Easy Woodworking

Projects and Methods

With Biscuit Joinery

A. William Benitez

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A How-To Workbook By

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Published By
Positive Imaging, LLC
9016 Palace Parkway
Austin, TX 78748 USA

Cover, photographs, and drawings by
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Contents

Introduction

Easy woodworking just refers to simpler, easier and faster methods than what some would consider traditional woodworking methods.

It's important to emphasize that this is in no way a put down of traditional methods or tools. Even among traditional woodworkers there are many different ways to do things.

I define Easy Woodworking as simply an alternative method some woodworkers may find useful for building projects. The main goal of these easy methods is to speed up the completion of woodworking projects while still maintaining a high standard of quality.

It's difficult to clearly define Easy Woodworking because it can vary depending on the project so instead I'll cover the basic methods and some of the basic techniques.

An Easier Joinery Method

One of the first questions for Easy woodworking was what kind of joinery to use for the projects. Mortise and tenon, dovetails, finger joints, dados, etc., while definitely effective, are time consuming and not easy. Dowels were not the answer because I've never believed they were strong enough because of inadequate glue surface and they can be difficult to align.

Butt joints are certainly simple and fast but have little strength. However, this was resolved by the advent of the Biscuit Joiner or plate joiner that can be used to reinforce all joints. This one tool has helped me build many beautiful projects quickly and easily without complex joinery or holes to plug or fill. Sharing the many ways the Biscuit Joiner served me then and still does is a major reason for this book

About Biscuit Joinery

Biscuit joinery is the main method for Easy woodworking. The Biscuit Joiner is the powerful, inexpensive and necessary tool for Biscuit Joinery.

This is the first book in the series about Easy Woodworking and contains complete information about the Biscuit Joiner and how to use it for many projects.

It also includes details of the many joints that can be assembled using biscuit joinery. They are not complex and, with the clear instructions and drawings included, are easily assembled by most novice woodworkers.

Also included are some final notes that should be of great help to anyone making use of the Biscuit Joiner and a Glossary of woodworking terms.

Below are a couple of images of an inexpensive model Biscuit Joiner made by Ryobi.

The image on the previous page is the Ryobi biscuit joiner with the fence recessed. The image below is of the Ryobi biscuit joiner with the fence set to control the location of the biscuit joint to be cut on the material.

My First Biscuit Joiner

The Biscuit Joiner brand was Virutex and it was made in Spain. At $335.00 it was a lot of money for me at the time but I could see it was a joinery breakthrough.

Like most Biscuit Joiners, the instructions with it were inadequate but sufficient to get me started and it was promptly saving me time in delivering quality cabinets and furniture.

Since I had never seen a Biscuit Joiner before I didn't know other companies made them. I now know there were other brands available, especially the commercial model Lamello. Now many other power tool companies have added Biscuit Joiners to their tool lines and the prices begin as low at $80.00.

At first some companies even developed conversion kits to attach to grinders or routers to make Biscuit Joiners but I've always felt it was better to buy a tool that was originally designed as a Biscuit Joiner.

My emphasis on the Biscuit Joiner is not meant to diminish the value of all the tools you would normally use in woodworking. They play an important role in woodworking but the Biscuit Joiner is an extraordinary and easy to use tool for joinery because it allows you to create strong and easily aligned joints on almost any cabinet or furniture project. Most importantly for a professional woodworker, it saves time without affecting quality.

Choosing A Biscuit Joiner

If you don't already own a biscuit joiner, choosing one is the first step. There are many brands to choose from even though the popularity of biscuit joiners seems to have waned. Recently I read a comment from a woodworker indicating his feeling that biscuit joiners were inherently inaccurate. In truth, the same could be said about most power tools. Carelessly used, table saws, circular saws, routers, sanders, and others could be considered inherently inaccurate.

Years ago, when I performed the power tool demonstrations at Home Depot stores for Skil, one of the most popular power tools with many of the store's customers was the table scroll saw which I demonstrated by cutting out names for individuals. People loved seeing their name cut out and some immediately purchased a scroll saw. Many of the purchasers would bring their scroll saws back the next weekend complaining it wouldn't cut straight and failed to make a name when they attempted one. Each time I would hook up the saw, ask them what name they wanted to cut, and immediately cut it out without difficulty.

These customers were convinced that the problem was with the tool instead with them. Power tools, whether scroll saws, biscuit joiners, or others must be controlled by the user. The scroll saw can't follow a line on the wood it can only cut the wood, you have to guide it along the line. I helped some who managed to catch on but some just wanted a refund because they were absolutely certain there was something wrong with the machine. Others were convinced the problem

was the quality of the inexpensive scroll saw. It's certainly true there is a difference in the degree of precision between an expensive trade tool and a consumer brand tool but, like these scroll saws, both are capable of a good job if handled competently. Choosing a Biscuit Joiner is important but all the available brands will do the job adequately if handled carefully.

To me, Lamello was the top of the line in Biscuit Joiners. With prices ranging from about $300.00 to over $700.00 they were the choice of many professional woodworkers. Even though these are precision tools, for the person working in a home shop there is no need for this large investment. Even a full-time professional woodworker can function adequately with a much less costly Biscuit Joiner.

Which one should you buy? Over the years I have used the Virutex, Skil, Freud, Craftsman, Porter-Cable, DeWalt and Ryobi biscuit joiners ranging in price from about $100.00 to $335.00.

I used the Virutex and the Freud for years and would definitely recommend them but my favorite now is the Ryobi. In spite of its low price it consistently does a good job for me and it has an efficient fence that doesn't require removal. It simply folds up out of the way. Since I work mostly without the fence on my Biscuit Joiner, this is an important feature.

