

A Guide To Basic Woodworking



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Introduction

So are you interested in wood or have a passion for working with it? Well then you have come to the right place because this is where you can get all of your wood info.

Not only will you find plenty of information on things such as timber, joints, finishes and adhesives, but you'll also find info on components, tools and I'll even throw in some handy facts and quick tips just to give you that little bit of extra help.

The info you will find on this website is about general areas related with wood which includes things such as some carpentry, cabinet making and furniture.

So if you like working with wood then you should be able to find plenty of information to help you out before you start your next wood project.

Timber

Solid Timber



Solid timber is rapidly becoming scarce and expensive due to logging and the long periods of time it takes for most trees to grow. There are many different timbers on the market that range in price, characteristics and strength.

The two categories that timber can be put into are hardwoods and softwoods and the two can be defined by their differences in the woods microstructure which determines its density and strength.

This timber is an excellent choice for any sort of woodwork but if you want a good quality timber with minimum flaws, be prepared to pay a bit extra due to the reasons above. Cheaper timbers such as pine can be good but don't compare in aesthetics and quality to dearer timbers.

In my opinion solid natural timber is the best type of timber for cabinet making and furniture use because it has the best features and characteristics. Manufactured boards are also good but nothing compares to solid natural timbers.

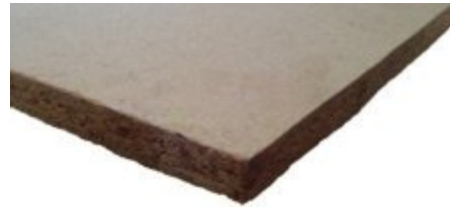
Advantages:

- It is the most aesthetically pleasing type of timber
- There are a vast amount of types for example Tasmanian oak, pine, Jara
- It is suitable for all woodwork joints
- Its long lasting
- There are a range of colours, textures and grains available
- Takes adhesives and finishes well

Disadvantages:

- Can be expensive
- Can be difficult to find the timber you are after
- Has natural defects such as knots
- Can warp, shrink, twist or swell

Particle Board



Particle board is a manufactured board that is often used in furniture because it can be made cheaply and is more affordable than solid timber but has a similar look.

It is mostly found in furniture that require large pieces such as table tops, desks and TV cabinets, this saves people from having to bond two pieces of timber together to achieve the same size.

This type of manufactured board is made from wood chips which are glued together and then compressed under heat in a large board shape, it is then dried and cut into various sizes to be sold.

These boards can either be bought bare or it can be covered with thin sheets of veneer or a plastic laminate, these two materials give the board a solid timber look and feel while costing marginally less.

Particle board is a good alternate option when buying furniture to a budget because it gives the impression of solid timber and it usually lasts for long periods of time if looked after and taken care of well, like all solid timber.

Advantages:

- Cost effective
- It is available in large sizes
- Veneer or plastic laminate can be applied to make it look more like solid timber
- It doesn't have natural defects and It doesn't swell
- Renewable

Disadvantages:

- Still doesn't quite match the quality of solid timber
- Can be prone to chip or flake
- It isn't available in very thick sizes
- It isn't suitable for many joints

Plywood



Plywood is another manufactured board that it is made from layers of solid timber veneer that are usually about 3 millimetres thick. Because it is made in layers it is incredibly strong but also light in weight.

The interior layers of these boards are usually made from an inexpensive wood while the outer veneer layers are made from more expensive timber to give the board a nice wood grain appearance.

This type of board is manufactured from layers of veneer that are glued together and compressed under heat, they are then cut into appropriate sizes. With each new layer of veneer added the grain is rotated at 90 degrees each time, this is done to maximise the boards strength and to prevent warping and twisting.

This manufactured board is used as a more affordably option to solid timber or as an alternate to other manufactured boards. You are most likely to see this wood used in places such as school desks, furniture, wood panelling and some flooring although usually only the faces are shown due to the unattractive look of the edges.

Advantages:

- Very strong
- Light
- Resists cracking, bending, warping, and shrinkage
- Can be made from most timbers to increase aesthetics
- Good for wood panelling

Disadvantages:

- Edges of board are unattractive and can't be covered
- Not suitable for many joints
- Still may contain natural defects such as knots due to the sheets of veneer

MDF



MDF stands for medium density fibreboard because it is a manufactured fibreboard similar to particle board. The difference between the two is the size of the particles, particle board is made from larger wood chips and medium density fibreboard is made from a very fine wood dust.

Medium density fibreboard is made basically the same way as particle board which is by gluing the fibres together with a resin and then compressing the board under heat, later the board is cut into appropriate lengths after it has dried.

The resin used in this fibreboard is toxic and because the fibres are so fine they are easy to breathe in so the timber should be cut in a well ventilated area or somewhere with a dust collection system.

Fibreboard is a useful woodwork product mainly used in cabinet making due to its affordability, lack of natural defects and range of sizes. Medium density fibreboard is usually covered with a plastic laminate and sealant to increase the aesthetics and prevent the fibres

from becoming loose and airborne.

Advantages:

- It is cost effective
- It's available in many sizes
- Has no natural defects
- Can be easily machined

Disadvantages:

- Contains toxic resins which means the saw dust created is dangerous
- Not suitable for most joints
- Should be fully sealed to prevent toxins from escaping
- Can split
- Needs to be cut in ventilated areas or in a room with a dust collection system

Veneer



Veneer is very thin timber that is cut 3 millimetres or less and used to cover either particle board or MDF to give the surface a wood grain appearance.

Strips of this wood are also used to make plywood as it is glued in layers to make it light weight and strong.

This product is widely used in woodwork because it is a useful product that is used to make cheaper furniture like particle board look more like high quality furniture.

More expensive timbers are usually used when making it to increase the quality look and feel of the product it is being applied too. MDF and particle board can also be covered with a plastic laminate but it does not give a quality feel like strips of wood do.

It is fairly easy to bond to manufactured fibreboards, panels and flooring as long as the surface is relatively flat and a good adhesive is used such as PVA glue.

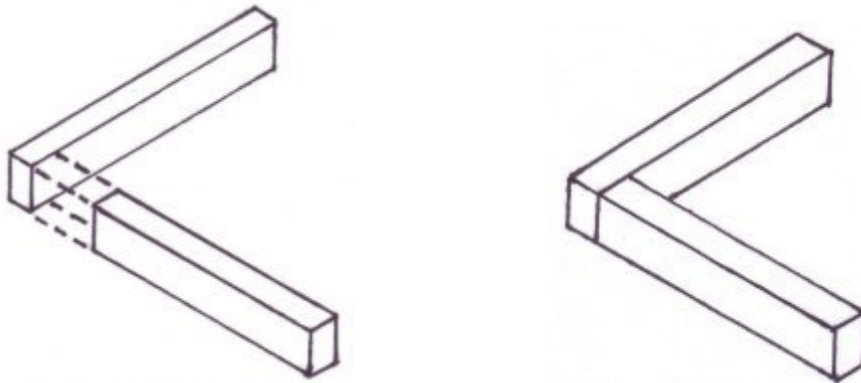
You can also buy this product raw so that a finish of some sort can be applied to increase the strength, durability and appearance of the wood.

If you are attempting to Glue your own veneer to a manufactured board you must be very careful and delicate because it does not take much to damage the sheets.

Also try not to leave any unwanted marks or dirt on the sheets because it may be difficult to remove as you generally can't sand it because of how thin the sheets are.

Joints

Butt Joint



The butt joint is the most basic and simple joint to construct because it is made with only two pieces of timber that are butted together at the ends, this also means that the joint isn't very strong in fact it is the weakest joint that is used in woodwork but it is also the easiest to make.

This joint is held together with glue, nails, screws or dowel but can also be secured with a combination of methods to greatly increase its strength and aesthetics.

Because the butt joint is so weak and not very aesthetically pleasing it is only used in basic woodwork projects. The strength of this woodwork joint can be greatly increased by adding a rectangular or triangular block of wood in the corner to increase the surface area

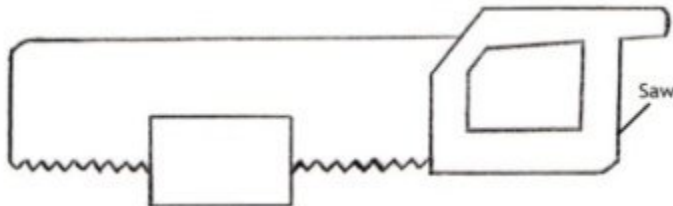
where adhesives are applied.

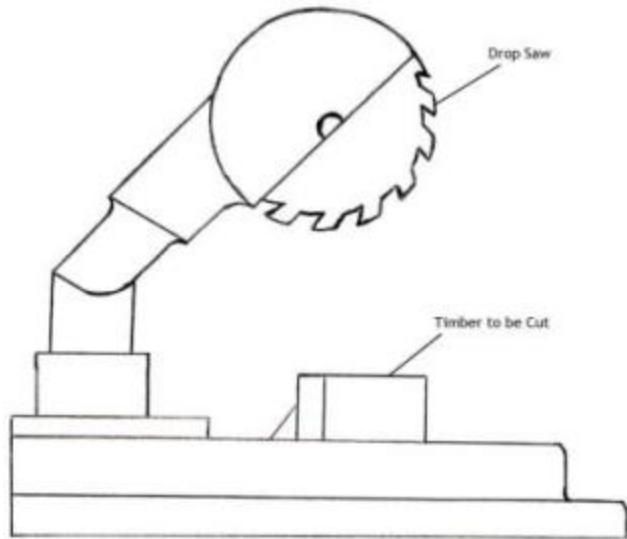
How to Make Butt Joints

Step1: The butt joint is very simple to make and you start by measuring out the lengths you want your timber to be and then using a try square mark a straight line across the timber where you are going to cut it.

Step2: Now cut your timber at the line you have marked and repeat steps 1 and 2 on your next piece of timber.

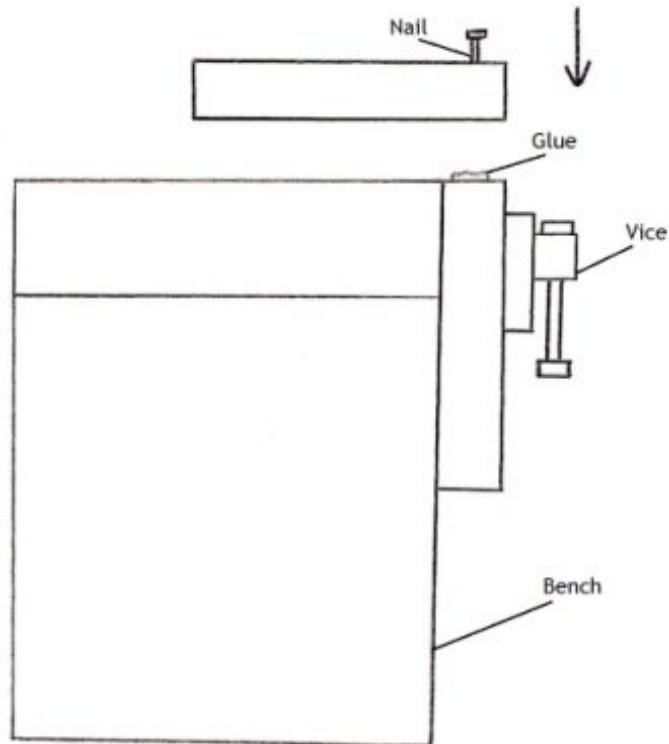
You can either use a hand saw such as a tenon saw to cut your timber or you can use a drop saw. If you are securing the joint together with pieces of dowel drill the holes accurately now before you begin step 4.





Step3: Secure your first piece of timber in a vice or to the side of a bench with clamps but keep the top flush with the rest of the bench.

