LESSON 1 WORKSHOP, TOOLS, & APPLICATIONS

Before beginning any sort of woodwork, you need a place to work, tools to use and materials (e.g., wood, nails, glue) to work with.

A workshop may be any area you designate as your chief area for storing tools and working on your projects, but it does not necessarily have to be a custom built workshop. It could be a shed, the area beneath a carport, or a basement, for example.

Workbench

This is one of the most useful things you will need as a woodworker. The workbench is where you will spend a lot of time working on your projects. There is no ideal bench since it is a matter of personal taste and preference in terms of what type of work you are likely to undertake on it. Nevertheless, there are some important considerations.

The carpenter's or wood worker's bench is a means of holding timber whilst it is being worked on. If you have the space, it is preferable to be able to walk around all sides of the bench rather than have it butted up against a wall.

Suggested Tasks: ▼

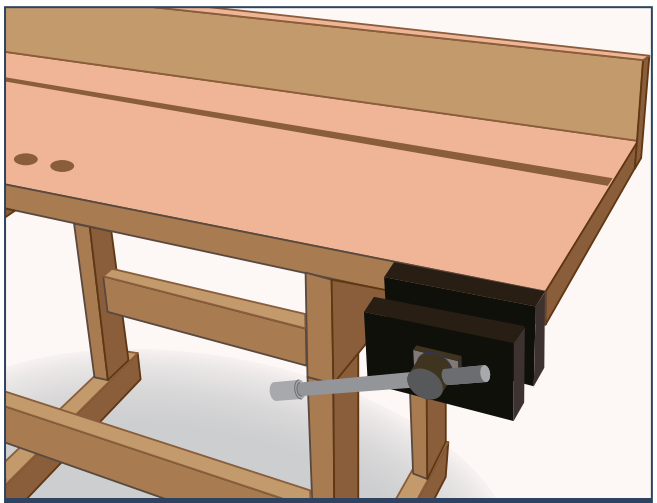
Throughout this course you will be provided with suggested tasks and reading to aid with your understanding. These will appear in the right hand column.

Remember: these tasks are optional. The more you complete, the more you will learn, but in order to complete the course in 20 hours you will need to manage your time well. We suggest you spend about 10 minutes on each task you attempt, and no more than 20 minutes.

Workbench

The bench can include several components to enable you to manipulate and position work:

The vice - the bench may include one or more vices of the same or differing size. If more than one vice is to be installed, each vice should be placed on different ends or sides of the bench so that use of one does not prohibit use of another. Woodworking vices are made from wood or metal (sometimes plastic). Metal vices should have wooden interior faces attached to the jaws so as not to damage the timber when it is secured inside it. The vice is set so that the tops of the jaws are flush with the surface of the bench. On older vices the jaws are wound in and out using a threaded handle. On newer vices, the handle is a lever attached to a split nut meaning that it can be quickly detached from the thread and the vice slid up to the work - saving time from winding in the jaws.



Workbench with vice

Bench dogs - these are wooden pegs which are inserted into dog holes in the bench top and are used to aid in clamping wood together. The vice itself often has a bench dog in it which is typically an iron peg and the other dog holes are set out parallel to this. Bench dogs may be of rectangular section or rounded, though they are usually the former since it is easier to get these to grip in the holes.

Holdfast - these are metal arms or hooks which resemble the top of a shepherd's staff. They act as a third hand and are slotted through a hole in the work bench surface so that the tip of the hook rests on, and secures, the piece of timber which is being worked on. The holdfast is secured in the bench surface by tapping it with a mallet and released by tapping it from underneath. Other versions have a threaded end so that they may be screwed to the bench top, and they have a clamp which can be tightened onto the work to hold it in place.

Planing stop - these are something which can be used to prevent a piece of timber from moving whilst it is being planed. Bench dogs could be used for this purpose, but usually a separate system is employed such as a wooden strip secured to the bench surface. It may or may not be secured permanently. The stop may be affixed at one end of the bench where the height is adjusted to match the work, and then it is set below the surface when not being used.

The bench itself needs to be strong enough that it can withstand heavy work being undertaken on it, and heavy enough that it doesn't keep moving every time a plane is pushed with force or a nail is hammered in. The depth of the bench top also needs to be deep enough to support any vices. An ideal bench top would be something around 3-4 inches thick. It could be built up of several boards of MDF for example with a solid hardwood surface such as

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Suggested Task

Visit a hardware store or retail stores that provides woodwork tools and equipment.

Look at the workbenches and workbench accessories they have.

Ask someone who works there to explain the pros and cons of each.

oak or beech. Marine ply may offer a better under layer since it will not warp due to moisture. If using MDF as a top layer, consider that it will produce toxic sawdust. If using other composites, consider that some (e.g., plywood) will produce splinters. If you can afford it, a hardwood surface without any coating is best (coatings can mark timber which is being worked on).

