

Introduction to Furniture Group



Robert Millard



Dave McNaughton

WONTHAGGI WOODCRAFTER INC.

239 White road, Wonthaggi, Victoria, 3995

The Wonthaggi Woodcrafters are a collection of like-minded enthusiasts, who get together to practise their craft, in the club premises at Bass Coast Adult Learning Centre. The club is a not for profit organisation, and provide no structured training. Members possess a vast wealth of knowledge which they willingly share. The Club caters for Toy Making, Scroll sawing, Wood Turning, Carving, Pyrography and Furniture making.

Prospective members are afforded two free session attendances, thereafter a nominal session fee is payable. New members will be issued a "New Member Guidance Notes" document upon acceptance to the club. The guidance notes cover everything from the Woodcrafters inception; committee structure; general information; OH&S; emergency procedures and general etiquette. The stationary machines (Jointer; Table saw; Thicknesser; Bandsaw etc.) may only be used by members who have successfully completed training and passed the required competency for each machine. David McNaughton conducts regular sessions in this regard.

When it comes to woodwork or joinery, there are many benefits. Woodworking is a great stress Relieving hobby as well as a useful trade to know. From learning how to understand the wood, to learning the different techniques to create a masterpiece, there are several skills involved in the process. These skills take time to master, but they are worth it. Wood is the most useful building material; it can be used for almost anything.

Wood Types

The first step in woodworking is understanding the different wood types. This skill takes time to develop but is very important. With many projects, you will want to know whether the wood needed is hardwood or softwood.

Softwood is wood from gymnosperm trees. Examples of these are conifers and furs. Pine is the most commonly used type of softwood. Many projects can be done with pinewood. In fact, as you become a more experienced woodworker, you might use it for the secondary wood in a lot of projects which will be explained later on.

Hardwood comes from dicot trees. Typically, hardwood trees are found in the tropics, but they are not exclusive to that climate. The most common type of hardwood that people think of is red gum or oak. The hardwoods found in tropical environments are typically very expensive but are beautiful in any project. Hardwoods are used as primary wood in woodworking projects. There is also a type of board called plywood.

Plywood is made by placing several thin sheets of wood at right angles to each other and glued together, often used as a secondary wood as well. Plywood can be used for many types of woodworking projects and is a good type of wood to use when learning basic skills such as using a table saw or learning how to make any basic joints such as a box joint.

Medium-Density-Fibreboard most often known by its initials MDF rivals the affordability and versatility of similar engineered wood products. In certain situations MDF even trumps all the others because it's so wonderfully easy to work with. Unlike real wood MDF has no knots, grain or warping, and its smooth surface gives way easily to the saw leaving no splinters, burns or tear-outs. For light carpentry projects, such as shelving and trim, MDF can be excellent.

Health risks – Most MDF contains urea-formaldehyde, a suspected carcinogen. Until it's fully sealed. So when you're working with this stuff it's best to do so outdoors or in a well ventilated workshop. You may want to go a step further and wear a respirator.

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Primary versus Secondary

Primary wood, the wood that is seen on the project is always the nicest wood used in any piece. To explain I will use a drawer as an example. If you look Figure 1 at the picture adjacent you can see that the main wood, which is most likely a red oak is used for the face of the drawers. Then the arrow points to the inside of the drawer where they use soft maple, and the other arrow points to the birch plywood which they say is used for the dust panel between each drawer and the bottoms of the drawers. In this example, there are two types of secondary wood. The soft maple and the birch plywood. These are considered secondary, because they are just used for structure, and are not always seen. The primary wood is the red oak because it is not only for the structure of the drawers, but it is used to make the drawers look amazing. The purpose of secondary wood is to save money. Hardwood is very expensive, whereas softwoods are much cheaper, and plywood is very inexpensive.