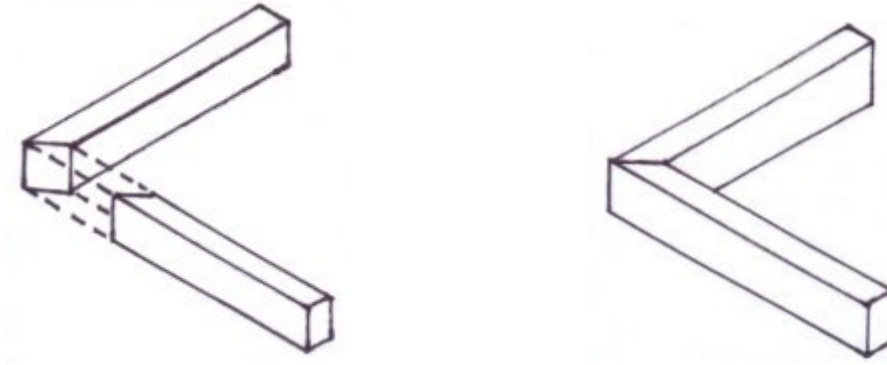
Step4: Apply some glue to the top of the secured timber and then place your next piece of timber directly over your first piece making sure to line up the edges. Now clamp up the joint or hammer in some nails or add some screws.



Step5: Now check to see if you're joint is square and leave it to dry. If you are putting nails or screws in the joint check it is square before you use them.

Step6 Optional: You can strengthen your butt joint by securing a square or triangular block of wood to the inside of the joint which also helps to prevent movement.

Mitre Joint



The mitre joint is another one of those woodwork joints that is almost as easy to construct and make as a butt joint. Even though it is similar to a butt joint this joint is marginally stronger and has much greater aesthetics.

The reason why this type of joint is stronger and more appealing than a butt joint is because the ends are cut at a 45° angle and then glued together, this creates better surface area for adhesive to be applied while also concealing the end grain giving it a nice flush look.

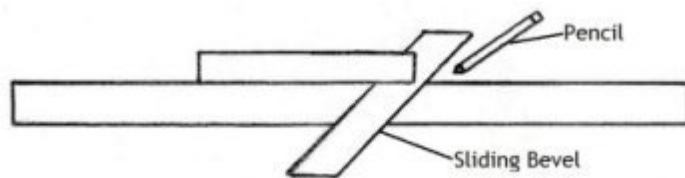
The best results for these joints are achieved by cutting the angle of the joint with a drop saw instead of a hand saw, this creates very straight and neat edges.

The mitre joint is very common on picture frames because there is no end grain showing and they don't require much holding strength. Sometimes a frame made from this type of joint is used to attach or

cover the edges of wood panelling.

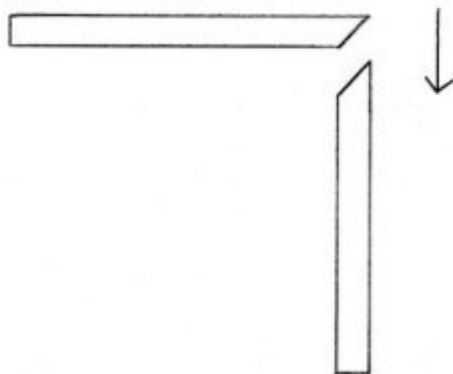
How to Make Mitre Joints

Step1: The first thing you do is draw 45° lines where you want your mitre joints to be. If you have a drop saw or sawing block you should not need to draw the lines.

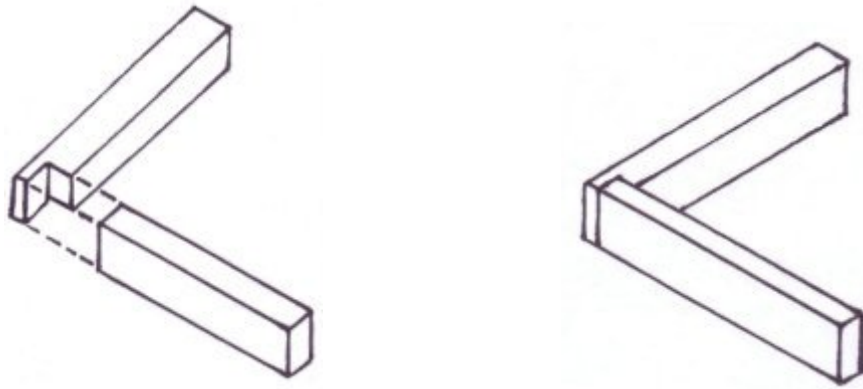


Step2: Now either cut along the lines with a hand saw or drop saw but remember if using a drop saw you can usually adjust it to a 45° angle and if using a sawing block it should have a 45° slot for mitre joints.

Step3: After the joints have been cut check them to see if they are accurate and then join the joint together with an adhesive and leave it to dry. If the joint is not reasonably accurate or if it is cut at the wrong angle the ends will not fit together properly.



Rebate Joint



The rebate joint is a very similar woodwork joint to the butt joint but the big difference between the two is that one of the ends of the timber has a groove cut out of it to create much better holding strength.

Even with the extra strength the joint is still relatively easy to construct and its appearance is also more appealing compared to a regular butt joint making it a better joint for carpentry or cabinet making.

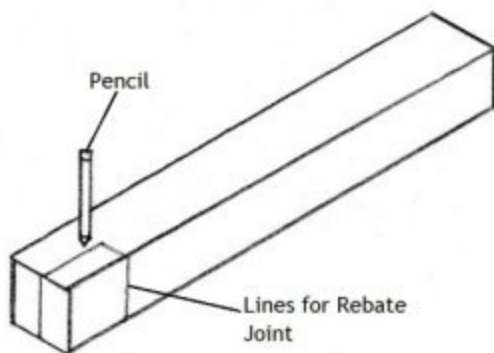
If more strength is still required you can also add nails, screws and dowel to the joint just like you would on a butt joint but no timber blocks should be needed in the corner because the rebate joint already has a large surface for adhesives to be applied.

How to Make Rebate Joints

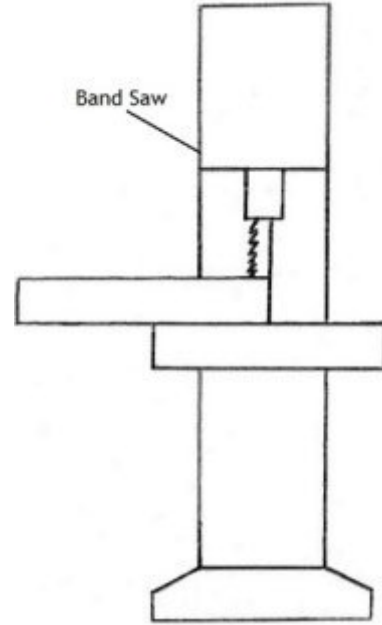
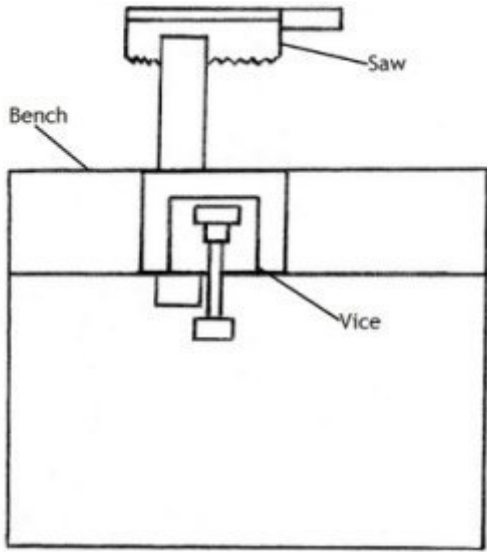
Step1: The first thing you do when making a rebate joint is measure and cut two pieces of timber to the size or sizes you need.

Step2: Make sure the ends of your timber are flush then get the piece you want your rebate in and mark out the width of the joint the same as the thickness of your second piece of timber.

Now mark another line on your first piece of timber about half its depth and mark around each side of the timber.



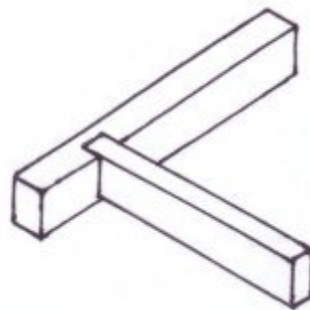
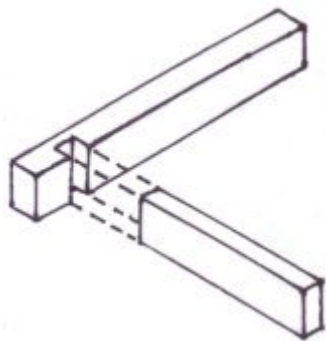
Step3: You should now have connecting lines so make sure they are accurate before cutting. Use either a tenon saw or a band saw and cut along the lines to make your rebate.



Step4: You can use a chisel to clean out your rebate if the timber you insert does not sit flat in the joint.

Step5: If your joint is flush and square secure it together with adhesive. Nails or screws can be added to increase strength or dowel can also be used but the holes must be accurately drilled before you start step 5.

Housing Joint



A housing joint can also be called a dado joint and it is fairly simple to make but requires the use of woodwork machinery for an accurate and tight fit. Woodwork tools can be used but with the use of machines the joint has a more quality appearance and tight fit.

A dado joint is made by cutting a channel across the face of a piece of timber about three quarters of its depth, the end of another piece of timber is then inserted and secured into the channel.

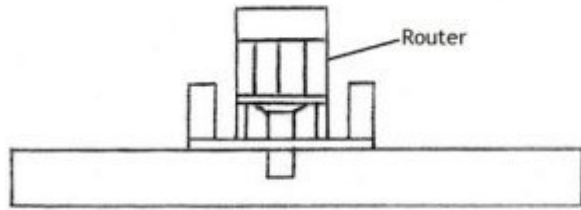
This joint is usually used on the back of drawers because it is strong and withstands stress from many directions.

The housing joint is pretty suitable for almost all woodwork projects because of its simplicity and strength. It is also very useful for fibreboard joints such as particle board or MDF because those manufactured boards are not very suitable for a lot of other woodwork joints.

How to Make Housing Joints

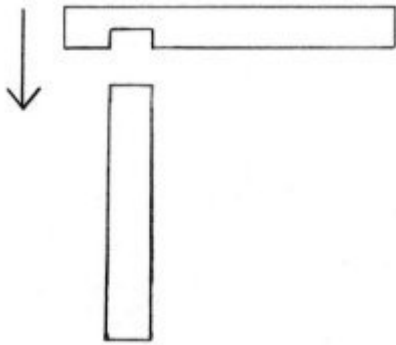
Step1: The first thing you must do is mark out a channel with lines across the face where you want the housing joint to be. The width of the channel will be the same width as the timber to be inserted into it.

Step2: Once you have marked out your channel you can now cut along the lines with a saw or you can use a table saw for more accuracy. Only cut the channel about half of the depth of your piece of timber and a router could also be used to do this.

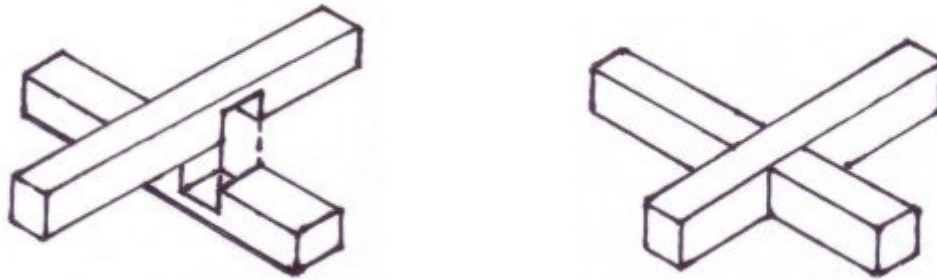


Step3: Once you have cut the channel you now use a chisel and hammer to clean out the excess timber so that the other piece of timber can be inserted into the joint.

Step4: clamp up the joint with adhesives and wait until it dries. You can also apply screws and nails to increase strength or to help the joint when applying an adhesive.



Halving Joint



The halving joint is mainly used in framework and is moderately difficult to construct because it consists of two channels that interlock and are bonded together with adhesives and sometimes a nail or screw is added for extra strength.

This type of woodwork joint is very useful for supporting or increasing the strength of two pieces of timber instead of just simply nailing or screwing them together.