All of the biscuit joiners I used performed reasonably well. The Virutex was excellent but more expensive than most. The Skil unit was priced fairly low and worked reasonably well but the last time I looked it was only available at eBay. I used this unit every weekend for about a year while performing power tool

demonstrations for the Skil Power Tool Company. The one problem I had with the Skil Biscuit Joiner was the dust chute feeding into the dust bag was too narrow and it would clog regularly. It also had a fence that can only be removed and adjusted by using an Allen wrench. I prefer a fence that doesn't require complete removal and will adjust with handles as part of the tool. These fences also resolve the issue of losing the screws to hold the fence in place while it is removed.

Regarding the clogging dust chute, over the years I have found this to be a common problem with biscuit joiners and other tools. On my biscuit joiners I avoid the problem by removing the dust chute completely and making a right angle sawdust exhaust using a pvc elbow I ground down slightly to fit tightly on the Biscuit Joiner. This guides the saw dust away from me when making a cut and avoids the problem of the clogged chute and having to regularly empty the too small dust bags.

Using The Biscuit Joiner

Using a biscuit joiner is not difficult but getting good results does require careful handling. Biscuit joiners cut a matching slot on two separate surfaces. Then the two surfaces are joined together by placing a compressed wood biscuit or wafer with glue into the matching slots. Because it can make the work go faster, some Biscuit Joiner users tend to rush and carelessly align the tool with the work. This can create joints that are sloppy, weak and often unattractive.

Because the biscuits (wafers) are made of compressed beech, they begin swelling immediately upon contact with the wet glue. This facilitates short clamping times. The momentary looseness of the biscuit as the glue dries allows for minor adjustment of the two parts during clamping to make certain the parts are perfectly aligned.

Unlike with dowels, minor adjustments are possible before the glue sets. It is a short open time but it does provide a unique advantage. Naturally, you can't make up for major sloppiness with these adjustments because it is only about 1/32 inch but it can be very helpful during assembly of projects.

As soon as the glue dries you have a strong joint. The biscuits provide a great deal more strength than dowels because they have at least twenty times the glue surface but, more importantly, all the glue surface is on the long grain of the wood. Because of the round shape of the dowels, much of the glue surface faces the end grain of the wood which doesn't glue well.

Obviously, using the biscuit joiner carefully is important if the two slots are to align properly. As with any woodworking tool, careless handling will lead to poor results.

Biscuit joinery can be used in many ways. It can be used in lieu of mortise and tenon joinery to assemble tables, chairs and other pieces. However, it is important to remember that even though biscuit joinery is stronger than dowels, it is not stronger than mortise and tenon joinery.

Biscuit joinery can also be used in lieu of dados when building bookcases. Biscuit joinery works well to assemble frames of any kind including cabinet doors and face frames. It is very useful for applying solid wood edging to an infinite number of plywood projects.

While operating my shop in Florida I found another unique advantage when building cabinets covered with plastic laminate. Since it is wise to laminate the inside of cabinet parts that require laminate before assembly, with the Biscuit Joiner you could cover all the inside surfaces with laminate and then cut the biscuit slots through the laminate so that you would still have a good glue surface available to hold the cabinet together. I used this technique on many cabinets over the years.

Learning to Use The Biscuit Joiner

Your new Biscuit Joiner will probably include a small book of basic instructions to help get you started. Some of these contain fairly good but limited information. Unfortunately some users won't take the time to read even a small book before starting to use the tool. Since the Biscuit Joiner is basically a small saw facilitating controlled joinery cuts, it requires careful and practiced handling to get precision results. In addition to making the work go faster, an important objective is to create quality projects and that is only possible if you know how to make good use of the Biscuit Joiner. The more knowledge you have about how to use the Biscuit Joiner the better, easier, and faster your work will be. The next few paragraphs contain information I have found helpful when using biscuit joiners.

This first tip is one few people have the patience for but it will save you time and frustration. Make a test cut every time you change the settings on your biscuit joiner. When you change the size of the biscuit, check for correct depth. The correct depth is slightly more than one half the overall depth of the biscuit. Place the biscuit in your test cut and make a pencil mark across the biscuit at the edge of the board with a sharp pencil. Pull out the biscuit and notice the relationship of the line to the center of the biscuit. The pencil mark should be slightly past the center of the biscuit, but only slightly. Don't make the slots too deep. Check the location relative to the edge of the material or the center of the board. If the depth and location are correct you can proceed to cut the slots in the actual work. This does consume time but not as much time as mak-

ing your cuts incorrectly and winding up with a flawed assembly. This one step will save you many mistakes.

Since the accuracy of the biscuit slots is critical to successful biscuit joinery, always make certain the face of the biscuit joiner and the face of the fence are tight and flat against the surfaces of the material to be cut. This is best done by clamping the work piece and controlling the Biscuit Joiner with both hands. This helps you line up the cut and maintain a steady position keeping the Biscuit Joiner from shifting during the cut. Start the biscuit joiner and make certain the torque of the motor has not caused the Biscuit Joiner to move before making the cut. Movement during the cut can cause the blade to enlarge portions of the slot causing poor fit of the wafers. Even if the slots do not enlarge, movement can impede accurate alignment and cause problems during assembly.

When making projects such as bookcases, use the shelves as a straight edge to make your biscuit cuts. For example, place the shelf face down on the line identifying its location. Clamp it in place so it is square and even with the edge of the bookcase sides. Then mark your biscuit locations on the shelf. This one mark will be used for both cuts.

