TECHNICAL HANDOUT

MACHINE SHOP LEVEL 1

BLACKHORSE WORKSHOP

INTRODUCTION

Machine tools are designed to aid the efficient and accurate production of multiple timber components. They are essential when working commercially with wood, where speed and professional quality are necessary. However, the risks of injury from machinery use are considerably higher than with hand or power tools, and so a conscientious approach to dust control and awareness of safe working practices in relation to each machine is fundamental. Not all woodworkers have the budget or space to set up a fully equipped machine shop, and so access to this type of equipment can have significant impact upon the type and scale of work a woodworker undertakes, as well as the type of making processes chosen.

At Blackhorse Workshop, we are fortunate to have the space to accommodate the main essential woodworking machinery needed to undertake most types of work with wood.

This handout gives a brief definition of the machinery introduced during the induction. These are accompanied by some key safety tips to help you work safely with these machines in the workshop.

THE CHOPSAW

The Chop saw or 'mitre' saw is one of the most commonly used items of workshop equipment. Although we treat it as a fixed machine, a chopsaw is essentially a power-tool designed for mobile use. Chopsaws have had a significant impact upon modern woodworking, and made it very easy for both DIY and professional makers to accurately cut timber at 90 degrees or a specific angle.
The chopsaw is one of the more dangerous pieces of machinery in the workshop due to its high-speed cutters that are exposed to allow the timber-cutting process to take place.

KEY FEATURES

- → On-Off switch & guard lock
- → Angle adjustments & scales
- → Guard function (to enclose as much of blade as possible during cutting)
- → Depth stop (to limit depth of cut).

COMMON USES

- → Cutting down long lengths of solid timber or board materials (max width 300mm)
- → Cutting angles accurately
- → Notching timber (using depth stop).

SAFETY TIPS

- → Keep fingers at least 100mm away from the moving blade at all times
- → Never use a saw with missing or damaged blade guard
- → Do not use with scarves, jewellery, long hair or loose clothing
- → Always wear eye and ear protection during use
- → Always have one of your hands on workpiece
- → Never have your hand in the path of moving saw blade
- → Ensure bowed workpieces are always concave face-up and away from fence
- → Do not apply excessive force – allow saw time to cut
- → Always position a 'stop' on the side you can apply pressure to workpiece
- → Do not cut material less than 150mm length
- → Always use dust extraction to prevent inhalation of potentially harmful dust
- → Wear a dust mask for additional respiratory protection – especially when cutting MDF.

THE BANDSAW

Bandsaws are generally lower risk machines than circular saws and are used for cutting curves or thicker sections of timber than other saws can manage. Their thin blade also produces less waste than other types of saw.

KEY FEATURES

- → On-Off switch
- → Guard purpose & adjustment / blade guides
- → Internals - blade tension & tracking / wheels / motor
- → Rip & cross-cut fences
- → Bed & angle adjustment.

COMMON USES

- → Cutting solid timber and board materials down to width and length
- → Putting a straight edge on waney edge timber
- → 'Deep' cutting of solid timber
- → Cutting curves / detailed work
- → Cutting joints e.g. tenons.

SAFETY TIPS

- → Always lower the blade guides and guard to just above the highest point of your workpiece
- → Keep fingers out of the path of the saw at all times
- → Fingers always min 100mm from blade – use push sticks as much as possible to reduce risk
- → Use a jig or device for cutting of very small, cylindrical or irregularly shaped components
- → Workpiece should sit on bed at point of cutting as far as possible
- → Only use sharp blades and do not apply excessive force to the workpiece or blade
- → Do not attempt to cut tight curves that might twist the blade excessively
- → Take care when backing out of a cut to avoid pulling blade off front of wheels.

SANDING MACHINES – DISC, BOBBIN & BELT

Machine sanders are generally more accurate than sanding with power tools. It is also easier to connect them to a proper dust extraction system, and so are preferable to use for sanding in a workshop environment. Sanding machines are available in different forms, depending upon the task to be carried out. These are defined below:

- → **Disc sander:** for shaping of wood, flattening of surfaces, convex curves and sanding of end grain
- → **Bobbin sander:** for sanding of internal (concave) curves
- → **Belt sander:** for sanding along the grain of timber.

KEY FEATURES

DISC / BOBBIN SANDING MACHINE:

- → On-Off switch / disc rundown time
- → Guard purpose / disc direction of rotation
- → Bed & angle adjustment
- → Extraction set-up
- → Bed & angle adjustment
- → Bobbin sizes / table extension

DISC/BELT SANDING MACHINE:

- → On-Off switch
- → Guards
- → Belt & tracking
- → Extraction.

SAFETY TIPS

- → Keep fingers min 50mm away from the moving sanding surface at all times
- → Workpieces should sit on the bed as far as possible
- → Avoid sanding very small or thin workpieces (risk to fingers / workpiece may slip between bed & moving belt/disc)
- → Extraction system must be turned on during ALL sander use
- → Wear a dust mask for additional respiratory protection
- → Keep the workpiece moving during use to prevent heat build-up and avoid clogging of abrasive surface
- → No metal to be sanded upon wood sanders due to risk of dust explosion.

PILLAR DRILL & CHISEL MORTICER

Pillar drills provide a more accurate means of drilling holes than with a hand-held drill. They are more powerful and so better suited for drilling larger diameter holes, and workpieces can be clamped to their adjustable bed for greater control over the drilling process, accuracy and safety. Chisel Morticers are similar to the above, except the drill bit is enclosed within a 4-sided chisel, allowing the cutting of square holes – usually the 'mortice' part of a traditional 'Mortice & tenon' joint.

KEY FEATURES

PILLAR DRILL:

- → On-Off switches
- → Chuck & drill bits
- → Feed handle
- → Guard use & purpose
- → Table rise / fall & angle adjustment
- → Speed change

CHISEL MORTICER:

- → On-Off switch
- → Feed handle
- → Change of chisel / bits
- → Bed adjustment.

SAFETY TIPS

- → Keep fingers min 100mm away from the moving drill bits / chisel at all times
- → Workpieces MUST be secured to the table by clamps or in a vice in case drill jams in the workpiece
- → Do not use with scarves, loose clothing, jewellery or long hair
- → Remove the chuck key after fitting or removing a drill bit
- → Safety guard should be lowered during all use
- → Select slow speeds for larger diameter drill bits
- → Eye protection essential for all drilling
- → Do not apply excessive pressure upon drill or chisel bits – the cutter may be blunt and need sharpening
- → Depth stop or table height should be adjusted to prevent drilling into the table of the machine
- → Keep hands clear of the mortice chisel – they are sharp and will get hot after use
- → For deep holes, drill or chisel bit should be periodically raised to clear waste and prevent heat build up.