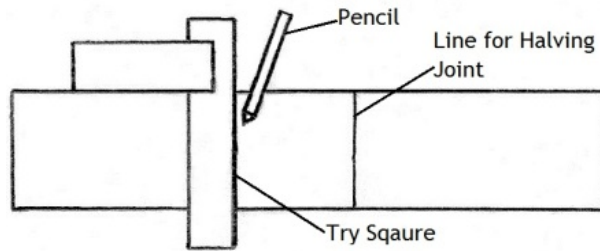
It consists of two pieces of timber that have two channels cut half the thickness of both pieces of timber to produce a flush interlocking joint which allows the two pieces of wood to pass through each other.

This joint can be made at both ends of the timber, in the middle or at the end and the middle depending on the design and what it is needed for.

How to Make Halving Joints

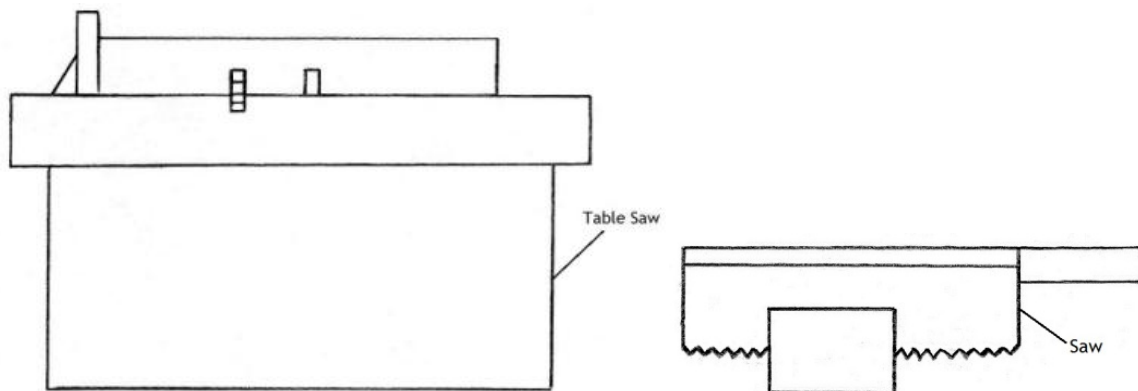
Step 1: First you need two pieces of timber and on the first piece you mark two lines which are going to be spaced out as far as the thickness

of your second piece of timber.

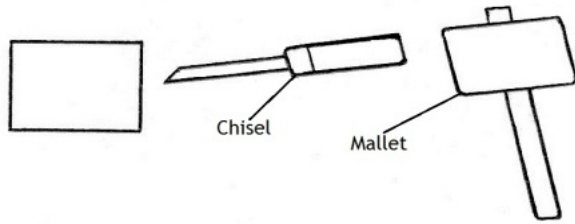


Step2: The next thing you do is repeat step 1 on your second piece of timber so that the lines you mark out are as wide as the first piece of timber. Once all lines are marked out you will notice that the timber should interlock once the joint has been cut.

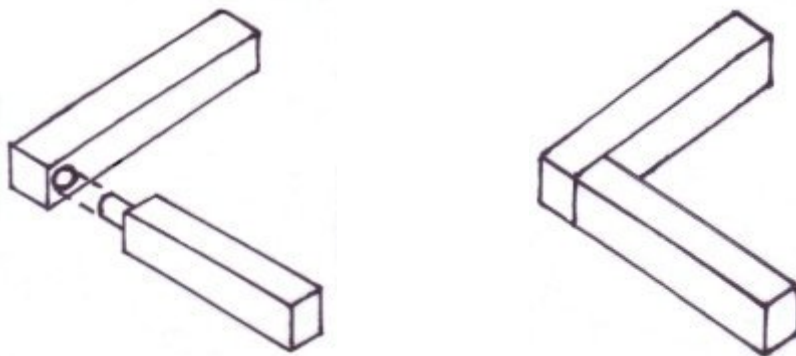
Step3: Cut along all of the lines with either a tenon saw or a table saw although a circular saw can be used. Make sure to only cut half the thickness of the timber because if you cut deeper or not deep enough your two pieces of timber will not sit flush.



Step4: Once you have made your cuts you now remove the excess timber with a hammer and chisel which should leave you with a tight and flush interlocking joint.



Dowel Joint



Dowel joints are very strong and attractive if they are, like all other joints constructive well. Dowel is also very useful for greatly increasing the strength of weaker woodwork joints such as the butt joint.

This type of joint is secured with an adhesive and a small piece of dowel. Construction also requires nothing more than a drill and some accurate markings.

To achieve perfect markings a special measuring tool can be used to measure the position of the holes for the dowel to be inserted.

The tool is called a dowel centre and they are placed in a predrilled

hole to create an accurate mark on the other piece of timber where the next hole will be drilled.

The dowel joint is assembled the same way you would screw a regular joint together only pieces of dowel are glued and inserted into holes instead of screws. By using pieces of dowel over screws the joint becomes much stronger and can be turned into an appealing feature.

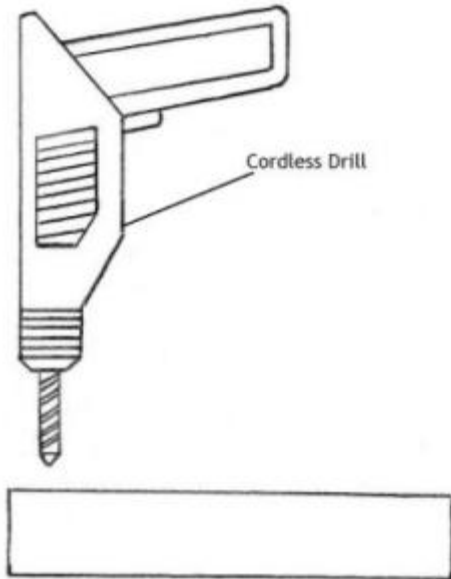
How to Make Dowel Joints

Step1: You need to calculate the size of dowel suitable and then mark where you are going to make the joint.

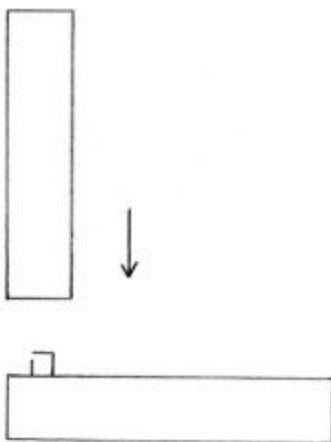
You can either mark the position of the joint and where to drill the holes with a ruler or you can drill a hole in one piece of timber and use a dowel jig to mark the second piece and this should be a very accurate method if done correctly.

Step2: The next step is drilling the holes for the dowel but remember to only drill as far as you need to fit your dowel and to use a drill bit the same size as the dowel.

You can drill the holes with a cordless drill or a pedestal drill but the pedestal drill is more accurate so it is usually the best option.

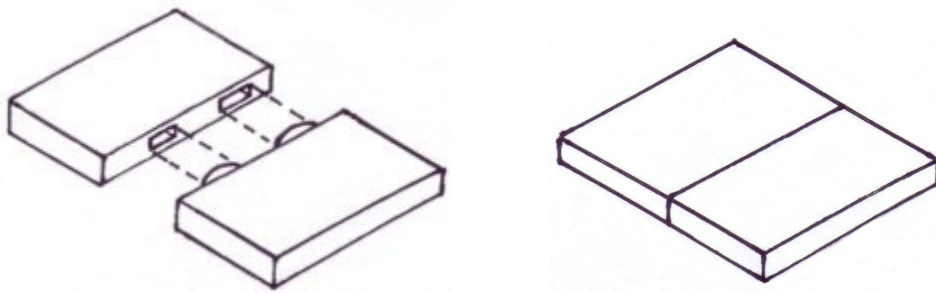


Step3: Now insert the dowel into one of the pieces of timber and insert the other piece on the other end of the dowel. Bond the joint together with a strong glue and clamps can be used but are not usually needed depending on the size if the timber.



Tip: You can drill a hole all the way through one of the pieces of timber and insert longer dowel but using this method will mean that the dowel will be visible in the back of one of the pieces of timber.

Biscuit Joint



Unlike many of the other joints mentioned biscuit joints are one of the less common woodwork joints. This is mainly because there aren't many places where this type of joint is more useful than another type of joint.

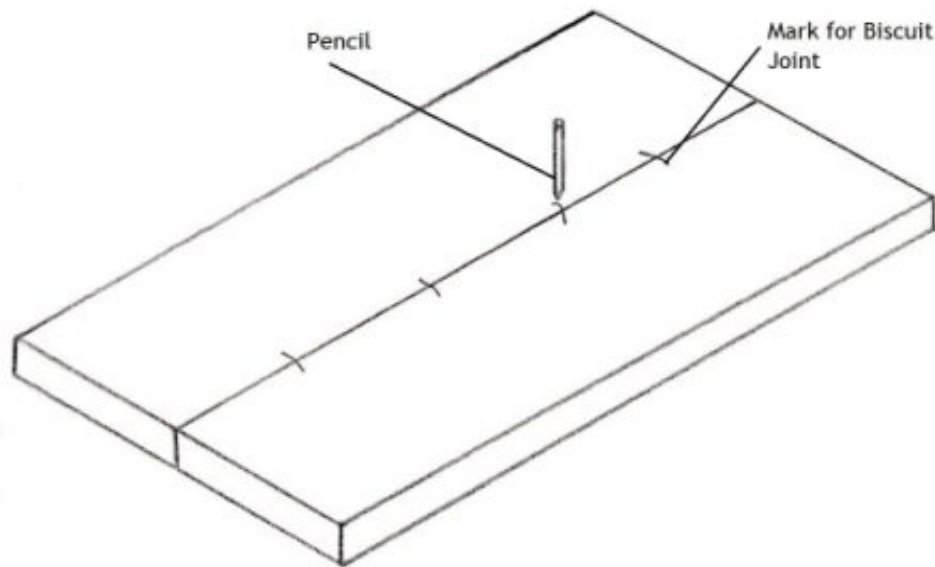
As its name suggests biscuit joints are secured with pieces of timber that are in the shape of a biscuit and these pieces of timber help to prevent movement and add strength.

To construct these joints you need to use a tool called a biscuit joiner which is used to cut the biscuit shaped holes in the wood.

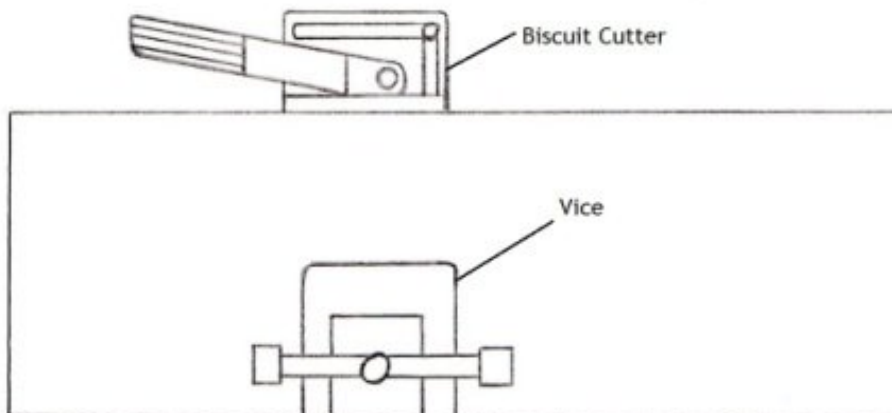
This joint is mainly used to join large timber boards together such as the ones you will find on table tops and it is also aesthetically pleasing if the joint is tight. As mentioned above the biscuit shaped pieces of timber help to stop the large timber boards from moving.