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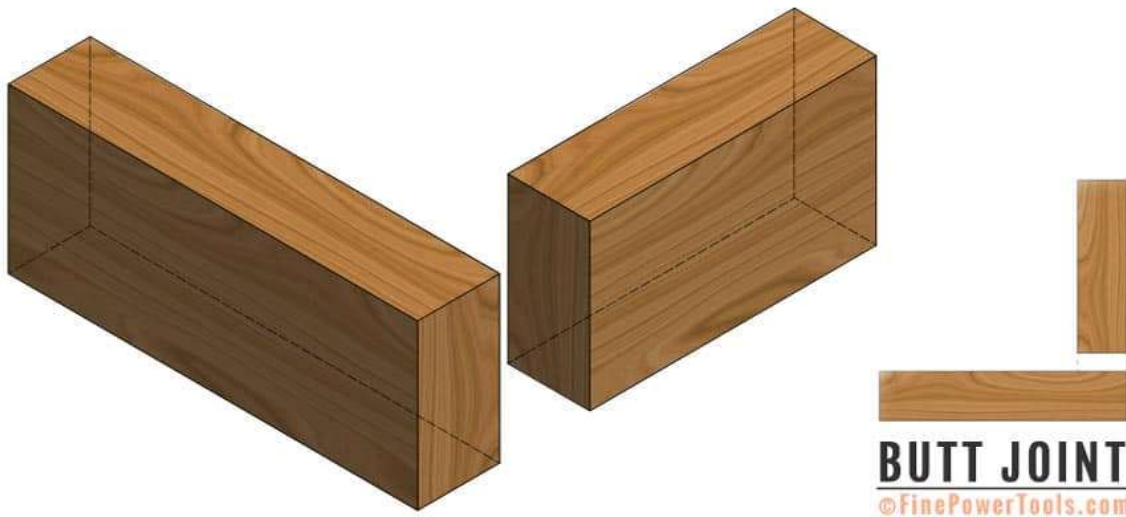
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Joints

Now, when becoming a competent woodworker, creating beautiful joints is one of the best ways to make your work stand out. Joining wood together using different joints can create a strong bond between two pieces that will not only look amazing but will add to the integrity of the project. There are hundreds of different joints, but in this guide, I will discuss eight of these.

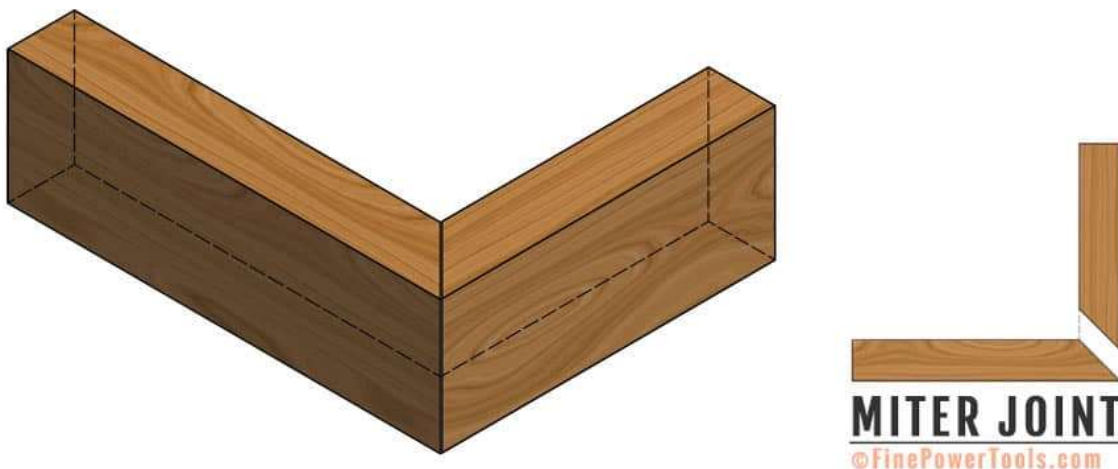
Butt Joint

The butt joint is one of the most basic joints used in woodworking. It is made by simply taking the end (butt) of each piece of wood usually in a right angle and gluing them and then reinforcing it with nails or screws.