When cutting the sides, line the marks with the centerline on the bottom of the biscuit joiner. Hold the biscuit joiner steady keeping the base of the biscuit joiner flat against the edge of the shelf and the fence flat against the side while making the cut. When cutting the shelf edges, line the marks with the centerline on the front of the biscuit joiner. Hold the biscuit joiner steady with the fence tightly against the edge of the shelf and the base tightly against the side.

Always make the cuts on the sides before the edge cuts on the shelves. This will ensure that the face cuts are completed accurately even if the clamped piece moves under the pressure of the edge cuts. The few extra moments taken to maintain a steady hold on the biscuit joiner will make the assembly easier and more accurate.

It's easy to make a glue mess when assembling a project with biscuits. Proper gluing involves planning each step of the assembly in advance. The most common problem for beginners is using too much glue. Many woodworkers believe the glue has to ooze out everywhere for a strong joint to result. All you need is enough glue in the joint, not all over everything.

Applying glue is the same wherever you do it. Not only does too much glue cause a big mess, it's difficult to clean and wasteful. Cleaning up excessive glue is no fun and often leads to a lot of sanding. Biscuits fit tightly and don't require excessive glue for a strong joint.

I suggest purchasing one of the special glue bottles made for biscuit joinery. Some of them are very inexpensive. If you will be using the Biscuit Joiner a lot, purchase a glue container made by Lamello. It is somewhat expensive but has the unique advantage of always dispensing the correct amount of glue into the slot. The other units depend on your skills to determine the amount needed in each joint. After much practice, I can apply the right amount of glue using a standard round glue bottle tip with a small hole. The trick is to apply a thin bead of glue on both sides of the slot just below the surface of the board and straight along the top of the slot. This way the

glue will begin to run down both sides of the slot slowly. If the biscuit is inserted promptly, a good bond will result. If you get any ooze out when you put the boards together you should immediately lighten up on the glue for the next joint.

The most important part of planning the glue up of projects with biscuits is to assemble in order to avoid having glue running out of the biscuit slots during the assembly. It really isn't complicated and will save you hours of cleanup, sanding, and frustration.

Just consider the obvious fact that glue will run into slots facing up and out of slots facing down. If you put glue into a slot and then turn it to face downward, the glue will promptly begin to run out and make a mess. If you plan your glueup so you will always be putting glue into slots facing up, the mess is avoided. This takes a little planning but it is well worth the effort to avoid a glue mess.

In the project books, each of the project plans has specific instructions on the best way to cut the biscuit slots and assemble the projects to avoid glue mess.

Biscuit Joinery Drawings

The next few pages contain simple drawings of various joints that can be done with a Biscuit Joiner with details of how each joint can be used and how they relate to the project plans in this book. Over the years I have used the Biscuit Joiner to make these joints for projects for myself and for customers. You can use these joints to assemble your own projects taking full advantage of the Biscuit Joiner.

I sincerely believe that using biscuit joinery can help you make excellent projects with strong yet easy to do joints whether you are a home woodworker or a part-time or full-time professional.

I hope that the joints described in these pages serve to interest you in biscuit joinery and lead to the creation of even more joints that can be made with the Biscuit Joiner.

The Corner Joint

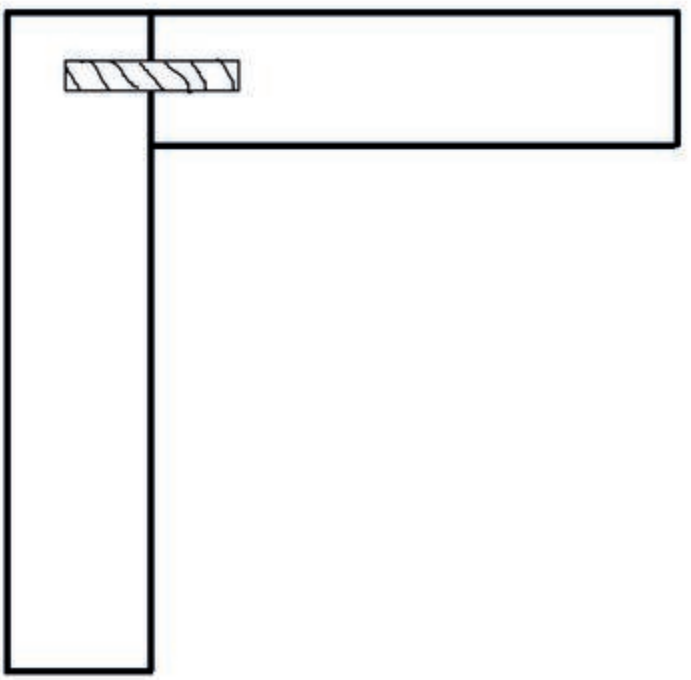
The corner joint is basically a butt joint which involves the edge or end of one board and the face of another. These joints can be simply the width of one board or the length of an entire sheet of plywood or MDF fiberboard.

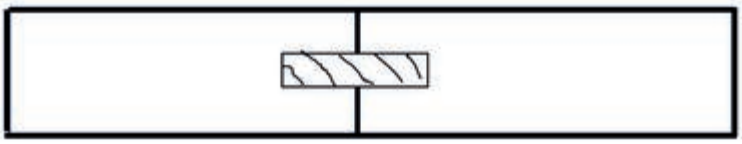
The number of biscuits used on these joints is based on that width or length. On a 1X4 board only 1 size 20 biscuit will fit. On a 1X6 board you can fit 2 size 20 biscuits.