How to Make Biscuit Joints

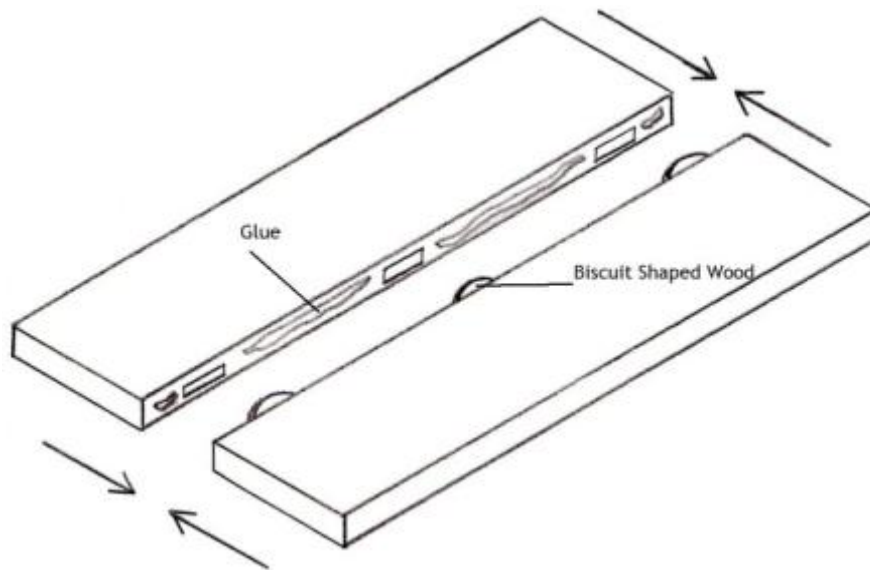
Step1: First get the two pieces of timber you will be joining together and line them up accurately on a bench and then use a pencil to mark some lines on the timber where you are going to make the joints.



Step2: After you have marked the position of the cuts secure the timber to a bench or in a vice so that it is steady when you cut into the wood. Adjust your biscuit joiner for the size of the biscuits you are using and cut into the timber where you have marked the lines.

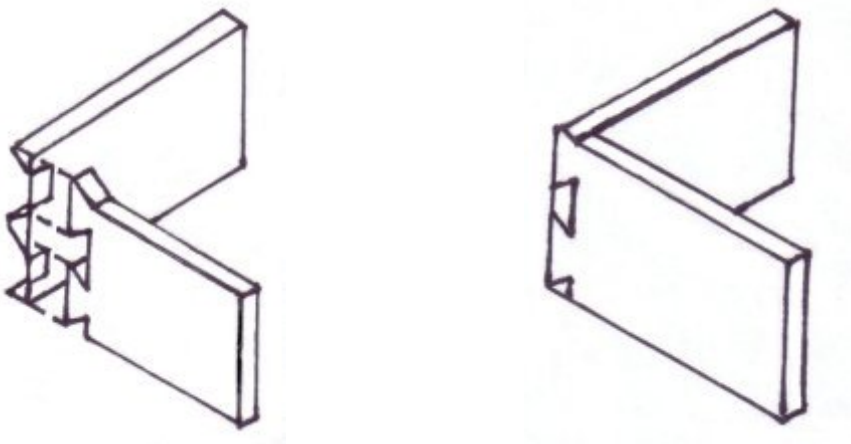


Step3: Check that your boards join together neatly and flush then bond them together with an adhesive and then clamp the timber up.



Tip: You may need to sand your timber if there is a slight unevenness where you have joined the timber together. The best way to do this is with a portable belt sander.

Dovetail Joint



The dovetail joint is one of the hardest if not the hardest woodwork

joint to construct and as its name suggests the joint consists of pins that look like dovetails which interlock into slots.

This pin and slot combination gives the joint great strength and aesthetics but it requires good precision and accuracy during the construction of the joint or it may become loose and it can be unattractive.

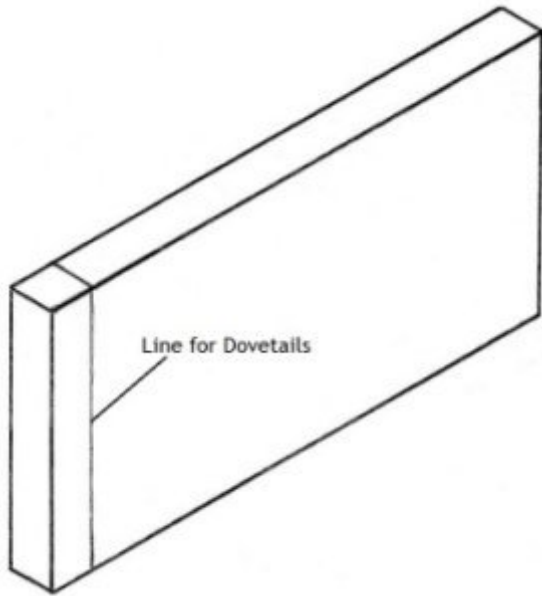
The pins are glued into the slots and a nail on each pin can be inserted to help keep the dovetail joint strong and square until the glue dries.

These joints are most commonly found on the front of drawers or on boxes such as a wooden tool box because of its great strength and very attractive look if the joint has been well constructed.

There is usually a three pin setup but more or less pins can be used depending on how much strength and aesthetics you want.

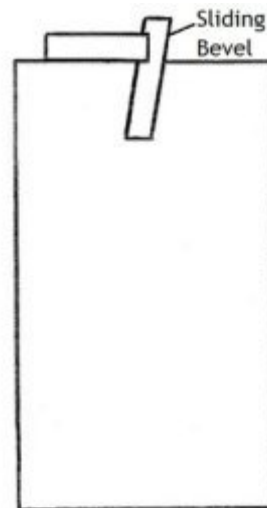
How to Make Dovetail Joints

Step1: The first step is to mark a line at the end of the first piece of timber that is as wide as the thickness of your second piece of timber. Make sure to mark this line around all faces and sides of the timber.



Step2: The next step is marking out the dovetails now there are a few ways of doing this but the easiest and most accurate would be to use a dovetail gauge.

Other methods use calculations and a sliding bevel to create the dovetails which allow you to create more or less of them but also requires greater accuracy or the joint will not work so a dovetail gauge will probably be more suitable.

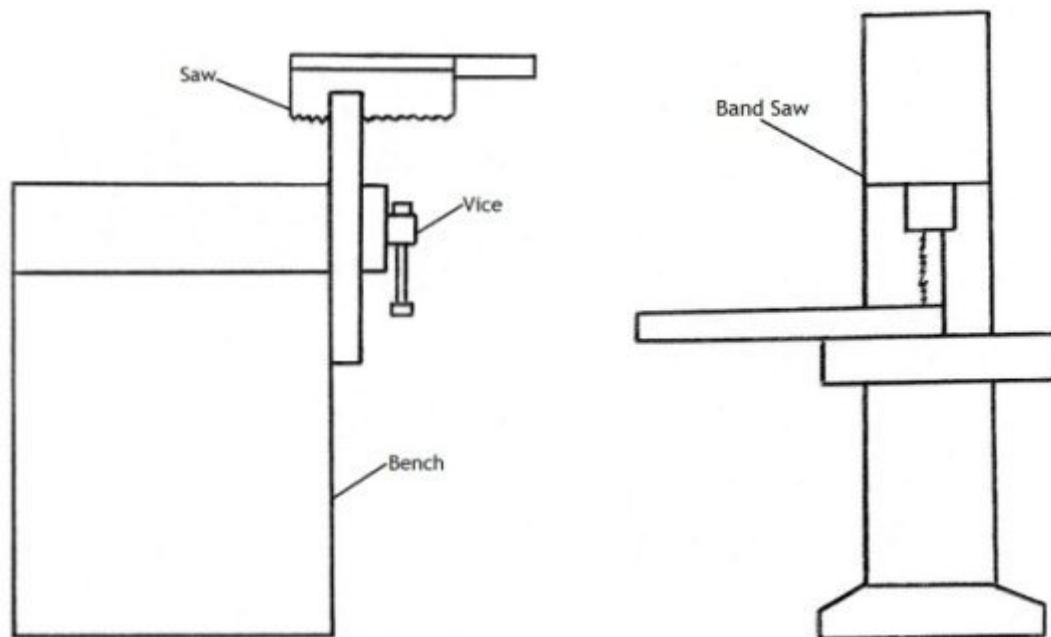


Step3: You must now run across each line with a marking knife to make the cut straight and neat.

Only cut the timber which is being removed or you will see deep scratches on the pins that are not being removed. To help you remember which to mark you can put an X on the pins which are going to be removed.

Step4: Now you must cut your dovetails and there are a few tools that can be used to do this but the two best are a band saw or dovetail saw. When using a band saw make sure to follow the lines and not cut too deep but remember this method requires much more skill and precision.

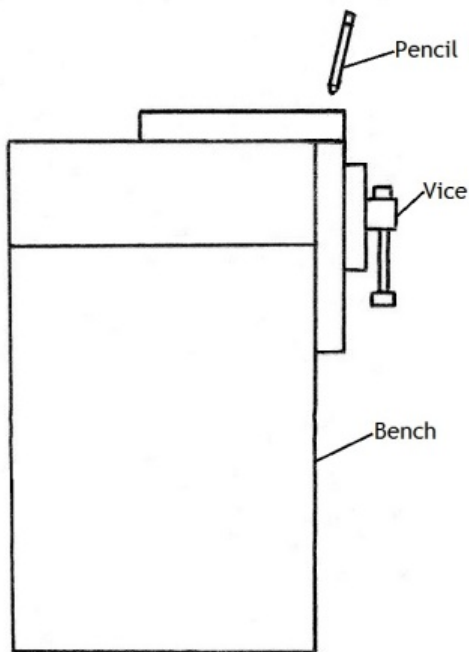
If you are using a dovetail saw you put your timber in a vice, it can be tilted at an angle to make the cut easier. Now you just use the saw to cut the straight lines and a coping saw to cut along the bottom edge.



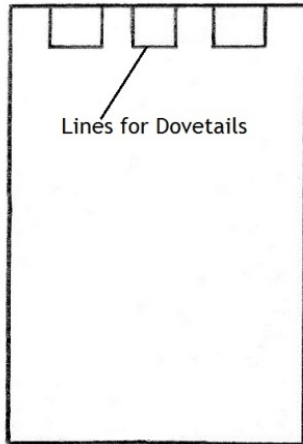
Step5: Once the dovetails have been cut out you can use a chisel or Stanley knife to clean up the joints or remove some excess timber.

Step6: Next you will use your dovetails as a template on your second piece of timber.

Secure your second piece of timber in a vice level to the bench and then line up your first piece of timber on top. You should now be able to use the dovetails as a template and mark lines on your second piece of timber.



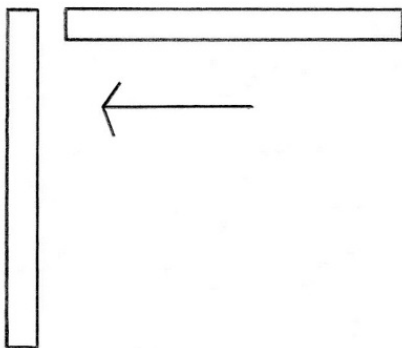
Step7: Once the lines have been marked you must mark lines on the faces of the timber which will be as long as the thickness of the timber. These lines should create pins that interlock with the dovetails so they must be very accurate.



Step8: Cut out the pins using the same methods as in step 4 and once again remove any excess timber from the joint to ensure a perfect fit.

If the joint was marked out accurately you will have tight or very tight interlocking pins. If they are a bit too tight minimal amounts of timber can be removed. Make sure the joint is flush and square before starting the next step.

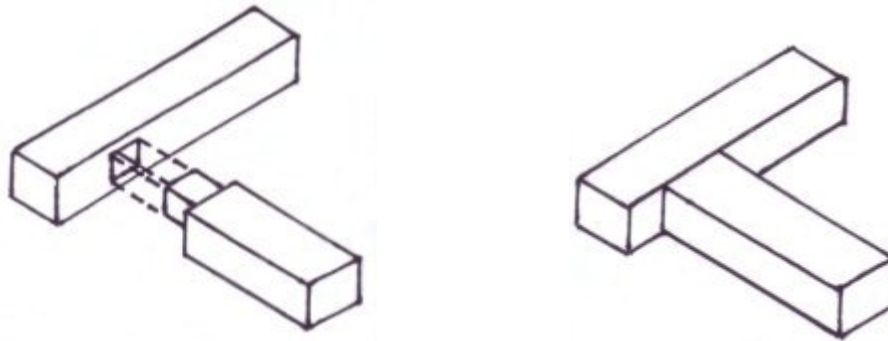
Step9: Now you can bond the joint together with glue but always check to see if it is still square. Some nails can be added in the dovetail pins to keep the joint closed and square while it dries.