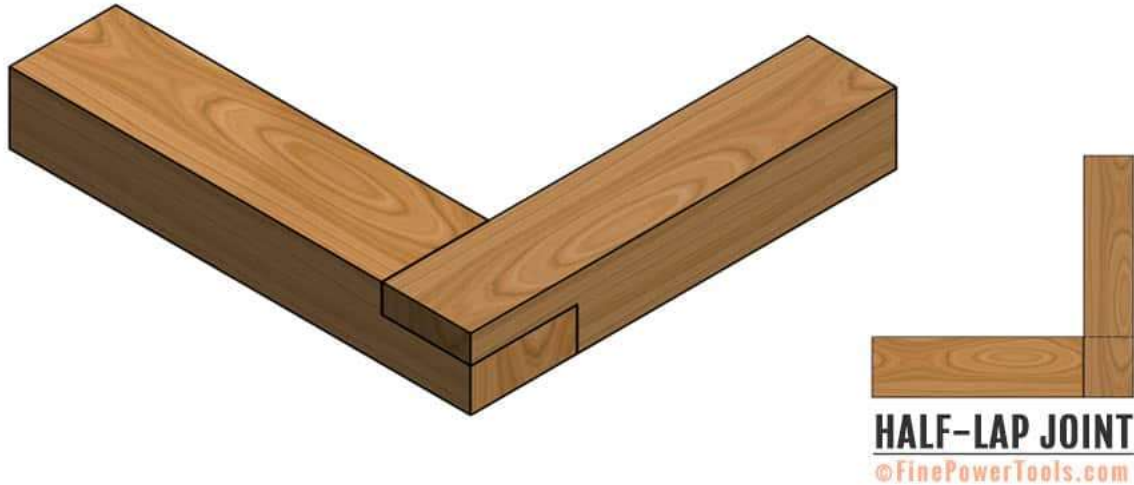
Mitre Butt Joint

Mitre butt joints are just like butt joints, except the ends of the boards are cut at a 45-degree angle to make them fit together and have a cleaner look, though this joint is **not** very strong.



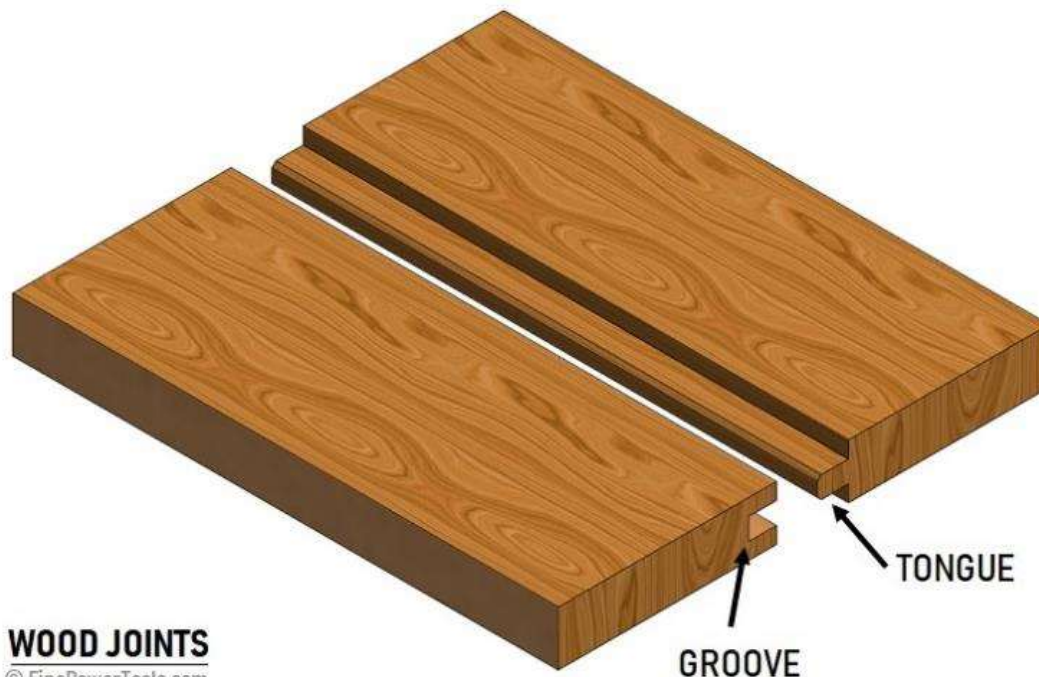
Half-Lap Joint

The half-lap joint is made by cutting halfway down each board and joining them together. This type of joint is stronger than the butt joints, even though cutting through the boards that much does weaken them.



Tongue and Groove

Tongue and groove joints are typically used for flooring, or for shiplap walls. These are made by having one side of the board with a square edge that sticks out from the board and the other side of the board having a groove that the square part of the next board can fit into. The part that sticks out is called the tongue, and the grooved side is the groove. So, when using tongue and groove you put the tongue of the first board into the groove of the next board.