When doing joints like this it's important to remember that glue works best on long grain. That is the

grain that runs along the length of a board whether on the edge or the face. The wood at the ends of a board, and at any location where you create an end by cutting the board, are called end grain. While you can use biscuits to attach an end grain to a long grain, it is not a good idea to join two end grain pieces even with good joinery. For the best possible joinery glue together pieces using the long grain whenever possible.

The end grain/long grain issue does not apply to plywood since the direction of the grain in the various layers is different. A drawing of the corner joint appears below.





The Edge To Edge Joint

The edge to edge joint shown above is often misused because of a lack of understanding about gluing up boards. When gluing up boards edge-to-edge in order to create wider boards, it's important to remember that in this kind of joint the biscuits serve only to maintain the alignment of the boards while the glue is drying.

The biscuits may add strength but it's unnecessary on this kind of joint. That's because the glue joint, once dry, is stronger than the wood. So, if you didn't use the biscuits the joints would be stronger than the wood itself.

If you don't believe that, conduct a simple test to prove it to yourself. Just cut a half dozen pieces of 1X4 or 1X6 6 inches long and then glue them side to side without any biscuits. Once the glue is dry, take the glued up piece and put it against something at an angle and break it with your foot or a hammer. Then take the two pieces and break them also. None of the breaks will be on the glue line. The board will always break in the wood itself. So, if the glue joint is as strong or stronger than the wood, why do you need the biscuit.

What the biscuit does is keep the boards aligned with each other easily during the glue up. Normally, boards

will slip and slide because of the wetness of the glue but not with the biscuits in place. So just use sufficient biscuits to keep the two edges lined up with each other to help alignment and thereby reduce the need for so much planing or sanding to make the boards even.

When doing your glue ups remember a couple of important things. First, use lots of clamps so you maintain a tight joint throughout. Secondly, make certain the clamped pieces are straight and even with each other because you won't be able to correct that after the glue has dried. This is best done by placing clamps on the top and bottom of the glue up. Finally, clean off as much of the glue ooze as possible. I have found that the easiest way to do this is to let the glue set for 15 to 30 minutes and then use a sharp putty knife to remove the partially dried glue. This will avoid a lot of sanding later.

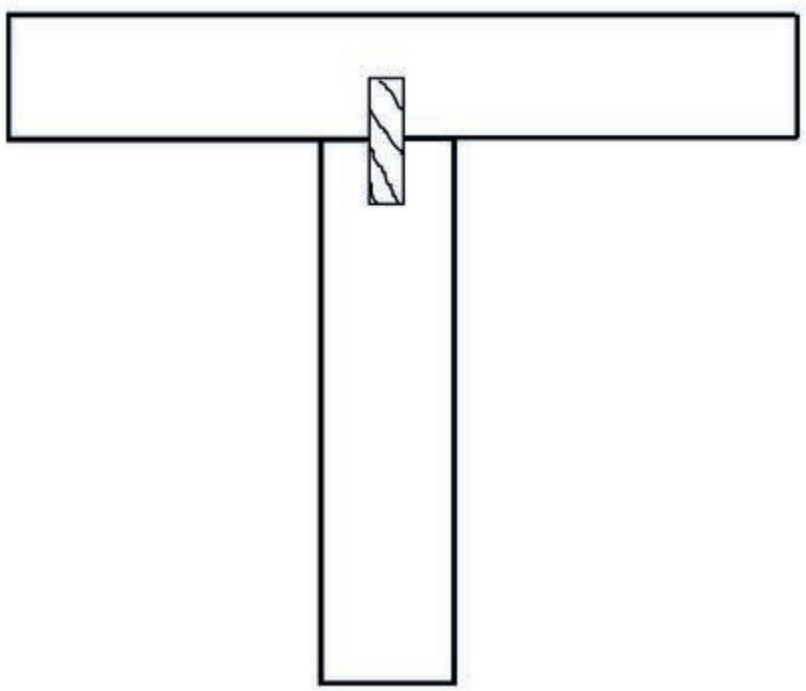
The T Joint

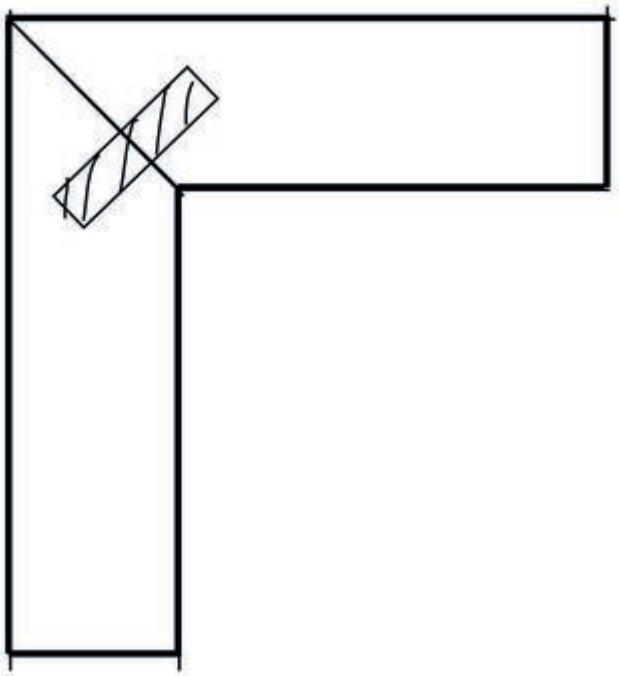
The T Joint shown on the next page can be used in many ways. I use it most often to assemble cabinets made of plywood or fiberboard. This joint can be used regardless of the length of the two pieces.

You could biscuit joint two full length plywood pieces or any other length by simply spacing the biscuits appropriately depending on the strength needed for the specific project. Usually you can place the biscuits with spacing somewhere between 6 inches and 12 inches. My suggestion is to opt for the closer placement. I believe that you can never make things too strong.

