

# NOOSA MEN'S SHED



*BUILDING A BETTER AND HAPPIER TOMORROW*

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# *Woodwork Shop* *Manual*

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# *A Role of Leaders in the Woodshop*

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. At the outset some leaders will restrict their training roles because they may not be 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.

Manage sales of NMS timber making sure that sales are accurately recorded and money 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. Clearly NMS does not have the space to be indulgent in this matter.

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

It is not the role of leaders to be 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.

We will review progress from time to time. Rules will change. Skill levels will rise and greater undertakings may follow however, let us start low key with modest expectations and goodwill toward all especially the volunteer leaders.

# *Rules of Operation of the Wood Workshop*

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

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

All accidents and safety incidents will be recorded in logs provided for insurance purposes and to permit follow up investigations.

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

Members should bring their own small and sharp tools where communal use may be problematic. The shed will have some safety equipment and sharps such as chisels and the latter will need to be maintained by members.

The workshop can be used for shed projects, charity assistance projects and member private projects. There is no priority assumption.

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

A Leader must be present to open the shop and check machine safety before each session. The leader must remain on the premises until the session is completed.

In lieu of a specific charge to use the workshop, the NMS Management Committee has decided to introduce a site visitation charge which applies to all activities. It is initially set at \$ 2.00 per session and will be paid during sign-in. Members may choose the option of paying the normal annual membership fee of \$50.00 plus \$100.00 for attendance irrespective of how many sessions they attend

Members must be inducted before using equipment. A record of induction completion is held in the shop and should be checked if leaders believe someone may not be appropriately authorised. .

Users will be held responsible for the cost of damage attributed to negligence.

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

Walkways defined by painted lines are to be kept clear at all times.

After each session, the shop is to be cleaned. Allow 10 minutes at the end of each session. If dust bags are approaching half full they must be emptied.

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

Reclaimed materials will not be used across the machines without express approval of the leader. If they are approved, old finishes must be removed, followed by visual inspection and checking with the metal detector. Damage from recycled materials use must be paid for by the owner of the material.

There may be 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 duty leader.

No NMS tools may be removed from the workshop without committee approval and recording.

NMS timber from new stock must be paid for at the price set by the duty leader. Shed policy is to keep prices as low as possible given the need to occasionally fund new stock. Once a price has been agreed, the leader will enter the sale in the sales register and provide the buyer with an envelope marked with the buyers 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 is usually available in under bench storage locations. Ask if in doubt.

Consumables like standard wood glue, nails and screws will be provided by NMS or in the case of special materials, 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

## *Safety Overview for Wood Workshop*

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.

Avoiding the wearing of loose clothing around rotating machines. Tying 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 functions. 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 machines is covered in instruction given to members before they are authorised to operate individual items. Unless you are competent to work a machine do not do it. It is ok to ask someone else, who is authorised, 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 duty leader is not so onerous.

## *Description and 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 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. The metal detector must be used and a leader must check and authorise. Damage will still be the responsibility of the user.

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.

Jointing with the fence set at an angle is difficult and can require the use of hold down devices. Not recommended for beginners.

## *Laguna Thickness Planer Description and 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 an electronic gauge as well as 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 thicknessed 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 \$6.50. 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 to 2 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.

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.)

## *Table Saw Description and Operation*

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, mitre 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 mitre 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 mitre 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 and a reset button mounted on the motor junction box.

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 mitre gauge, push sticks and feather boards.

Use a mitre gauge for all cross cutting.

Do not use the fence and mitre 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.

## *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.

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.

The machine is designed to cut curves in wood. It is also useful 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. The size of a bandsaw is described by the depth of its throat.

The NMS's main shop band saw features a foot brake which allows the operator to stop the saw quickly after a cut. The saw also has a dust extraction port. It is necessary to use the connected dust extractor for all cuts.

Jobs passing through the saw 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 100 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 usually break to the right and can inflict injury. If a blade breaks, shut down the saw immediately.

When cutting a curved shape 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.

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 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 shed leader to help you.

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

Hearing protection should be considered.

The small bandsaws in the workshop are similar in design and operation but lack dust extraction or a foot brake.