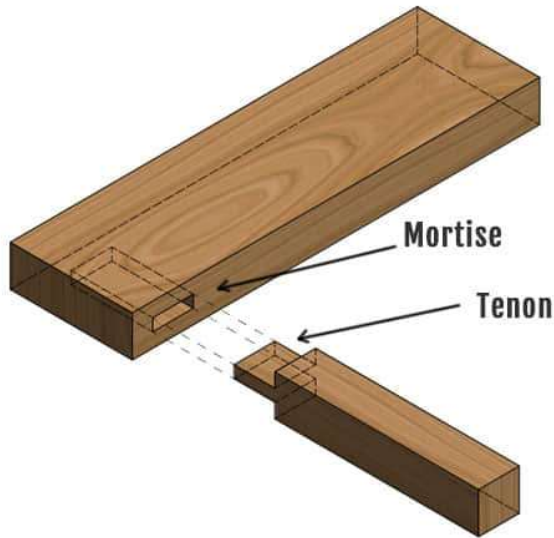


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Mortise and Tenon

Mortise and tenon joints are one of the strongest joints. It is done by cutting a square hole into the side of one board and having a square edge cut out from the other board. The hole is called the mortise, and the edge is called the tenon. The tenon fits snugly into the mortise and often times goes all the way through to the other side of the mortise. They can be open or closed both create a beautiful joint. The best part of this type of joint is that it does not require screws or nails, just glue each piece with wood glue, and clamp them together to let them cure overnight. They can be reinforced by using a pin, which is a wooden dowel put into the side after drilling a hole and gluing the pin into the hole.



Pocket Joint

The pocket joint is another very simple one. This type of joint is accomplished by taking a **pocket jig**, which can be bought at any hardware store, and placing it on the piece of wood you would like the pocket joint to be and then drilling into the holes to give the screws a pocket to hide in. This type of joint is often used when building doors or cabinets but can be used for several types of projects and is placed on the inside part of the joining pieces. Browse the internet for more uses.