A basic design would be something like a 60cm x 1.5m (2 feet by 5 feet) bench top, four upright posts of 100mm x 100mm (4 x 4 inch) section, eight cross rails between the posts of 50mm x 100mm (2 x 4 inch) section (one set flush with the top of the posts where the bench top sits, and one set about a foot from the floor), one board around 2 foot by 4 foot to sit on the lower set of rails to form a shelf. Mortise and tenon joints will be very strong, but dowelled joints and threaded rods can also be used.

Hopefully by now you have some tools, are familiar with cutting and joining timber, and have a bench of sorts you can work on. If not, you might consider making the bench in the following section.

Safety

You should consider safety when buying tools. Many tools are potentially dangerous, especially power tools. It is not recommended that you buy second hand electrical equipment. Always read the manufacturer's operating instructions before using a tool you are unfamiliar with.

When purchasing tools, ensure that you also buy any necessary safety equipment such as protective gloves, safety goggles, and earmuffs. Your local hardware store or timber merchants will be able to give you more information about the type of safety gear that you need.

For home projects any risks involved are your own, but if you are employed to undertake carpentry work you may be required by law to use certain types of protection (not only for yourself, but for others).

If you are working at any height, you may be legally required to have scaffolding.

Eye goggles and safety gloves

Note: When using tools, power tools in particular, you should always wear appropriate safety clothing. Wear protective eye goggles if using high speed equipment such as power planes or electric drills or with any tool where chips of wood are thrown into the air. Wear a dust mask when removing fibres of wood such as when sanding or planning. This is especially important when working with composites which may house harmful glue vapours or other chemicals.

Tools

Hand Tools

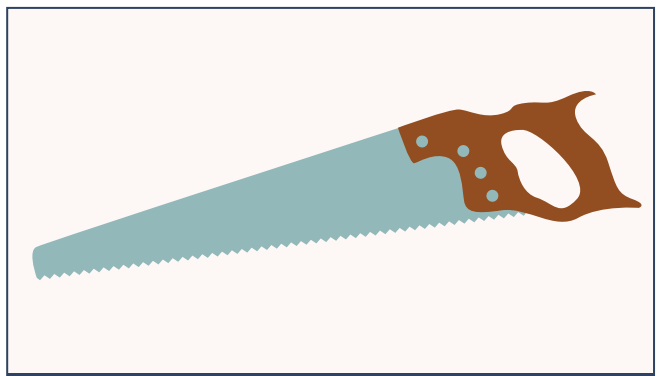
Some of the most useful hand tools are now reviewed.

Saws

Saws have teeth which are measured as points per inch. The number of tooth points per inch is always one more than the actual number of teeth per inch (tpi), since any measure of whole teeth will always include the point of the next tooth. Rip saws have larger teeth with somewhere between 4-7 points, compared to say, a dovetail saw, which may have 20-24 points. As the number of points increases so does the precision cutting obtainable with a saw.

The teeth on saws are ‘set’ meaning that they are bent out slightly to either side of the blade in an alternate pattern along its length. This prevents the blade from becoming stuck in the timber by making the cut slightly wider than the blade. Some saws used for finer work may have a blade which is tapered to become narrower above the teeth to achieve the same outcome. Some modern hand saws have hardened teeth which means that unlike traditional saws they cannot be sharpened and are useless once blunt.

Rip saw - these saws have long blades to around 65-70 cm (26 – 30 inch). They are designed to cut timber along the grain. The relatively large teeth on the blade have a chiselling action which cuts out small chips of wood, and so cutting is done to the waste side of the cutting line. The fronts of the teeth are set at 60-90 degrees (typically, 90°) in relation to the cutting edge, where 90 degrees provides more ‘hook’. The smaller teeth towards the tip of the saw blade are used to create a ‘kerf’ of enough depth to enable the saw to be pushed forward in the same position. Note: The kerf is the cut and is measured as the width of the cut, which is the distance from one side of the saw teeth to the opposite side.



Rip saw

The blade is then drawn backwards in a long sweeping movement whilst maintaining an angle between the blade and the timber of at least 60 degrees to avoid making long cuts through the wood. These days, there is less use for a rip saw since most timber is already cut to the right width, and circular saws can also be used for the same purpose.

Cross cut saw – these are so-called because they are used to cut across the grain e.g., cutting boards to length. They are usually a similar shape to rip saws though usually not as long. The blade teeth are more pointed and have a bevelled edge on the front and rear. The front of the teeth is set at 75 degrees to the cutting edge, and they vary between 5-12 teeth per inch.

The saw is drawn backwards on the timber to start cutting. The angle between the timber and the saw does not have to be as great as with a rip saw.

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Suggested Task

Speak to someone who works with wood (tradesman or amateur); perhaps as a carpenter or woodworker.

Ask them about the different hand saws they own:

1) How often do they use each of them?

2) Which ones are most useful?

3) Which one is their favourite, and why?