The T Joint can also be used on a much smaller scale to create dividers in a cabinet or drawer. Or, to create

a knick knack shelf unit with shelves at various levels and dividers. They can also be used for removable shelves or dividers by gluing biscuits into the sides of cabinets, cases, or drawers and then cutting slot into the edges of the dividers. Then the dividers can be slid over the biscuits when needed and removed when no longer needed. The dividers or shelves will remain in place. If it seems that the dividers are too loose on the biscuits, apply a very small amount of glue to the biscuits and wipe it dry. This will slightly swell the biscuit and tighten the fit.



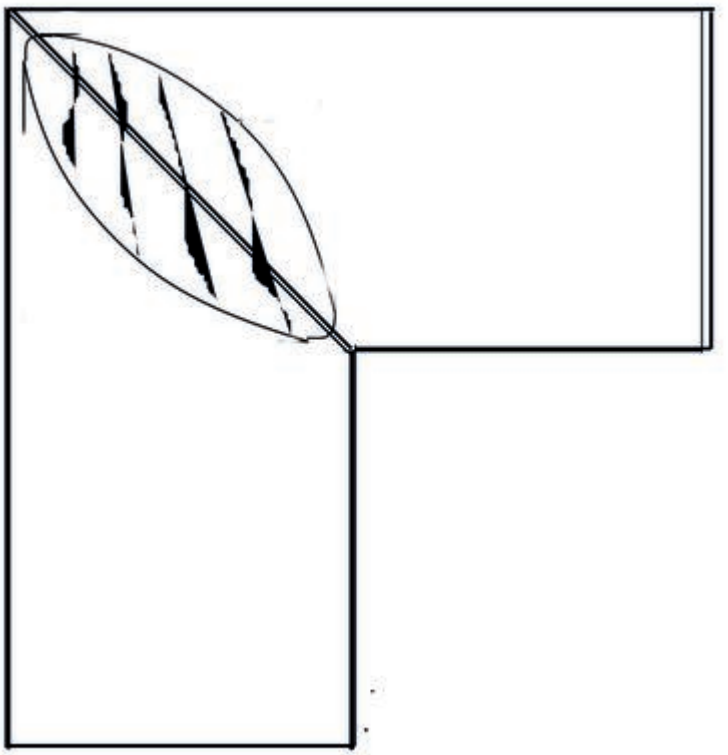


The Edge Miter Joint

Edge miter joint shown above comes in handy to assemble pieces of all lengths. You can use it to make small boxes or cabinets where it is important to hide end grain. The number of biscuits used is directly related to the length of the joint. I suggest that you use a biscuit every 6 inches for most joints.

To ensure a tight joint it's important to cut the miter carefully and then cut the biscuit slots with the Biscuit Joiner properly aligned. Failure in any of these steps can lead to joints that fit badly and are weak and unattractive requiring a great deal of filler and sanding. Taking a little extra time to produce accurate pieces ensures tight accurate joints.

There are various ways to cut the biscuit slots for edge miter joints. These are covered in detail in the section on using the Biscuit Joiner. For cutting these slots you can set the fence on your Biscuit Joiner to 45 degrees or 135 degrees if that setting is available on your Biscuit Joiner. My preference for this cut is to leave my Biscuit Joiner fence set at 90 degrees and clamp the two mitered pieces back-to-back to form a 90 degree corner. That accommodates my Biscuit Joiner with the 90 degree fence setting and gives me a more stable work surface for the cut.



The Frame Miter Joint

The frame miter joint shown on the previous page is used mostly for frames but you can also use it to make door frames. It is a strong joint for many uses. The size of the biscuit for each application is based entirely on the size of the frame. For smaller frames you may have to use a size 0 biscuit and for larger frames you may have to use several size 20 biscuits. The important thing is to use enough biscuits to ensure a strong joint.

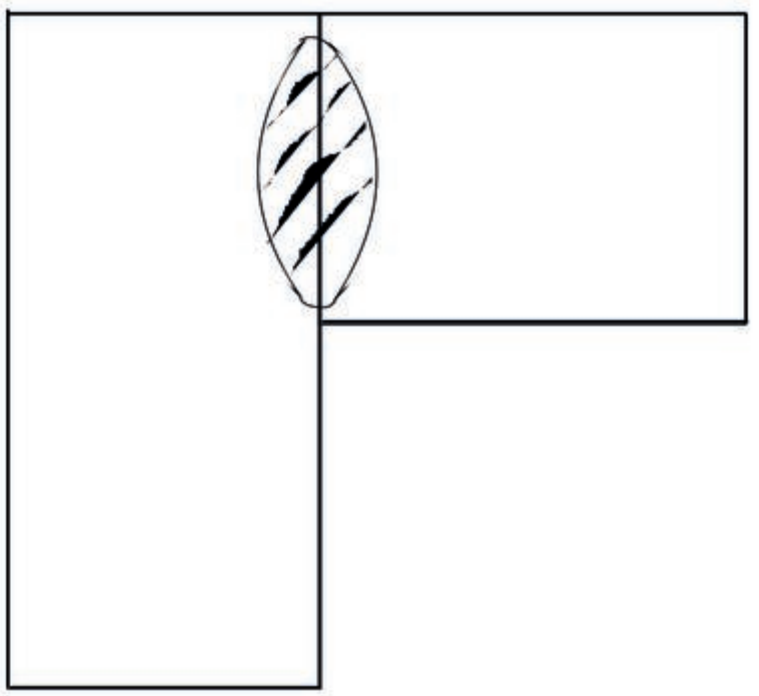
I prefer to cut the biscuit slots for frame miter joints using the Biscuit Joiner without the fence but you can also make the cuts using the fence. For materials thicker than 3/ 4 inch you can use a second biscuit. I would cut the slot for a second biscuit by using a spacer for the second cut but you can adjust the fence. Some users are more comfortable with the fence and accuracy can be maintained with either method.