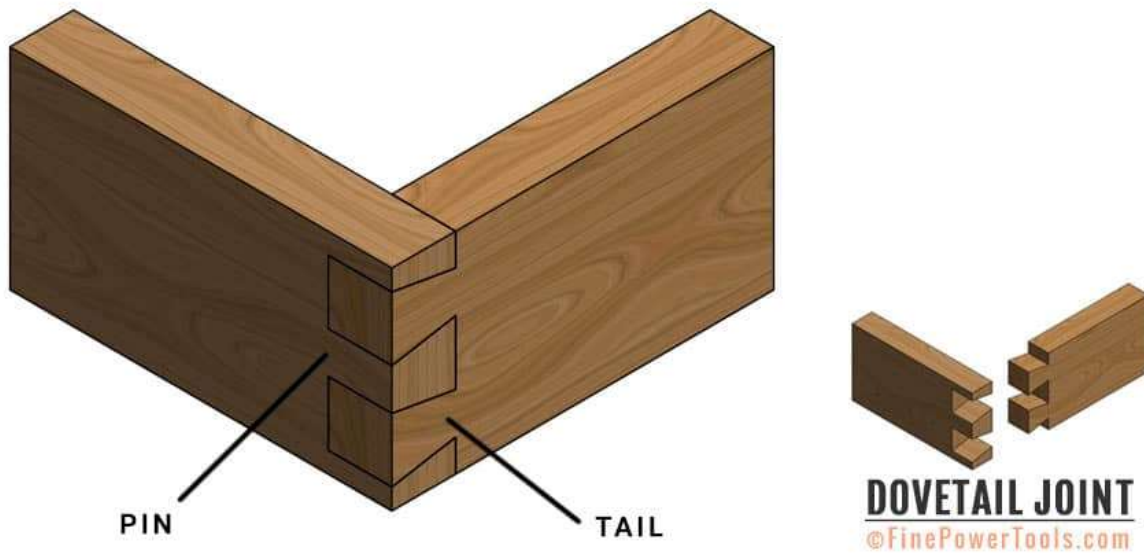


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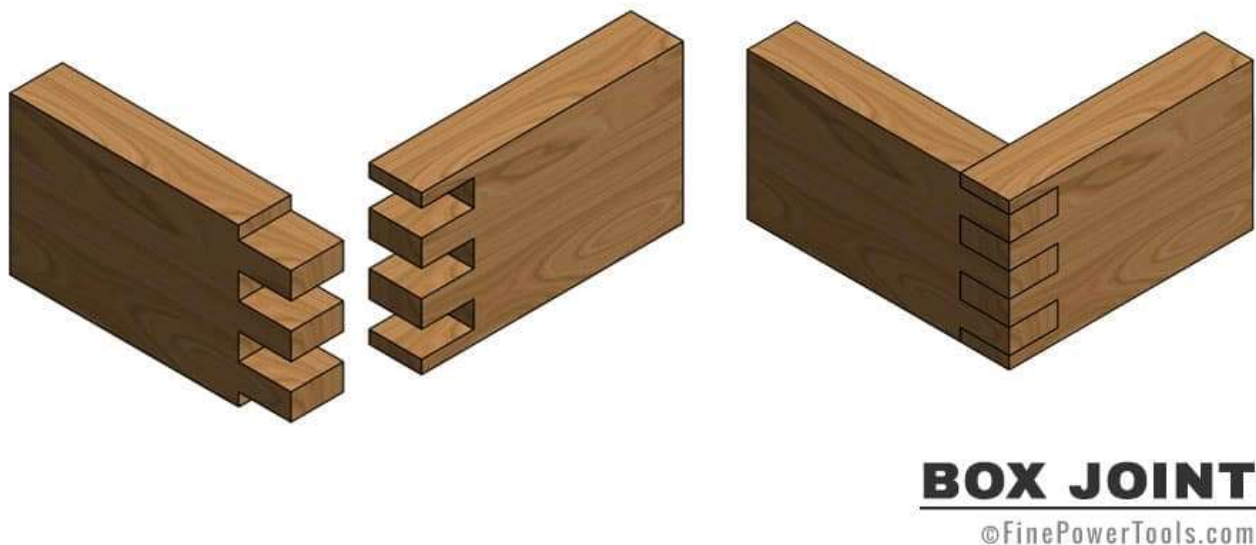
Dovetail Joint

Dovetail joints are my personal favourite, though they take practise to learn to do. Dovetails are usually cut by hand if you want a more craftsman look to it, but they can be cut using a router and a dovetail jig. Either way they are the most beautiful type of joint and are very strong. These are joints that are square but flare out like a dovetail and alternate creating a space where they fit inside each other. They are especially beautiful when two types of wood are joined together. The only thing required to hold this joint together, is wood glue.



Box or Finger Joint

The box joint, also called the finger joint is similar to the dovetail joint. The difference is in the shape of the interlocking parts. The box joint is simply just a rectangular shape that sticks out and each side alternate so they can interlock. They are not as difficult as the dovetail joint but are still a very beautiful joint. This joint also only needs wood glue to hold it together.



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Safety Equipment for Woodworking

Woodworking can be a dangerous hobby. However by following a few common sense rules, you can avoid the risk of serious injury. Develop the habit of using the following pieces of safety equipment from the start, and you'll never want to work without them.

Safety Glasses

Safety glasses are the most important piece of safety equipment. There are many styles of safety glasses, but all share the same features, namely impact resistant lenses, and side screens to protect against dust and debris created by power tools.

Hearing Protection

When working with loud power tools and machinery such as, routers, surface planers, and jointers, it is wise to wear hearing protection. There are two common types: expandable ear plugs and ear muffs. Ear Muffs tend to provide slightly better protection, but can be very awkward and cumbersome. Consistent use of hearing protection will help protect you from long-term hearing loss.

Respirator and Face Masks

Sanders, routers, and other power tools can generate a lot of dust. When using these tools, it is a good idea to wear a dust mask, to keep these fine particles from entering your lungs. When spraying varnish or paint, a respirator is a better choice, to protect you from any harmful effects of using these chemicals.

Face Shield

When using a lathe, you'll likely generate a lot of flying chips. In addition to wearing an appropriate smock, an impact resistant, clear full-face visor is a good idea. The shield is comfortable, can be flipped up when not needed, and will keep most of the flying chips away from your face.