Tip: If you are making this joint for a drawer make sure that your larger pins or dovetails are at the front or it will look as good. A piece of timber can be stuck on the front to cover the joints if you wish to

cover them up.

Mortise and Tenon Joint



The mortise and tenon joint is another one of the strongest and most appealing woodwork joints able to be made because of its flush fitting design.

Like the dovetail joint this woodwork joint can be difficult to properly construct but it is incredibly strong and aesthetically pleasing if constructed well.

This woodwork joint consist of a tongue that is secured into a slot and it is used in areas such as table legs. For structural areas like these the joint must be tight fitting to ensure maximum strength but also to achieve a neat flush look.

There are slightly different versions of this woodwork joint which include double tenons, twin tenons and haunched mortises and tenons.

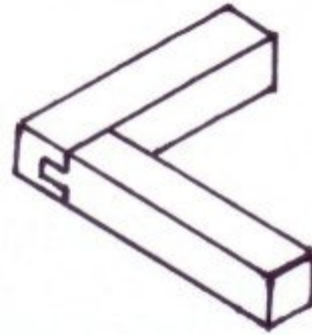
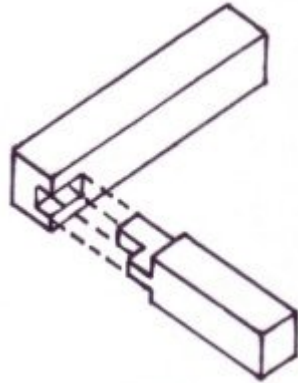
The haunched version of this joint consist of an extra piece of wood that is half the depth of the mortise and it is mostly used at the end of the timber to prevent twisting.

The double and twin tenons are exactly as they sound being two tenons next to each other which create an even stronger joint. The double tenon is made of two separate tenons while the twin tenon is two tenons which are joined in the middle.

Areas where the mortise and tenon joint or some form of it are most effective and best suited are areas which are required to support a large amount of weight or are structurally important such as the rails and legs of a table or chair.

The tenons should be made to the correct length and thickness depending on how much weight will need to be supported.

For example if the joint is for a large dining table you will need a larger and thicker tenon or even a double or twin tenons to support the extra loads and weights the table will likely endure but also ensure the mortises are tight fitting to create the strongest and most aesthetically pleasing joint possible.

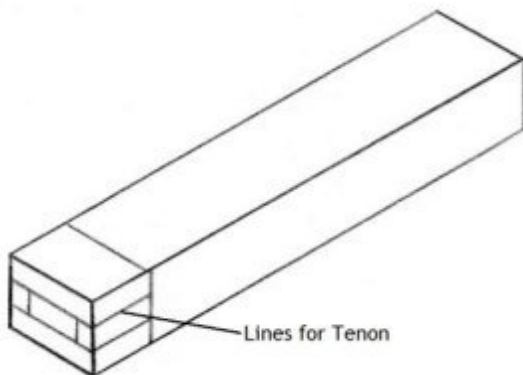


How to Make Mortise and Tenon Joints

Step1: The first thing you must do is mark out the mortise or tenons and you can start with the tenons. To mark out the tenon you need to start by drawing a line around the entire piece of wood to create the length of the tenon.

The tenon length is usually about $\frac{2}{3}$ rds the depth of the piece of timber it is being inserted into. Now you must mark your tenon width and it should be around $\frac{1}{3}$ rd the thickness of the timber.

Check to see if the tenon matches the closest size chisel or mortising drill bit and if it doesn't modify the lines to match the chisel or mortising drill bit.



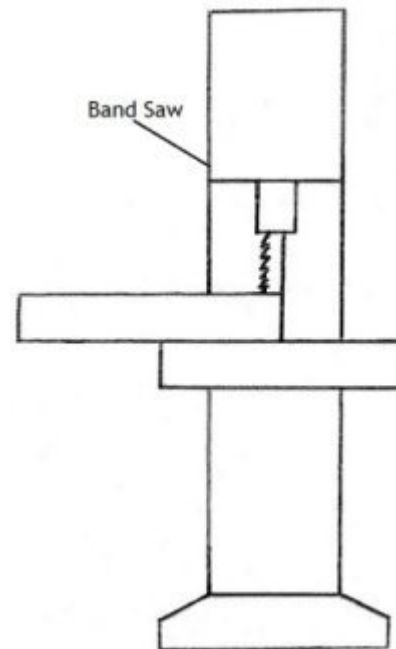
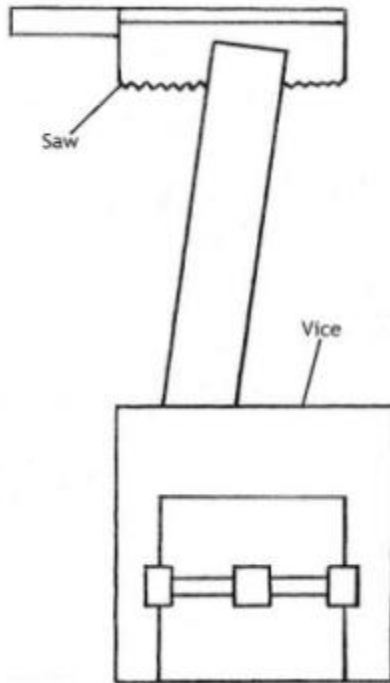
Step2: You must now cut the tenon and there are two methods of doing this the first is with a tenon saw. Put the piece of timber in a vice on a slight angle to create a neater and straighter cut and then carefully cut along the lines.

Next put the timber back upright in the vice and mark around 5 millimetres in from each end although it can be slightly more with larger tenons.

Now cut straight down where you marked to create small cut outs on both sides of the tenon, the reason you do this is to create a neater and more flush joint but it also hides any gaps you may have from your mortises if they are cut slightly to wide.

The second method of cutting tenons is with a band saw and all you have to do is cut along the lines like you do with the saw.

This method is usually better because the band saw has a guide rail making the cuts quicker and more accurate. Remember to cut the shoulders of your tenons first so that you do not cut to far later on.

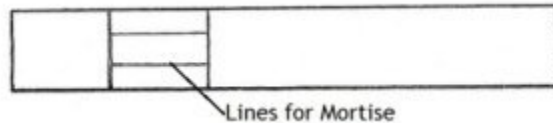


Step3: The next step is marking out the mortise and the first things you need to do is decide where you want to position the joint.

Next you can use your recently cut tenon as a guide for the width of your mortise and you do this by resting it across the timber that will have the mortise and drawing lines along the two edges of the tenon.

After you have the width sorted you must put two more lines in between the ones you have already drawn to create the thickness of your mortise.

The thickness will be the same as the tenons thickness and you can use it again as a template if you need to but remember to measure the space on each side of the mortise to ensure it is centre.



Step4: Now you must cut the mortise and once again there are two methods and the first involves a mallet and chisel.

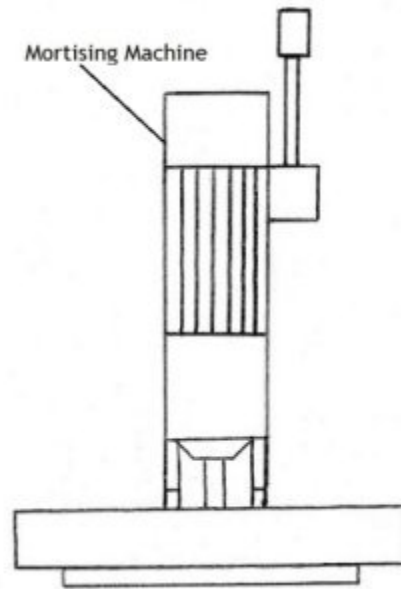
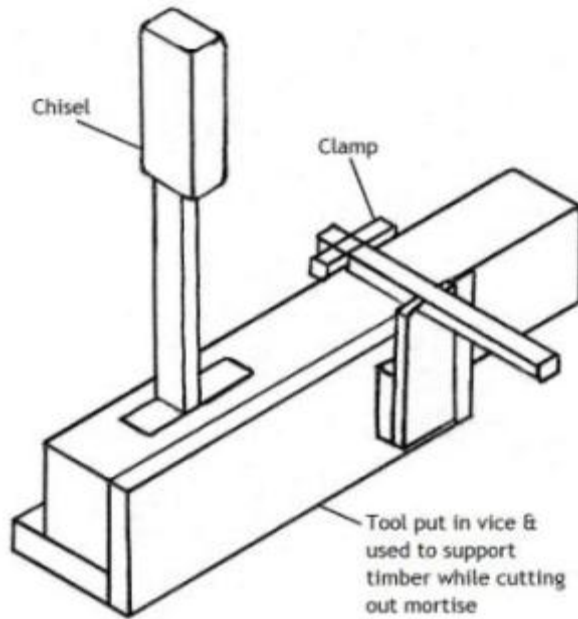
If you use the first method you need to put some timber in a vice to rest your timber against and then clamp the two bits of timber together to hold them steady but make sure to put some scrap timber in between the clamp so that it does not mark your timber.

Now get the chisel and hammer it straight into the wood with your mallet. Apply some pressure away from the chisel bevel and repeat this on the other side of the mortise to create a V shape.

Work from the centre to the outside of the mortise and be patient meaning do not remove too much timber at once also remember to stop at a depth that is the same as the length of your mortise.

The second method involves the mortising machine and what you must do is set the width and depth before you use it. Once they are set simply drill into your mortise bit by bit to remove the timber.

This method is also the faster more accurate one but remember not to drill too much at once and make sure the gap in the drill bit is facing the empty space of the mortise so the excess timber can escape when it is removed.

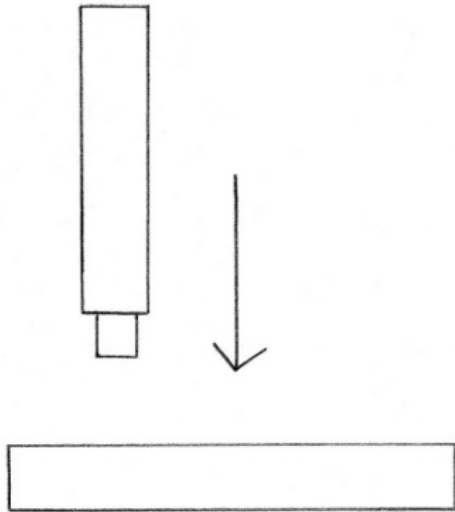


Step5: After you have completed the mortise and tenon check to see if they interlock neatly. If your tenon won't fit you can shave a minimal amount of timber off with the band saw but do it to both sides.

If the tenon won't fully interlock with the mortise you have to remove some timber from the mortise that may be stopping it.

Step6: Once you are happy with the joint and it fits flush and neat you can now bond it together with clamps and an adhesive.

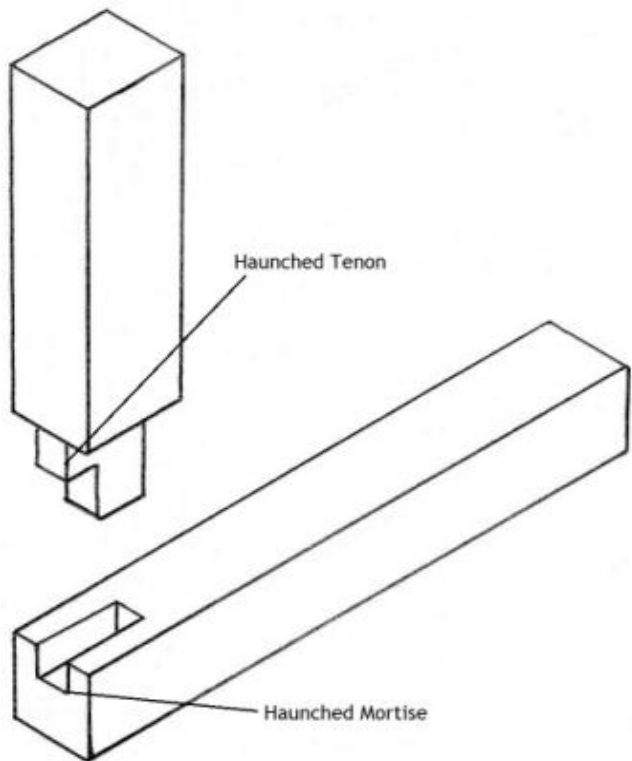
Always do a dry clamp first to ensure everything fits and always keep checking for squareness while clamping plus remove the excess glue or you will have glue spots which are hard to remove later.