The very large bandsaw in the wood turning area is for block breakdowns and board resawing. Check with a leader before attempting to use this machine.

## *Miter Saw Description and Operation*

There are two mitre saws in the NMS. One is a Makita drop saw while the second is a Bosch Professional compound saw. The first has a capacity of 150mm maximum cut ( 100 mm on 45 degree cuts)while the Bosch Professional cuts boards up to 335 mm wide ( 240 mm on 45 degree mitre. Both mitre saws make quick, accurate, cross cuts, mitres and bevels.

Safety glasses and dust masks (treated wood) are recommended when using the saws.

Always make sure the guards are in place and functioning correctly.

Use sharp blades that cut with ease. Forcing a blade can distort a cut. (Many toothed blades allows for clean slower cuts. 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 slightly bowed place the bow toward the fence.

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

Keep fingers at least 100 mm away from the saw. To saw a small piece of wood use a clamp.

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

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

When using the 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 make 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.

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

### **Special Notes . Bosch Professional Saw.**

This saw has most of its controls at the front. It also features a laser light system to assist in positioning material to be cut. Once it is 'on' at the wall switch it is necessary to grasp the handle and move a lower control sideways before pulling the secondary 'start' trigger. On completion of each cut, release the dual trigger system and wait for the blade to cease rotation before picking up stock.

The rear fences have red control levers to enable the extension fences to be slid sideways when it is desired to roll left or right.

The major lever left front is a lock. This has to be released upward to change saw positions. Relock after each alteration.

The lever beneath the handle controls the indent positioning rod. There are 18 indents at major, marked, angles. The mitre detent override, top front, assists lock the angles when there are no indents at the chosen angle. Tightening front rotating handle assists lock the saw in the angle chosen.

The right side front has a red rotary switch. Turn it left to roll the saw over to the left. Turn it to right to roll the saw to the right. Here is a useful hint from Bosch - before switching right side, roll the saw slightly left. This makes it easy to move the control switch to the 'right' position.

You should also note the presence of a transport lock, upper right side toward rear, There is also a glide arm lock, mid rear left (to lock and use as a drop saw).

Please make sure you seek assistance before forcing anything. You may need a little guidance to become a competent user. When the dust bag is in need of emptying, twist bag connector to release then unzip bag.

## ***Scroll Saw 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 press features a multi speed, belt drive system to turn a chuck that accepts bits and cutters. The work table is 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 on the wall near the drill press giving a guide to rotation speeds. To alter the speed, open the top cover and move the belts on the drive pulleys as required. Ask to be shown how, if in doubt.

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. 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 must 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 mitre 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. Only one dust port can be open at a time!

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.

## *Lathe 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.

Dust extraction systems are not always present with lathes so it can be necessary to use dust masks, Safety glasses and /or face shields are required particularly when wood is out of balance. Avoid loose clothing like long sleeves.

A range of cutting tools is needed to achieve results. These need to be kept in good condition and sharp.

Avoid using wood with 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.

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.

## ***Belt and Disc Sander Description and Operation***

The sander 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 machine come from contact with the moving abrasive.

Eye and dust protection are recommended. Turn on dust extraction and open the appropriate blast gate. All other blast gates must 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 supported.

Hold work firmly or you will lose control.

Consider the use of the backstop. This may be difficult when sanding longer items. If you remove it you must replace it on job completion.

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.

## ***Hollow Chisel Mortiser Description and Operation***

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.

## *Tormek Grinder Description and Operation*

Sharpening tools well isn't a skill easily won. The Tormek grinder and honing system is recognised as a leader in the field. The machine features a grinding wheel and a leather clad honing wheel running at slow speed on opposite ends of the same shaft. The grinding wheel is reasonably fine and operates in a water bath to lubricate the stone. The leather wheel is dressed with a honing compound for final sharpening of edges. A tool support system caters for the use of jigs and guides to help in accurate sharpening of chisels, plane blades and gouges. At NMS the Tormek is reserved for flat blade only.

The Tormek speed of operation is such that it is considered a fairly safe machine to use although eye protection is recommended. No one should attempt to use the Tormek without having an experienced user there to assist. It takes time to learn how to sharpen well.