The Square Frame Joint

I use the square frame joint shown on the next page to make doors for cabinets and furniture. All the doors for the projects in the project books were made using the square frame joint cut with my Biscuit Joiner. It is a strong joint that I have used for many years on hundreds of projects.

I always cut the biscuit slots for this joint using the Biscuit Joiner without the fence. By clamping each piece to the work table and then guiding the cut with the base of the Biscuit Joiner on the work table. The blade of the Biscuit Joiner is set perfectly so when the base is on the work table the cut is centered in a 3/ 4 inch thick board.

The exact same procedure works with thicker materials simply by using spacers between the base of the Biscuit Joiner and the work table surface. For 1 inch to 1 1/ 4 inch thick material I would use a spacer for a second biscuit. For 1 3/ 4 inch thick material I would use two spacers of varying thickness and use three biscuits in the joints. This give you an extremely strong joint by creating six glue surfaces for each piece of the joint.



The Offset Joint

The offset joint shown on the next page is useful to add solid wood pieces to the edges of plywood or fiberboard sheets. The number of biscuits used along this joint is determined by the strength that is needed for the particular cabinet or furniture piece.

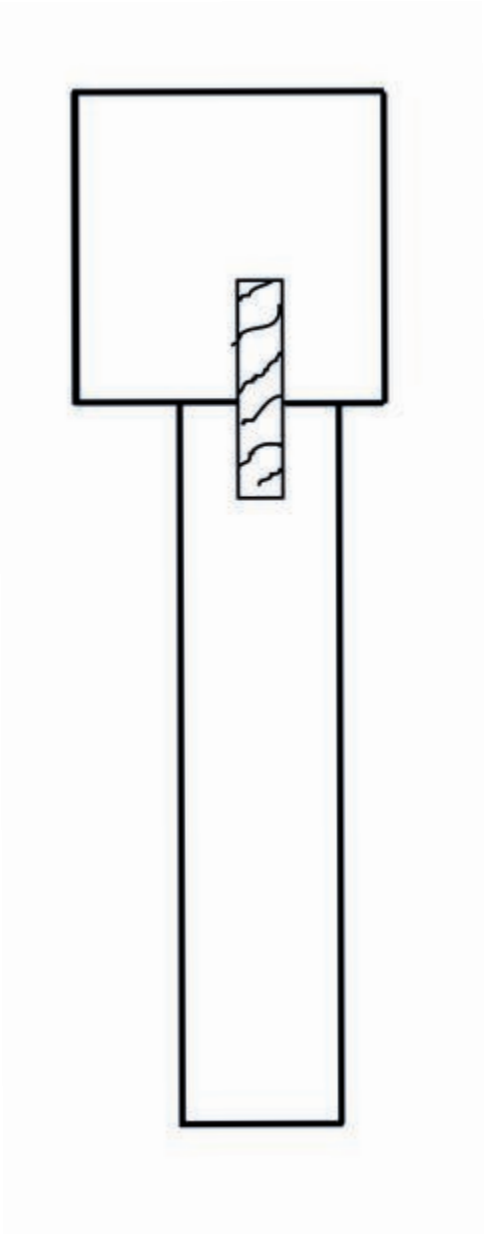
This joint can also be used to form a strong corner for a cabinet or furniture piece. By applying a second plywood or fiberboard piece in the same manner you can form a 90 degree corner that is decorative and protects the sheet goods from damage. To make it more attractive you can round over all the corner pieces.

Years ago I was commissioned by a hotel to create a rugged design for their lecterns because they were always handled roughly. They wanted the lecterns to be made of oak plywood instead of veneered fiberboard and they wanted it to have strong corners that could be easily refinished if damaged.

I came up with a design using 3/ 4 inch thick oak plywood for the basic box with 1 3/ 4 inch X 1 3/ 4 inch corner pieces rounded over with a 1/ 4 inch round over bit. I then assembled the units with the corners extending 1/ 2 inch beyond the face of the plywood and assembled the pieces with biscuits every 6 inches throughout every joint.

The lecterns were built over 25 years ago and are still holding up well. The corners have been sanded and refinished on some of the units because they have been run into walls or corners in the hallways but the plywood surfaces remain in good shape because they are protected by the extending corners.

In this case the offset joint served a dual purpose because it added a decorative feature to the lectern and protected the plywood veneer from normal damage.



The preceding drawings are just basic joints that can be created with the Biscuit Joiner. It is certainly not every possible joint which can possibly be created with this tool. If you are going to bond two pieces of wood to each other in some manner, chances are that biscuit joinery can be used to reinforce that joint.

Anytime you are designing a project consider the possibilities of joints made with a Biscuit Joiner. Even if you have project plans that include details on a different kind of joinery, why not consider using the Biscuit Joiner instead.

Whether the power tool is a table saw, circular saw, jig saw, scroll saw, router, sander, planer, or Biscuit Joiner, it's been my experience that we often fail to explore the full potential of a tool. Making full use of the Biscuit Joiner will help you to create projects with strong joints while still saving time. For the home woodworker that means quality projects completed faster. For the professional woodworker it means that and the potential for increased profit.

Final Notes

What follows are some notes that you may find useful when using a biscuit joiner. Much of the information is just a reminder and was probably covered either earlier in this book or in one of the project books. I hope they are of help to you.