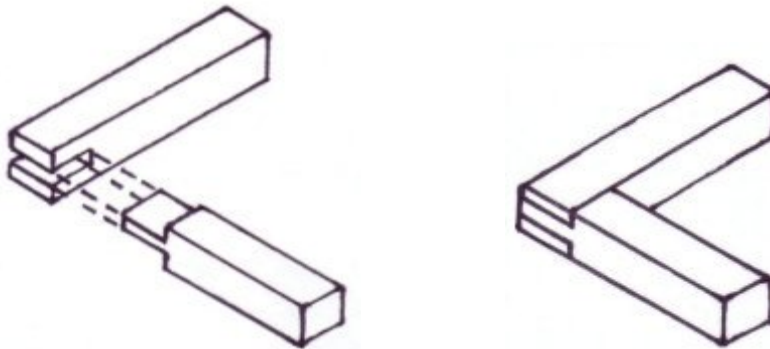
Haunched: If you are making a haunched mortise and tenon all steps are the same except you will leave slightly more timber in the mortise and on the tenon.

The way you cut the tenon is the same only when you make your indents on the sides of the tenon only cut one side. On the other side is where the haunch will be and all you do is cut half way down the tenon to create it.

The mortise will be made at the top of the timber and all you have to do is leave a section that will fit the haunch of your tenon. Instead of cutting this section in the mortise the entire depth of the rest of the mortise leave it half as deep to house the haunched tenon properly.



Bridle Joint



Bridle joints are very similar to the mortise and tenon joint but the difference is in the size of the mortise and tenon. Because these joints still have a mortise and tenon they are still very strong and fairly attractive.

The difference in the bridle joints mortise and tenon is in the length of the tenon and the depth of the mortise. The tenon on this joint is as long as the depth of the timber it is being inserted into and the mortise is cut the whole depth of the timber.

This allows the two pieces to lock tightly and you can also see the end grain of the tenon unlike on the mortise and tenon joint which makes it a little less attractive.

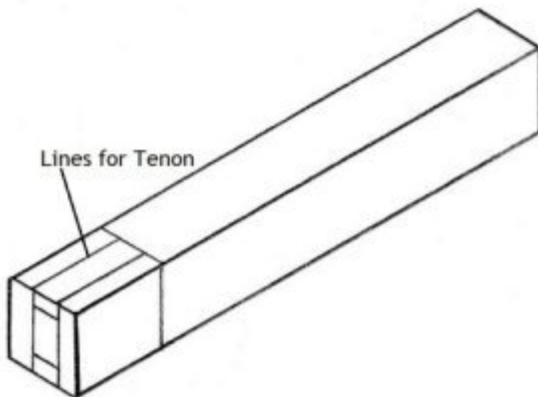
Because of this woodwork joints increased interlocking area more adhesives can be applied which creates a joint that may be marginally stronger than a regular mortise and tenon joint although it isn't quite as aesthetically pleasing because the end grain of the tenon can be

seen.

How to Make Bridle Joints

Step1: Start by marking out the tenon by drawing a line around the entire piece of wood to create the tenon length. The length of the tenon will be the same depth as the width of your other piece of timber which has the mortise.

You must now mark your tenon width which should be around 1/3rd the thickness of the timber. Check to see if the tenon matches the closest size chisel or mortising drill bit and if it doesn't modify the lines to match the chisel or mortising drill bit.



Step2: Now you cut the tenon and there are two methods of doing this the first being with a tenon saw. Put the piece of timber in a vice on a slight angle to create a neat and straight cut and then carefully cut along the lines.

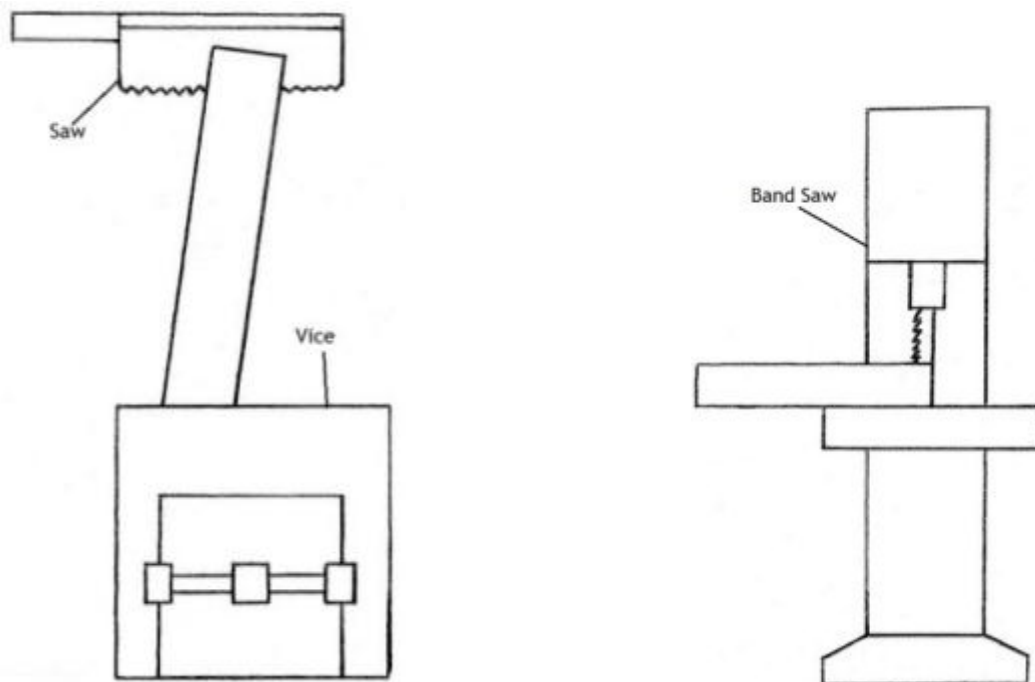
Next put the timber back upright in the vice and mark 5 millimetres in

from each end although it can be slightly more with larger tenons.

Now cut straight down where you marked to create small cut outs on both sides of the tenon, the reason you do this is to create a neat and flush joint but it also hides any gaps you may have from your mortises if they are cut slightly to wide.

The second method of cutting tenons is with a band saw and all you have to do is cut along the lines like you do with the saw.

This method is usually better because the band saw has a guide rail making the cuts quicker and more accurate. Remember to cut the tenon shoulders before cutting the rest of your tenon.



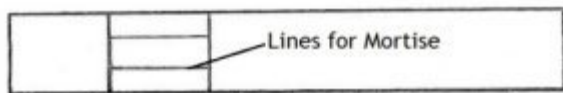
Step3: For this step you need to mark out the mortise and decide where you want to position the joint.

Next you can use your recently cut tenon as a guide for the width of

your mortise and you do this by resting it across the timber that will have the mortise and drawing lines along the two edges of the tenon.

After you have the width sorted you must put two more lines in between the ones you have already drawn to create the thickness of your mortise.

The thickness will be the same as the tenons thickness and you can use it again as a template if you need to but remember to measure the space on each side of the mortise to ensure it is centre.



Step4: Now cut the mortise and once again there are two methods the first involves a mallet and chisel. If you use the first method you need to put some timber in a vice to rest your timber against and then you clamp the two bits of timber together to hold them steady.

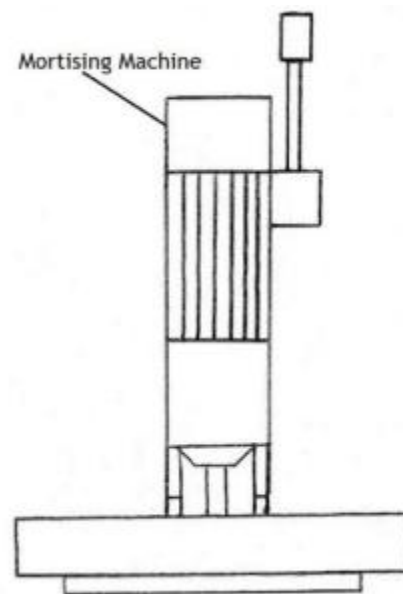
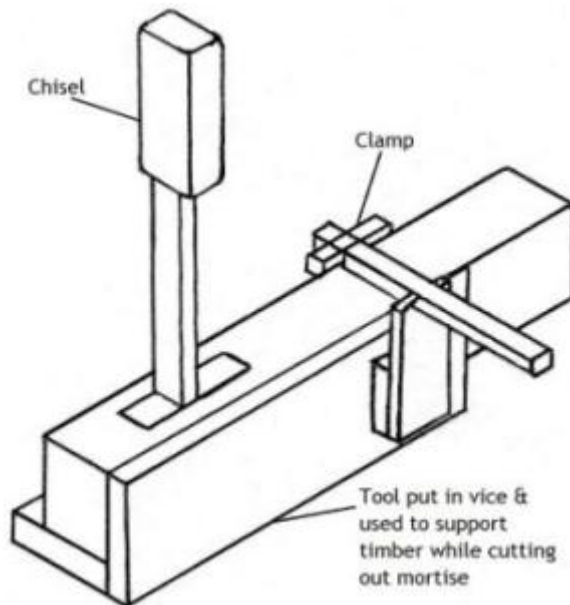
Now you get your chisel and hammer it straight into the wood with the mallet. Apply some pressure away from the chisel bevel and repeat this on the other side of the mortise to create a V shape.

Work from the centre to the outside of the mortise and be patient meaning do not remove too much timber at once but also remember to cut the mortise the entire depth of the wood to house the tenon.

The second method of cutting a mortise involves the mortising machine and what you must do is set the width and depth before you use it. Once they are set simply drill into your timber bit by bit to

remove the excess wood.

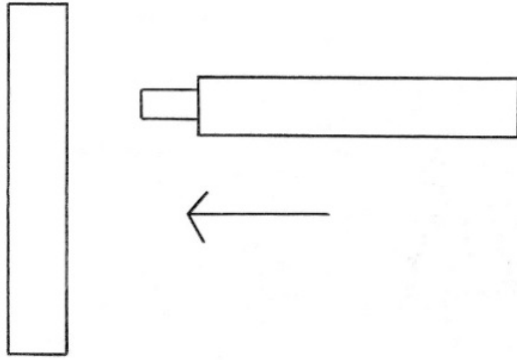
This method is also the faster more accurate one but remember not to drill too much at once and make sure the gap in the drill bit is facing the empty space of the mortise so the excess timber can escape when it is removed.



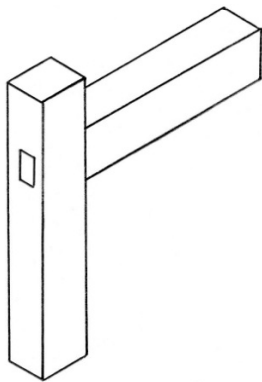
Step5: After you have completed the mortise and tenon check to see if they interlock neatly. If your tenon won't fit you can shave a minimal amount of timber off with the band saw but do it to both sides.

Step6: Once you are happy with the joint and it fits flush and neat you can now bond it together with clamps and an adhesive.