Proper Clothing

When working with power tools, you should always wear proper clothing. As such, you should never wear loose fitting clothing or jewellery. Comfortable, long-sleeved shirts and long pants combined with good steel-toed work shoes will each provide a layer of protection. However, loose articles of clothing can easily become entangled in a power tool which can be very dangerous. A shop apron is also advisable at times, particularly when using a lathe.



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Wood Finishes

Wood finishing involves the application of a protective layer to otherwise bare wood. Before a protective coating can be applied, the wood's surface must be prepared. Sanding, planing, and scraping can help eliminate surface imperfections by softening and smoothing the wood. Processes to alter the wood's colour and appearance are often applied before the finish, including staining and bleaching. Once these processes are complete, the appropriate finish is selected.

Wood Finishing Products

When selecting a wood finish, there are a range of wood finishing material and characteristics to consider. Do you want the final product to shine? Or are you more interested in a matte appearance? Is the application intended to withstand outdoor use? Or is durability not a concern? Prioritizing finish traits can simplify finding the appropriate coating. Have a look below at some common types of clear finish and their distinguishing characteristics for ways to finish wood. .

Wax

One of the perks of opting for a wax finish is that it's easy to use and apply, and it produces a nice shine. However, wax finishes often need to be reapplied and only provide minimal protection. They are easy to remove, which makes it fairly noncommittal finish selection.

Shellac

Although shellac is classified as a clear finish, some grades carry a distinct yellowish tint. The coating itself is durable and does not require reapplication. The application technique can be complicated but, like wax, shellac can be completely removed using alcohol. Additionally, shellac is compatible with other coatings and acts as an effective base layer.

Clear Lacquer

This clear coating creates a hard, glossy finish, which provides good substrate protection and has strong durability. However, there are several toxic solvents in the mixture. Additionally, the coating typically requires a spray-on application method, which further releases toxins into the air. Like shellac and wax, clear lacquer can be removed.

Polyurethane Varnish

Like other varnishes polyurethane delivers a clear coating. However, multiple layers can give a substrate a plastic type finish, which provide strong protection against an array of substances. Because the solvents involved are petroleum-based, the coating is relatively safe. The coating can be somewhat difficult to apply and require a 30 day curing period. Paint stripper can effectively remove the coating, and after the curing period, the coating is quite durable.



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Water-Based Polyurethane

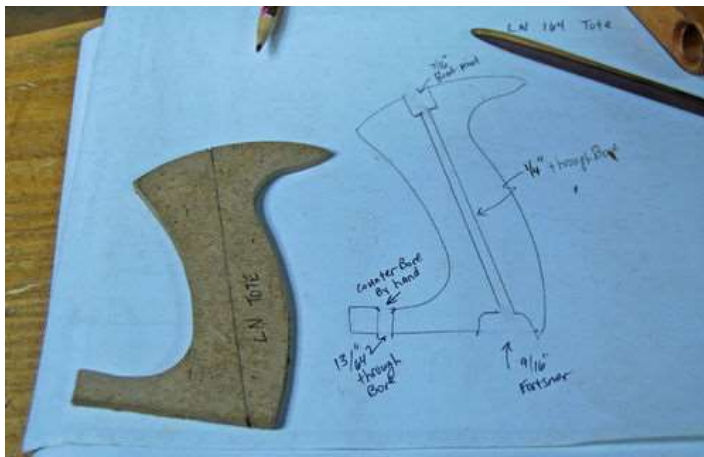
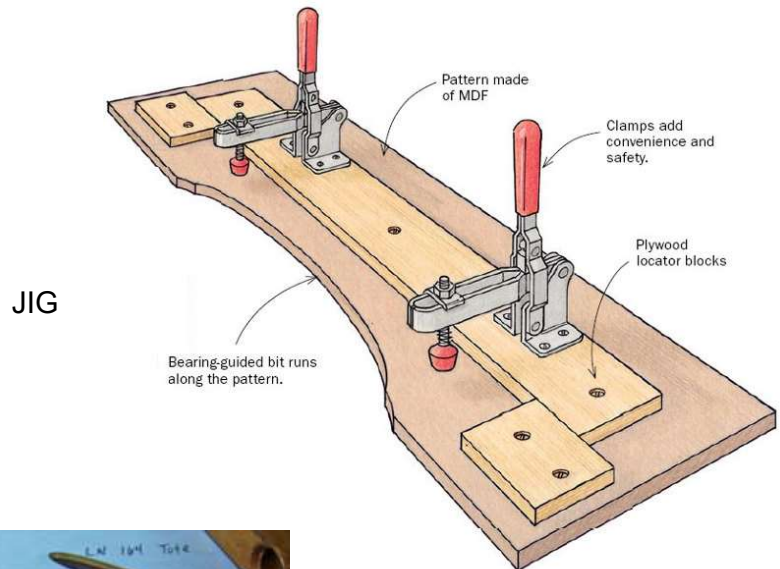
Due in part to the addition of water, water-based-coatings produces a clear coating without the plastic look. Additionally, it works well on products that are exposed to UV and is safer to use than traditional polyurethane varnish. The coating dries rapidly, so care must be taken in brush and spray applications. The curing period is the same as polyurethane finishes, after which the coating is durable. Paint stripper also work to remove water-based polyurethane.