Edge-to-Edge: Remember when gluing boards edge-to-edge the only purpose of the biscuits is to align the boards so that major planing or sanding will not be necessary after the boards are glued together. The biscuits are not necessary for the strength of the joints. When boards are glued together edge-to-edge the glue joint actually becomes stronger than the grain of the wood.

Order of Glue Up: As you check out the information in this book and the project books, you will find details on the order of glue up. These may seem unimportant but following the instructions will save you from a glue mess that is difficult to clean and can lead to excessive sanding. Take a little extra time to glue things up in the best possible order and you will save time in the long run.

Slot Cut Mistakes: If you use the Biscuit Joiner regularly there will probably be some misplaced biscuit cuts. This is an easy problem to resolve by simply gluing a biscuit into the slot, let the glue dry, use a hand saw to cut the protruding part of the biscuit off, and then sand down the surface or edge and you are ready to make the cut in the correct location with just a minor delay.

Multiple Biscuit Slots or Offset Joints: If you need to have multiple slots cut for a project as I did for the chairs shown on the cover, there is no need to use and continuously adjust the fence. What I did was adjust the fence to cut the slot closes to the flat work surface first. Then I used a small piece of 3/8 inch thick plywood and placed it on the flat work surface for the second cut without the fence. Then finally I used a small piece of 3/ 4 inch plywood on the flat work surface to make the third cut. These fillers allowed me to make all three cuts for the framework of the chair without using the fence.

If you must use the fence, in the interest of accuracy cut all the project pieces first. Set the fence for the first cut and then make all the cuts that will be at that level on every piece of the project. Then adjust the fence for the second cut and make all of those cuts. Finally, adjust the fence for the third cut and make all the third cuts in all the pieces and you are ready to assemble.

Sand Before Assembly: Once you have all your pieces ready for assembly, do all the sanding before you begin. Your project should be ready for the finish once it is assembled. Many projects have inside corners that are difficult to sand properly once assembled. Save yourself all that work by finishing the sanding first.

Choosing The Right Biscuit Size: The choice is simple, always pick the largest biscuit that will fit in the joint that you are creating. This will always give you the maximum amount of glue surface for maximum strength.

In addition to the three basic sizes, 0, 10, and 20, there is a size called FF which stands for Face Frame.

This is a smaller size used for attaching face frames to cabinets. There are also some micro size biscuits available for very small jobs but for these you need a smaller, specialized Biscuit Joiner because these biscuits are also thinner. I have not used these smaller sizes as the three regular sizes have always been adequate for my purposes.

Cutting Miter Joints Using Fence at 45 Degrees: In the chapter on Biscuit Joiner methods I show you how to cut the biscuit slots on a mitered corner using the fence set at 90 degrees and at 135 degrees. These are the two methods I believe to be safest and most accurate but you can also make this slot cut by setting the fence at 45 degrees.

For this you would put the fence on the short point side of the board and the face of the Biscuit Joiner against the miter. This method feels less accurate and I recommend one of the two methods previously discussed.

Double Wide Biscuit Slot: For extra strength in extreme situations you can use two biscuits together. This could become necessary on projects that require the extra strength but are constructed of 3/ 4 inch thick material that will not accommodate two separate biscuits.

Using two biscuits requires cutting two slots next to each other. The best way to do this is with a 4 mm (5/32 inch) spacer. You can make a spacer from a piece of scrap plywood or other lumber.

Once you have the spacer, place it under the piece that will be cut and make the first cut. Then remove the spacer and make the second cut and you will have a double biscuit slot. You could also place the spacer

under the Biscuit Joiner for the first cut and then remove it for the second cut or vice versa.

Once the double cuts are made, place glue directly on the inside surfaces of the two biscuits, put the glue in the slots, place the biscuits in the slot and then assemble the pieces.

Biscuit Joiner Accessories: I have not made use of the many accessories that are available for biscuit joinery but you may want to look into them. One that I find interesting is the biscuit joiner hinges. These hinges are the shape of biscuits and you use your Biscuit Joiner to cut the mortise for them and then attach them as you would any hinge.

Another item is glueless biscuit clamps. These are half biscuits that are used for gluing boards edge-to-edge. The half biscuit are placed in the biscuit slots without glue and then the boards are placed against each other after the glue is applied to the edges and the biscuits grab each other to keep the boards well aligned.

Another item is metal half biscuits that are tapped tightly into biscuit slots to allow you to create knock down furniture or cabinets. The two biscuits have protrusions that slide into each other to keep the pieces together without glue and allow you to knockdown the pieces later.

A simple accessory made of plastic serves as a simple guide to check the depth for the slot cuts for all three sizes of biscuits. It may be worthwhile to some but certainly not essential to biscuit joinery.

Biscuits Versus Dowels: After visiting many blogs and web sites it's obvious that this is a touchy subject. I believe, and much evidence has shown, that biscuits

create stronger joints than dowels. This is simply because biscuits have much more glue surface and that surface is all glued to the long grain of the wood.

Dowels have less glue surface and much of their surface faces the end grain of the wood that does not glue well. In spite of this obvious difference there are running arguments about which of the two provide a stronger joint.

I am not going to participate in that argument. This book is not intended as an attempt to prove that biscuits joints are stronger than dowel joints. It is my opinion based on my years of woodworking experience that they are better, faster, and easier to use but the purpose of this book is to share with you as much information as possible about how you can take advantage of this excellent tool to speed up your work and create quality projects.

Some may wish to spend their time running various tests to prove which is the strongest joint, I prefer to spend my time helping you to built projects faster and better.