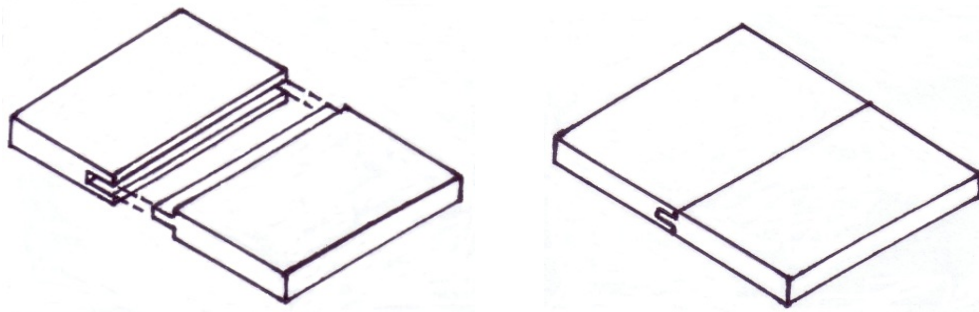
Always do a dry clamp first to ensure everything fits and always keep checking for squareness while clamping plus remove the excess glue or you will have glue spots which are hard to remove later.



Tip: Remember that on a bridle joint you will be able to see the end of the tenon because your mortise is cut all the way through the timber. The back of the mortise may need some sanding if your tenon is slightly long but remember it is better slightly longer than shorter.



Tongue and Groove Joint



A tongue and groove joint is a unique woodwork joint that is attached edge to edge with two or more pieces of timber. It is made with one edge consisting of a slot that runs down the entire length of the timber and a tongue which fits into the slot.

This groove and tongue feature creates a reasonably strong and aesthetically pleasing joint that can be used in areas such as floorboards, lining boards, wood panelling and table tops.

The tongue with a groove feature is easy to attach together because of its simplicity and it allows for a tight fit that has plenty of surface area for adhesives.

These joints can be very difficult to make without the right woodwork machinery. You are more likely to buy timber with this joint already in it, such as lining boards than you are to make it yourself.

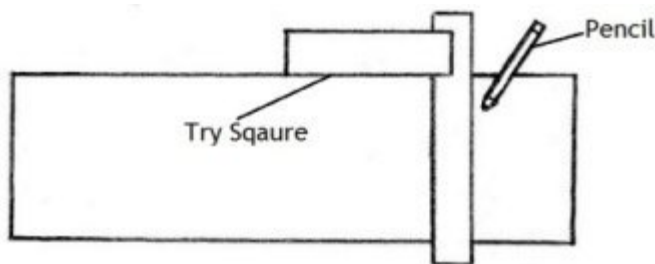
Because of the many types of timbers readily available with this particular type of joint it is probably best to buy what you need than to try and make the joint because it is much simpler than attempting to

make the joint which requires great tools, machinery and skill.

Also you don't often require much timber with this joint because it is used as more of a feature in most furniture so there usually isn't a lot of it used

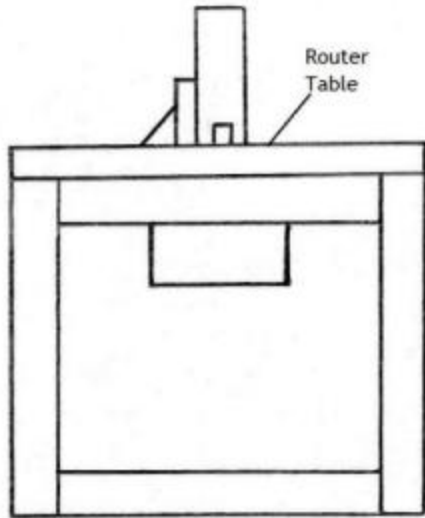
How to Make Tongue and Groove Joints

Step1: This joint is really only used for timber boards so the first thing you must do is measure and cut up some timber boards to your required length.

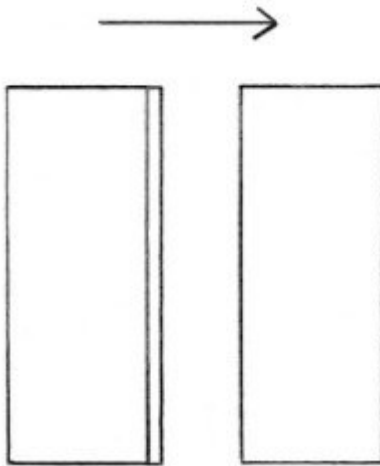


Step2: This step is not entirely necessary if you have some experience using a router but if not you need to mark the giving and receiving ends on your boards.

Step3: This step needs to be done with a router bench to create a successful joint and the first thing you do is start with a router bit to cut the groove. After the groove has been cut you now use another router bit to cut the tongue.



Step4: Check to see if the joint fits tightly and if it does you can now glue and clamp the boards together which will interlock from your tongue and groove joints.



Tip: You can buy lining boards which already have tongue and groove joints cut which makes this option a simpler and easier method for people with time restraints or inexperienced woodworkers.

Finishes

Stains

There are many different types of timber stains such as varnish or shellac and they are made for interior or exterior use. These finishes usually darken the timber but bring out the grain and they are available in a range of different colours and textures that also help to preserve the timber.

Finishes like these such as shellac or varnish are usually applied with a brush because it is the simpler and easier method for most people when applying this type of finish.

You also need to apply around two or three coats depending on how well the wood absorbs the finish or how dark you want your timber to be.

Before the finish can be applied the excess dirt and dust must be completely removed with a slightly damp cloth so that the finish is applied evenly and no dirt is trapped underneath the coat.

You must also sand the timber smooth to remove any scratches, lumps

or creases so that an even coat of finish can be applied. Later when the finish has dried you can add a clear coat to further increase the timbers aesthetics or to help protect it better.

If you don't have much experience working with a finish such as these I would suggest applying it with a brush because it is usually the simplest and most effective method especially for beginners.

If you do not wish to attempt applying the finish you can pay for it to be done professionally which often gives your timber a glass like appearance and smoothness.

Oils

There are a large range of different types of oils such as water based ones and they are for both interior and exterior use.

These finishes are similar to wax finishes only they are generally thinner so bare timber can absorb it easier than they can absorb wax.

This finish is rubbed or brushed onto the timber like a wax and they are also very easy to apply or maintain although more coats may be needed compared to a stain because of how light and thin most of them are.

They don't leave overlap marks and they also bring out the timbers

natural shine when it is bare or stained like a wax does.

This type of finish is also good for rubbing into furniture like tables to enhance the shine and appearance and to give the furniture greater protection than it would have bare.

Before applying the finish the surface of the timber should be prepared the same way you would before applying any other finish.

First you should remove old paint or timber stains or if the wood is already bare sand the surface with different grades of sandpaper until you end up with around 800 grit sandpaper.

Once the surface is very smooth remove all excess dust and dirt as this will affect the final quality and appearance. Once the timber is completely sanded and clean you can apply the finish but remember oils are thinner so more coats may be needed and sanding between coats shouldn't be necessary.

If the finish has been applied correctly you should be left with a nice natural looking shine and the oil will also bring out and enhance the natural beauty of your chosen timber.

This type of finish is usually used for interior use or decking and it must be maintained more often due to it being quite thin and not as durable as other stains and finishes.

Wax

Waxes are an easy finish to apply and maintain because they are generally rubbed onto the timber with a special cloth or brushed on and they also give the timber a natural shine and appearance.

They also don't have to be the only finish applied to the timber either they can also be applied after a stain has been used such as a shellac or varnish.

By adding this finish after a stain it helps to bring out the stains colour and it also helps to protect it better from marks or scratches.

Over time This type of finish tends to slightly harden and they are difficult for bare timbers to absorb because of how thick they are. This is a good finish for applying to furniture pieces that may need extra maintenance and protection such as a table.

This type of finish is a very good product for increasing a timbers durability, shine and moisture resistance. You can also buy coloured waxes suitable for the different colours of timber such as lighter or darker timbers and it is used enhance the unique colour of a particular timber.

This sort of finish is good to use if you feel your furniture needs the extra protection or enhance aesthetics but it also does require more maintenance and more often than a traditional timber stain or finish.

Acrylic

Acrylic paints can be used to paint wood for indoor or outdoor purposes and they are available in a vast range of colours and textures. These finishes are water based which means they dry fast but excess paint can also be easily removed with a damp cloth.

When buying acrylic paints for wood use there are different sorts depending on whether you will be using it on interior furniture or exterior furniture. For outdoor use the paint is generally more durable and has greater resistance to sun and weathering where as interior paint does not usually need this extra protection.

This type of finish is best applied to timber furniture by brush because it allows better and more consistent paint coverage and is very easy.

They need little to no maintenance compared with a wax or oil finishes because of how durable and resistant they are however outdoor furniture may start to peel or degrade over time depending on the quality of the paint and how harsh the conditions are.

Over time your furniture may need to be repainted especially outdoor furniture due to damage from weathering or general wear from being used. If so it is easier to remove old acrylics from wood then it is to remove old oil or timber stain but the same basic methods are used.

To remove an this type of finish you can either try scrapping it off if starting to peel or you can sand it off, the best method is usually to use a combination of power sanders and hand sanding. It is best to start with a coarse sandpaper to remove the bulk of the paint then move down to a finer grade.

After you remove the old paint make sure to sand the bare timber until smooth then remove all dirt and sawdust to achieve the best results. After the timber is completely sanded and clean you can reapply a new colour or change to a timber stain or oil.

Polyurethane

Polyurethane finishes are usually intended as an after coat once a stain has been applied but now they are often made as a finish because they are usually easy to apply and greatly increase the appearance of bare timber.

They are the clearest type of finish and they are lighter and thinner than most stains so more than one coat needs to be applied.

These finishes give good protection for bare or stained timber and they is available in many hues and tones but the main three are dark ones, light ones and one that is somewhere in the middle of the light and

dark.

This finish is best suited for interior use which generally means that they are very aesthetically pleasing and work well with most types of stains.

Because this type of finish is most suited for interior use it is mostly seen on furniture pieces such as tables, desks and television cabinets.

This type of finish is very easy to apply by brush and once enough coats are applied it is also very durable. It leaves a glossy appearance that is also like a slightly hard shell over the timber which is why it is durable and looks glossy.

Like any other wood stains and finishes this is one that will need to be maintained and reapplied over time due to normal wear and tear such as what a piece of furniture may receive over a few years.

Polyurethane finishes come in two types which are solvent based and water based though the water based ones are easier and safer to work with which is why it is the more suitable choice for beginners in woodwork.

Before applying a timber finish like this the wood should be completely sanded and dust free or it will diminish the quality of the final product. Apply a thin coat up to three or four times and sand in between each coat with very fine grade wet and dry sandpaper, doing this will leave a

very smooth and glossy finish.

Adhesives

PVA

In the following adhesive pages I have outlined the four most common and best adhesives that are used in woodwork but there are many others that can be used.

PVA stands for Polyvinyl Acetate and it's a type of aliphatic resin that is also water based and is available for interior or exterior use but is also non toxic.

This glue is now very popular and in many opinions it is the best timber adhesive available because it dries clear, it's very easy to apply and has super strong holding strength on wood.

They can creep over time but a tight joint helps to prevent that. Because of its many great features Polyvinyl Acetate is excellent for bonding woodwork joints together or as a furniture and carpentry adhesive.

Polyvinyl Acetates are very versatile and are relatively fast drying but excess glue must be wiped away after applying or it is very difficult to remove when dry.

Polyvinyl Acetate glues are available in white and yellow and are relatively inexpensive compared to most glue, they also have a reasonably long shelf life.

The white type is better for interior use because moisture weakens it over time and the yellow is better for outdoor use because it is water resistant but it doesn't dry completely clear.

Epoxy

Epoxy glues are supplied as a two pack which include a resin and hardener and are also more difficult to apply than most adhesives. They take a while to prepare and dry so they are not the easiest adhesive to use and they are fairly expensive compared to PVA glue.

When the resin and hardener are mixed they make a sort of white paste that is strong and bonds to many materials.

They are water proof and their fumes are usually toxic so safety glasses and masks must be worn. This adhesive is very common for fixing boats so it is not really seen much in furniture or cabinet making.

This adhesive is a good gap filler and is also good at bonding end

grain but when dry it is very difficult to clean off wood so it must be done while still wet.

This type of adhesive has very good strength but because of its difficulty to prepare, long drying times and bad fumes it is not suitable for people that aren't experienced with using it.

It is also not a great adhesive for woodwork joints compared to simple PVA glue because of its properties mentioned above such as its price and preparation.

Polyurethane

Like PVA glue polyurethane adhesives are fairly strong when dry and they are usually fairly clear when dry.