Oil Finishes

Wood preserving oils, such as Tung oil and Linseed oil, can be used to accentuate the wood's grain but do not provide much protection. They provide the wood with a warm glow and increase in durability when layered. Application is easy, but drying typically takes 12 hours or longer. To remove oil finishes, the substrate must be sanded down because oil absorbs into the wood.

Woodworking Jigs and Templates

Woodworking jigs are one of the most useful elements when carrying out projects in wood. Jigs and templates make projects go faster as well as provide accuracy and safety. This is due to the functions they offer, essentially serving as a template to facilitate the execution of repetitive tasks related to drilling, measuring, cutting, or any other woodworking activity. Jigs and templates are made as needed and then held onto for ever!



TEMPLATE

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Workshop Tools

Whether you are just starting to get into woodworking, or exploring a different discipline, you know that tools and a well setup workshop is key. There are many tools a skilled craftsman should have and having them can improve the quality of your work as well as make it much safer.

The Mitre Saw

When it comes to basic cross cutting of wood, the mitre saw is your go to. The mitre saw, also called a drop saw, is used to make simple crosscuts in wood. It can be tilted and turned to make angled cuts as well.



The Table Saw

The table saw is a woodworker's workhorse, it is used in woodworking projects more than any other type of saw. The table saw can be used for a range of things such as ripping boards, creating certain joints. The table saw blade can also be tilted to create angled cuts and can be adjusted to make different sized rips in timber. Ripping wood for those who do not know is when you slide the wood across the table saw cutting along the grain of the wood.

It is often used for cutting down large slabs of timber and for making sure it is even all the way down the grain which is especially handy when using reclaimed boards.



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The Bandsaw

The bandsaw is another important saw to have in your workshop. It can be used to make rounded and irregular cuts in wood. Bandsaws can also be used to cut slabs of wood into thinner slabs. The bandsaw is a great tool that also can be used for more than just wood. It can cut metal and some plastics as well.



The Thickness - Planer

Thickness planers are used to level out a piece of wood. There are hand planes to perform a similar task but if you want an easier and more uniform way to make boards flat, an electric planer is the way to go.



The Surface planer

A jointer is a surface planer is used to produce a flat surface along a board's length. As a jointer the machine operates on the narrow edge of boards, preparing them for use as is, or gluing into panels. A planer jointer setup has the width that enables smoothing ('surface planing') and levelling the faces (widths) of boards small enough to fit the tables.



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The Router

Routers are used for creating edges on wood that look really nice. There are many different types of router bits that can be bought to fit into a router for creating a simple little flare to any woodworking project. Routers can also be used in many other aspects of woodworking to cut slots; grooves; recesses and a host of other details.



The Domino Joiner

The Domino machine can precisely locate and mill well-fitting mortises for floating tenons. The mortise and tenon joint is the strongest way of joining a rail and stile, and a well-fitting tenon has the same strength as a fixed tenon.



Hand Sander

No woodworking project is complete without sanding down the wood to make it smooth. The orbital sander is the best choice in sanders when it comes to the final sanding of the project. When it comes to orbital sanding, you will want to have different grits of sandpaper that go from low to very high. The higher the grit, the smoother the project will be, but you always have to start sanding low and work your way up in grit for the best results.