Biscuit Joints Versus Mortise and Tenon: This is truly a no brainer. If you have ever built a project using mortise and tenon joinery, as I have, there will be no doubt in your mind that mortise and tenon joints, when done correctly, are considerably stronger than biscuit joints. However, mortise and tenon joinery is truly difficult and time consuming for anyone with limited skills and it's unnecessary for most projects.

Mortise and tenon joinery is an excellent method and if you have the time and inclination I would definitely

advise you to try it at least once if for nothing else but the sense of accomplishment.

Other Joinery Methods: There are many other joinery methods including various styles of dovetails, finger joints, dado joints, tongue and groove, just to name a few. They all have their uses and if you decide to use any of them I hope it works for you. For me it isn't a competition, it's simply about getting the projects built. That was always the case when I was operating my woodworking business and it still is now that I build projects only for us.

This is the end of this book but it will be followed by short project books that include all the instructions and drawing to build individual projects using biscuit joinery. I plan to write and publish quite a few of these project books. The first four will be small, easy projects as listed below.

Child's Heart Chair

Bookcase

Kitchen Range Shelf

Child's Table

Thanks for reading this book and please look out for the next four.

Safety Notes

POWER TOOLS ARE INHERENTLY DANGEROUS. Any tool that cuts wood can also cut skin and bone. Keep this in mind every time you use a power tool. Plan every cut carefully before starting the tool. Clamp work pieces securely before cutting, routing, sanding or using a Biscuit Joiner. Read and adhere to the safety guidelines that came with the power tool.

These guidelines are written to help you avoid serious injuries. Here are a few more simple hints that will help you avoid injuries. While it is best to use both hands to control power tools, if you are using a power tool with one hand, always check where the other hand is before starting the tool. This may sound silly but it is a good way to keep all your fingers.

Whatever cutting, routing, planing, jointing you are going to do, take a moment to review the procedure in advance. Visualize the complete procedure before you start. Doing this will often allow you to realize mistakes that you may have made without thinking. An extra moment before proceeding could help you avoid potential kickback or other injury causing incidents.

If you believe that these extra precautions are not necessary for you because you are so proficient with the tool, please think again. It does take time to be careful and use power tools safely but not nearly as much time as a serious injury can take out of your life.

Never use power tools if you are tired, taking medications or using alcohol or drugs. This is a sure way to get hurt. Always use ear and eye protection and dust masks when needed. Woodworking is an enjoyable hobby and it can be profitable. Don't let a moment of carelessness ruin it for you. Before turning on any power tool think and make certain you know where both of your hands are. Take good care of yourself and others around you.

BISCUIT JOINER SAFETY

Because the blade is hidden from view except while cutting biscuit slots, the Biscuit Joiner may give a false sense of security. Remember that the small carbide-tipped blade in the Biscuit Joiner is razor sharp and just as capable as any other power saw to injure you if you get careless. All the rules described in this safety section apply fully to the Biscuit Joiner and should be adhered to at all times.

Disclaimer

Everything described in this book is based on my personal experience. I owned and operated a full-time woodworking business for over thirty years, first in Tampa, Florida and then in Austin, Texas. During most of those years I used Biscuit Joiners to build hundreds of projects for many customers and for myself and learned many ways to take full advantage of the capabilities of the Biscuit Joiner as a wood joinery tool.

This book attempts to convey as much of that knowledge as possible so you may experience the same benefits. Nevertheless, no guarantees are expressed or implied regarding your own results using the information in this book.

Every method described and pictured in this book and all the project books was actually performed many times on many projects. I personally designed, built, and photographed every project shown in the project books so I know these methods work.

I believe anyone, even with limited woodworking skills, can use a Biscuit Joiner to perform the work described, especially if they practice with the simple project plans included in the project books. Toward that end I have included detailed instructions, drawings, and photographs to clarify the methods. Nevertheless, it's impossible to know the skill level and capabilities of readers so I can't guarantee you will be able to successfully perform the tasks described herein.

In addition to the Biscuit Joiner, woodworking involves the use of an extensive collection of tools capable of inflicting serious injuries. I have made every effort to accurately describe my experiences with the Biscuit Joiner in detail, including safety considerations with it and other power tools, but I cannot be held liable for any damages or injuries resulting from the use of this information even if the user informs me prior to or after these damages or injuries occur.

This book includes the names of and information about several brand name products. Many of these are products I have personally used as indicated in the book and others have been highly recommended to me. I own no interest in any of the manufacturers or distributors of these products nor have I received any payment for listing them in this book. They are listed only as part of my experience and for informational purposes.

The user of this information agrees he or she is solely responsible for the consequences of using the Biscuit Joiner or any other tools or products described in this book. The information contained and distributed in this book is not intended as nor should it be considered professional, business, or legal advice.

For any questions please contact bill@positive-imaging.com

For over twenty-five years Bill Benitez used biscuit joiners to build hundreds of cabinets and furniture pieces in Tampa, Florida and Austin, Texas.

During those years he used biscuit joinery for almost all of his residential and commercial projects. Biscuit joinery made his work easier, faster and more profitable and in this series of books he shares his experience.

Also in this series of books, learn all about the Biscuit Joiner and every step of using it on all your projects including:

About Biscuit Joiners and how to choose one for yourself.

Instructions with photos on how to use the Biscuit Joiner.

Complete project plans with instructions and detailed drawings.

Photos and descriptions of cabinets and furniture projects.

Drawings and descriptions of the joints you can make with the Biscuit Joiner.

A set of helpful Final Notes including valuable advice for making the best possible use of the Biscuit Joiner.