth stop high enough so that the chisel will not strike the table at the bottom of the cutting stroke. Use a wood spacer beneath the job as appropriate.

Securely attach the work piece to the table. Do not hand hold.

Keep hands 100 mm clear of the chisel.

Do not use excessive down force.

Don't cut a three sided hole. Cut the first hole. Move along and cut another hole leaving a small portion of material. Continue until mortise length is achieved then go back and remove the material between the holes. Failure to do this will damage the chisel and bit.

Sharp chisels and bits make clean cuts! Sharpening equipment is available.

Bench Grinder Description and Operation

These notes refer to the operation of the high speed grinder. The grinding wheels revolve at sufficient speed to cause serious injury in the event of wheel disintegration. For this reason, it is essential to check the grinding wheels for flaws such as hairline cracks before turning the machine on. Wheels need to be dressed periodically.

Make sure guards and shields are correctly set. Adjust tool rests about 5 mm from wheels and slightly below centre. Keep spark guards close to wheels.

Wear eye and hearing protection.

Stand to the side as wheels run up to speed. If imbalance is evident shut down for rectification. Do not use a wheel that vibrates.

Bring objects being ground into contact slowly and smoothly, avoiding impacts.

Move the object back and forth against the wheel face to prevent wheel surface ruts forming.

If small objects need grinding hold them in clamping pliers.

Do not touch the work until it has cooled.

Avoid overheating tools having sharp edges as excessive heat damages the ability to hold an edge.

Tools that need to be very sharp are best dressed on alternative equipment.

Keep bystanders well away.

Watch over the machine until it has finished its run down after switch off.

Drum Sander Description and Operation

NMS has a drum sander suitable for initial sanding of breadboards and the like. A primary requirement before employing the sander is to have the job correctly thicknessed so that there is no wedge shape that might cause a jam. When a jam happens the sanding abrasive is often destroyed

Most sheds experience a lot of operator error with drum sanders. For this reason, operation is restricted to the trained leadership group who are always ready to assist. Inexperienced operation usually results in sanding medium failure. Off the shelf sanding belts cost \$25 each.

The basic operation is as follows.

Check that there is clearance between the drum and the conveyor belt.

Check that the belt is tight in its clips on the roller head.

Run the conveyor belt at speed 4 and check it tracks properly. If tracking is correct proceed to the next step.

Turn on the dust extraction.

Lift the head/drum above the work to be sanded. Start the sanding drum and belt.

As the job runs beneath the drum, slowly lower the drum until the abrasive just kisses the work. Allow the job to exit and then wind down the drum no more than one tenth of a turn and send the job through again. At each pass lower the head slightly but never more than recommended.

When finished, clean the sanding abrasive with the rubber stick and blow down the machine.

Do not sand anything that is painted, varnished, contains gum, damp glue or any product that will stick to the sanding medium.

Avoid very thin pieces of wood as they will burn the medium and the belt. 2 inches wide is a fair guide to minimum width.

The wider and harder the wood the smaller the bite taken at each pass. Be patient.

Dust Extraction Systems

The NMS wood workshop has several hobby style dust extraction systems. These were inexpensive to install and are moderately effective in keeping the workshop dust levels tolerable. They are not a substitute for personal protective equipment in preventing lung disorders.

Dust extraction systems of all types require management to maintain effectiveness. Common problems experienced in the workshop include :-

Failure to turn a dust system on before working a connected machine. This results in blockages that need clearing most noticeably with planers and jointers which produce bigger chips.

Failure to empty dust bags with sufficient regularity. This leads to blockages and system underperformance.

Failure to clean the filter bags. Commercial systems employ automatic rappers to shake dust free from the filter medium. Hobby systems require regular manual bag cleaning. This is not a first choice task for many.

Failure to manage airflows by using the blast gates provided to isolate equipment not in use.

Attempting to extract dust from equipment that has been poorly designed for dust extraction.

Extractor noise. The three main plants are housed externally in structures designed for safety and modest noise suppression however, some smaller units are on the shop floor. These are sometimes left running when not required and make shop noise levels higher than desirable.

Dust management is important. All workshop users need to play a part in optimising the assets available.