Cordless Drills

Cordless drill drivers are extremely versatile and can be used for multiple applications. Drill drivers perform two basic functions. You can either fit a standard drill bit to make holes in various materials. You may alternatively fit a screw driving bit that can drive screws into materials such as metal or wood. There is a wide range of cordless drill drivers including brushless, hammer, light weight and heavy duty drill drivers with power ranging from 10.8 to 18Volts.



Circular Saw

The portable circular-saw with the blade attached to the motor shaft, is probably the most commonly used saw. With the proper blade it can cut almost any material – wood, metals, plastic, fibreglass, cement block, slate and brick. On wood it can rip (cutting with the grain direction), crosscut (cutting across the grain direction) and make angle cuts too.



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The Backsaw

The backsaw is a saw with a stiff back to it that is used for precision cutting especially in creating joints in wood. Specific joints include the dovetail, and tenons. They can also be used to cut grooves in wood. They are often used to just make small cuts side by side into the wood that make it easier for the woodworker to chisel it out.



Chisels

Chisels are important for creating joints in wood. They can also be used to fix small irregularities in wood. There are many different types and sizes of chisels. When it comes to getting good wood chisels, make sure you have a wide variety of sizes.



The Wooden Mallet

Mallets are important for knocking wood into place without damaging it. A mallet can be either wood or rubber and its bonus points if you make your own wooden mallet.



The Level

Levels are large rulers that range in size and are used to make sure that different surfaces are level. They work by a little tube in the ruler that has liquid in it as well as an air bubble. The tube has lines on it and whenever the air bubble is between the lines, the surface is level.



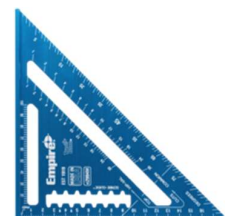
Tape measure

Finally, there is the tape measure, this of course is extremely important for every project, because without it the entire thing would be a lot more challenging. Measuring tapes ensure that everything is the right length and width and height. This of course is not all that would be needed when setting up the perfect shop.



Speed Square

Speed square, also called a triangle square is a multi-purpose triangular carpenters' tool used for marking out. It's functions include many of those of a combination square, try square and is used to mark square to an edge and to check right angles at joining parts.



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Workshop Layout

Every woodworker needs a work space, and there's no better workshop than a well-organized one. When it comes to setting up a workshop, the most important thing is making sure you have plenty of space to work with and move around in.

A good-sized workshop has enough room for stationary machinery, such as a table saw, as well as enough space for a workbench. A workbench is the most important tool in a workshop. A workbench is simply just a table where most of your manual woodworking will take place. There are several different types of workbenches that can be used and several building plans for them if you choose to build your own.

When setting up your workshop, considering the flow of work is very important. Beginning with wood storage. Storing wood is best done near the entrance of the workshop. This makes moving wood in or out of the shop much easier, especially when you have large slabs or sheets. When it comes to wood storage, the best way to keep it organized and out of the way is by using a lumber rack. One of the best ways to maximize efficiency is to have your mitre saw beside the wood storage. Along with having your mitre saw beside the wood storage, you should keep your planer and table saw close by as well. These three tools are often used one after the other, so keeping them close will allow for a greater workflow.

When it comes to where to put the workbench, it is best located against a wall. This allows for wall cabinets to be stored above it that can hold tools that you would be using at your workbench. Organizing your tools above the workbench makes finding them easier in the future and keeps them from piling up on your workbench.

A great way to maximize workflow, is to have an assembly table in the centre of the shop. This allows you to have a place to place wood after it has been cut and allows you to have a clean space for putting together your project. Above I said that the table saw should be near the mitre saw, it does not have to be right beside it, in fact it is better for it to be close by and have space on every side of it to allow for movement of wood. Having it at the end of your assembly table allows for the wood to be pushed through the table saw and go on to the assembly table. This keeps the shop neat and organized. Below is a drawing of our workshop layout. There are many things to learn over the course of becoming a skilled woodworker. As a beginner, it may be challenging to get every tool needed to make exquisite pieces, but do not let that prevent you from learning. Many hand tools can be used in place of more expensive power tools. These may even be preferable to some woodworkers. Either way, woodworking is a great trade, or even hobby for any person.

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This is the floor plan of the Wonthaggi Woodcrafters Machinery / Furniture Group Shed.