These adhesives have an advantage over most PVA glue when it comes to water resistance because when a polyurethane adhesive is dry it is water proof.

These types of glues expand a little bit when they dry so they are good for most woodwork projects or for using in woodwork joints.

Even though it expands slightly the joint must be fairly tight and clamped hard. This is a glue that is considerably more expensive than PVA glue and its shelf life is not nearly as long as a PVA glues shelf life is.

These glues are a good alternative to PVA glue but they still come up short compared to PVA glue. Even though they are strong and water proof they are still more expensive and not as versatile as a good PVA glue which is why it is probably still the best option for carpentry or cabinet making especially for a beginner.

This type of adhesives is available as a one part or two part system and not only is it strong and durable it also has excellent sealing properties so it can be used to level, seal and fill gaps and holes better than most other adhesives.

Because these adhesives react with moisture it can be more difficult to work with especially for woodwork beginners and it is also a good idea to wear gloves when using this type of adhesive because it can react with the moisture on your skin.

This adhesive is suitable for interior and exterior use and once dry it is strong and very durable and is usually able to be painted over after drying. This type of adhesive is not only suitable for woodwork it can also be used in metalwork, construction, decking and flooring.

Contact Adhesive

Contact adhesives also known as contact cement are rubber based and can be made from natural or synthetic rubbers. These adhesives are very good for bonding veneer or plastic laminate to manufactured boards.

This means it is a good adhesive for cabinet making or for furniture that is made from manufactured boards such as particle board.

Contacting adhesives are harder to work with compared to other adhesives such as PVA glue and this is because they require a great deal of accuracy.

This adhesive is applied to both surfaces being bonded and is then left until touch dry. Once the adhesive is touch dry the two surfaces are then secured with some pressure and the bond is immediate.

Because the bonding is immediate there is no margin for error because once the timber is bonded it cannot be removed.

Contacting adhesives have great holding strength and don't require clamps to hold the timber together because there is no drying time and once contact is made the bond is permanent.

These adhesives are usually toxic and flammable but they can be made with a water base so that they are non flammable or toxic although care should still be taken when working with them.

Facts and Tips

Hardwood

Hardwoods or hard timbers are generally more durable and dense than softwoods or soft timbers although not all are harder than softwoods the main differences between them are botanical.

You are able to identify hard timber trees by characteristics such as their leaves because these types of trees have broader leaves than soft timber trees.

Hard timbers are often a darker colour than softwoods and most are denser due to thicker cell walls although again this does not mean that all are denser than soft timbers.

The main difference between a hard and soft wood is the vessels or pores in their microstructures. Vessels are like pipes running through the tree and act as conduits for water and nutrients in the outer layers of wood in a growing tree.

The cells in these woods are closed so they cannot function like a conduit and this is why they have vessels where softwoods don't.

Many people like to buy hard timber furniture, wood panelling or floors because the majority are fairly dense which means if looked after well they last a long time and are more resistant to dents and scratches.

These woods are also good for making really strong woodwork joints such as the mortise and tenon joint because they are often dense.

Softwood

Just like hardwoods softwoods or soft timbers are not necessarily soft or less dense it is just more likely that they are softer than hardwoods. The visual differences in soft timbers compared with hard timbers include things such as usually being lighter in colour and usually softer.

Soft timbers come from trees that are conifers meaning that their leaves are usually needle shaped instead of broad like a hard timber trees leaves.

The difference in a softer woods microstructure is that they do not have vessels like harder woods because their cells are open not closed unlike a hardwoods which enables them to act as conduits and feed nutrients and water throughout the tree.

Because soft timbers have open cells this also allows them to absorb things better than most hardwoods such as adhesives or finishes and it

also makes it easier to treat soft timbers and increase their durability.

Because these woods take well to finish and adhesive they are a good woodwork product for furniture use or cabinet making as long as they are maintained regularly.

Pine is an affordable soft timber that is also denser than some hard timbers which is why it can be a very useful product for interior furniture if you are working on a budget but wish to use a solid timber instead of a manufactured board like particle board.

Seasoning

Seasoning timber is essentially just to drain it of water which is called its moisture content. This can cause it to shrink but it helps to prevent warping, splitting, it will become lighter and stronger and it becomes easier to machine.

There are three main ways to reduce moisture in timber which includes kiln, air or chemicals. Using a kiln to reduce water involves a large kiln to reduce a stack of timbers moisture content and it is commonly used because it is non toxic, fairly quick and also easy.

Using air to reduce water is when the timbers moisture content is reduced naturally with air although this method takes a long time.

Using chemicals to reduce water involves the use of chemicals to reduce the timbers moisture content but sometimes it is toxic and can change the timbers colour.

This type of timber is a good woodwork product for things such as outdoor furniture and carpentry because reducing the moisture content helps prevent weathering and swelling. It is not as good for interior furniture and isn't really used in cabinet making.

If you are interested in making your own outdoor furniture a wood such as seasoned pine is a good product to start with because it is fairly affordable plus because it has been dried almost all of its strengths will be increased.

For example the timber's ability to absorb a finish or adhesive will be even better than untreated pine because of its reduced moisture content. This is why the dried timber is a great option for outdoor products.

Wood Layers

There are many different species of trees and they are either hardwoods or softwoods but the one thing they have in common is the wood layers.

Every different timber has different characteristics such as its ability to take a stain or adhesive, how well abrasives work on it when sanding or even things like if it is suitable for furniture but the one thing that is the same is the wood layers.

Trunk:

A tree is made of five main layers and when it is cut down for timber you are able to see these layers in the trunk. These layers are the pith, growth rings, medullary rays, cambium layer and bark.

As a tree gets older these layers increase in size and become more distinguishable once the tree has been cut down.

Pith:

The first layer of the tree is the pith and the pith is essentially the centre of the tree which is developed in the trees first year, it is also where the impurities and deposits are stored as the tree grows.

Growth Rings:

Growth rings are the rings throughout a trees trunk and one is made per year which shows the trees growth and age. Once a tree is cut down you can count the growth rings to determine a trees age.

A tree does not have to be large to contain a lot of growth rings and large trees don't always have many growth rings and the rings can also vary in size depending on such things as growing conditions, temperature and water consumption.

Medullary Rays:

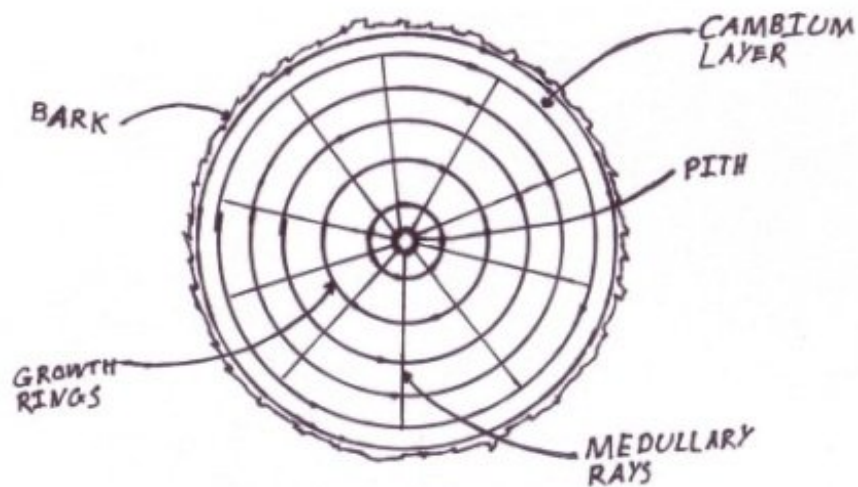
The medullary rays are the vertical lines in a trees trunk that pass from the pith to the bark. They are cellular tubes used to transport sugars and food throughout the tree and the waste is left behind in the pith.

Cambium Layer:

The cambium layer lies between the outer bark and inner bark of a tree. The cambium wood layer is the part that is used to produce the new cells of a tree and essentially being the cause of its growth and it also helps to make a protective cork under the bark.

Bark:

The bark is the most easily identifiable part of the trunk as it lies on the outside and is the only part you usually see. The bark is the wood layer that offers the most protection from weather, insects and fungus and it also helps to keep things in such as moisture and food.



Woodwork Tips

Sanding with the Grain:

This is a woodwork tip that just about anyone with a little bit of woodworking experience should know and it is sanding with the timbers grain. By sanding with the grain and not against it you are able to create a smooth face while not leaving any scratches behind.

Going through the grades:

This next woodwork tip also involves the use of sandpaper and is called going through the grades. This is when you use multiple grades of sandpaper to create an extremely smooth surface.

You start with a small number such as 80 and work your way through each grade until you get to a number such as 200 and this will ensure that your piece of wood is incredibly smooth. These grade numbers are also located on the back of your pieces of sandpaper.

Loosening Sandpaper Fibres:

This woodwork tip is also a tip that many people who regularly hand sand should know and it is loosening up the sandpapers fibres or abrasives.

When you buy sandpaper it is fairly stiff and if you sand with it straight

away with a sanding block the sandpaper will get large creases in it and will wear out in half the usage.

A method to prevent this is to find a straight edge such as on a piece of timber or furniture and by grabbing two corners of the sandpaper and running it along the edge a few times the sandpaper's abrasives will loosen and the sandpaper will curl slightly.

This is when you know it is ready for use and it will fit more easily around the sanding block.

Preventing Splintering:

This woodwork tip involves cutting timber either with a hand saw or drop saw although you are most likely to encounter this problem with a drop saw.

There are timbers that are more prone to splintering such as Meranti and cutting it with tools such as a drop saw may cause the edge to splinter.

An easy way to prevent this from happening is by putting masking tape along the area that will be cut and this will help to prevent the wood fibres from splintering.

Another way to prevent splintering is to cut along a marked out line first with a marking knife, this should slice the top fibres creating a straight cut.

Countersunk Holes:

Another woodwork tip for when you are constructing something such as a piece of furniture and you are using screws it is best to make a countersunk hole first to conceal the screw.

A counter sunk hole can be made for any screw but it is best to use countersunk screws. The best way to make the countersunk hole is with a mounted bench drill or pedestal drill but a cordless drill can be used although more precision is required.

It is best to start with the larger whole drilling down just enough to conceal the screw and then using the smaller drill bit as it should easily centre due to the already pre drilled large hole.

After the screw is put in you can cover it with some dowel to fully conceal the screw or make a feature out of the holes.

Removing Excess Dust:

It is essential that you remove all the excess dust and dirt from your assembled job before you apply a finish to it.

This is to ensure that your finish can be applied evenly and smoothly and if any dust is trapped it will be trapped for good and you will be able to see it.

The best way to remove excess dust is to use a slightly damp cloth and wiping your completed job but make sure it isn't too damp or your

timber could swell.

Glue Spots:

Sometimes you may find that after applying a finish to your completed woodwork job you are left with lighter coloured spots. This is caused from dried glue that has not been removed from the surface.

To locate these spots before you apply a finish you can wipe down your job with a denatured alcohol which will temporarily darken the timber revealing the spots and allowing you to sand them off.

Raising Timber:

This woodwork tip is a technique that is used to remove dents in your wood by raising the surface. This can be done in two main ways which is swelling with water or rising with a damp cloth and iron.

You can apply small amounts of water to the dent which will cause it to swell and rise and this will allow you to sand the surface flat. The other way to raise the timber is by applying a damp cloth to the surface where the dents are.

You then iron the cloth like you would your cloths and this should make the dents rise and allows you to sand them flat. Be careful not to iron the cloth for too long as you can burn the cloth and wood.

Sanding Blocks:

When you are going to sand large or long pieces of timber by hand with sandpaper the best way to do it is with a sanding block. A sanding block is a block of wood or cork that you wrap a small piece of sand paper around.

Sanding blocks make sanding by hand much easier, more comfortable and more consistent because you have the block to support your hand. They are very easy to make or a proper sanding block can be bought from just about any hardware store.

Sawdust Putty:

Instead of using timber putty you can make your own from sawdust and PVA glue. All you have to do is mix some PVA glue with some sawdust from the timber you are using and then apply it to any holes or cracks in the timber. It also completely matches your timber and you can't see the dry glue