Most danger is to the Tormek's grind stone arising from incorrect use. For example, the water bath should only have water in it when sharpening is taking place as the water tends to soften the stone. A soft stone wears away quickly. Failure by the operator to apply light pressure only and failure to move the tool being dressed from side to side across the stone as it turns also causes damage. If the tool is held in one place, the stone becomes grooved and useless until surface dressed with a special stone cutter and grader. Dressing the stone often means it wears out quickly. Replacement is expensive.

Before sharpening a tool on the Tormek it is sometimes necessary to do initial repairs on a high speed grinder. If you do take this course of action, make sure not to overheat the tool tip as this damages the steel and its ability to hold an edge. (It is handy to have water to dip the tool often thereby keeping the metal cool.) When sharpening on the Tormek, establish the correct sharpening angle. For example, on many popular brand chisels a 25 degree edge is used. Some very high quality steel will take a 20 degree edge while some narrow blade chisels feature a 30 degree edge. Check the maker's recommendations. The shed uses 25 degrees only.

The tool to be sharpened is placed, at the correct angle, in a jig fitted to the universal support. When the wheel runs up to speed the edge is introduced to the stone and moved back and forth against the face. After a few cuts, the tool is examined to establish if the cutting action is likely to produce the desired result. To end up square, a chisel must be correctly aligned. This alignment in the jig may need adjustment before continuing. It can take quite a time to achieve the right result as the cutting action is not quick.

There are a number of jig styles for different tools and operations.

After the grinding process is finished, the tool's edge is polished on the leather wheel. This wheel is oiled lightly from time to time. It is then coated with a smear of hone paste and the tool is brought into contact. This is a light freehand operation. Care must be taken to hold the tool at the correct angle to avoid damaging the leather.

## *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 thickened so that there is no wedge shape that might cause a jam. When a jam happens the sanding abrasive is often destroyed. (An alternative is to know, by careful measurement, that one end is thicker and allow it to enter the sander first.)

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 eights of a turn and send the job through again. At each pass lower the head slightly but never more than one eights of a turn.

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.

## *The Robert Sorby Pro Edge Sharpening System*

The Robert Sorby sharpening system is used mainly for wood turning gouges, plane blades and chisels. It has proved to be an extremely valuable workshop acquisition.

Prior to adopting the RS system as the shed standard, we had significant difficulties keeping tools in good condition. Members with experience differed about the best angles for gouges and a certain amount of free

handing went on with the result that tools were often sub optimal in condition and excessive time was needed to bring them back to acceptable condition.

The beauty of the RS system is that recommended profiles are catered for by simple adjustments on the machine. Once tools are correctly profiled, re-sharpening is quick and effective and loss of tool steel is minimized. A rule of the shed is that no one is permitted to alter tool profiles.

The main abrasive belts used at the shed are aluminium oxide and zirconium 60 and 120 grits. Zirconium is best for High Speed Steel. The 60 grit provides a quick useful edge on gouges while the 120 grit provides a finer edge preferred on plane blades and chisels.

When replacing a belt, it is necessary to disconnect power then temporarily remove the safety guard, relax the belt tension lever and fit a new belt taking notice of the direction arrows. After guard replacement and tensioning, run the machine checking that the belt is tracking correctly. Tracking is achieved by use of two small bars fitted into holes in the spindle shaft and locking collar of the top pulley. Hold the shaft still and unlock the collar. Small movements of the spindle shaft move the belt left and right on the pulley. Relock. Once a belt is tracked it tends to stay that way.

There is a chart on the wall behind the sharpening station that advises of the correct angle for each gouge. There is a plate on the machine showing how to set the angle mechanism. Some commonly used angles are 45 degrees for roughing and bowl gouges, 15 degrees for skew chisels, 20 degrees for parting tools and 80 degrees for scrapers. For ease of understanding, we use 25 degrees for chisels and plane blades. (For more details read instruction book.)

Tool rest accessories are needed to perform different functions. We have a bowl gouge jig, a skew chisel jig, two different fingernail jigs and a distance setting jig.

Although a qualified leader will usually ensure that shed tools are sharp you are encouraged to learn how to use the equipment. Please ask for a lesson. Remember no free hand sharpening is permitted.