Reel Seat Insert Making for the Rod Builder:

A discussion of materials, design, methods and tools for producing mortised reel seat inserts

Article and photos by Gary Dabrowski

Introduction

The reel seat and the wood insert it often displays, has long been an important part of the style, and functionality of the bamboo fly rod. While many materials can and have been used throughout the years on rods built by the many makers of the past and present, the wood reel seat insert offers the most benefits. Woods may be selected for their weight, color or grain, machine-ability, availability and numerous other reasons important to the rod maker. The selection of a type of wood is one of the many ways the rod maker personalizes his work. This discussion addresses methods of producing a mortise on the wood insert.

Materials

Wood turning material suppliers provide turning blanks variously sized from 3/4 inch by 3/4 inch square and up. Some provide blanks in the round or dowels in useable hardwoods. I prefer a blank that is cut to be 1 1/8 inch by 1 1/8 inch square. Several species of hardwoods are used to make inserts for the reel seats I put on my rods. The first are two different grades of American walnut. Fancy or Full Fancy Grade is used on rods near the high end on the line. This wood shows good figure, some fiddle back and complex grain and color. The second grade of American Walnut is a common or straight grained wood and is sometimes used for other rods. While the walnut comes from commercial sources, others are obtained from friends offering logs from recently harvested trees or from other local sources. These woods include Butternut, which is a cousin to the American Walnut and is sometimes known as White Walnut. Cherry and other woods possess interesting color, grain or structure. Others include spalted Maple and Apple heartwood. This wood is all sawn into 6/4 or thicker boards, sealed, identified and stored in the shed to dry.

Storage, preparation and processing

Recently harvested rough cut boards should have their ends sealed in preparation for storage and drying. Doing so will limit the amount of checking and splitting that will occur as the wood dries. One may

seal the ends of his boards by painting them with melted paraffin or applying carpenters glue out of the bottle. I like to mark my boards with the date of acquisition in order to manage usage and drying time. Wood should be stacked in a way that permits the circulation of air throughout its volume and care should be taken not to stack directly onto a concrete or dirt floor in an unheated building. My reel seat materials are kept at least a couple feet off of the floor to limit the pickup of moisture from the ground or through the floor. Drying time is a matter of personal choice. I generally wait a year or so as a little wood goes a long way.

As I need to fabricate insert blanks I will choose boards appropriately. Dry boards are first ripped into a long square blank on the table saw and then trimmed to a length that permits final precision sizing later. These blanks will then be drilled along the center of their length and then turned to about one inch round in preparation for stabilizing. Once stabilized, blanks are put into storage and finished in lots as required.

Insert design

Seat inserts are typically made to be 5/8 to 11/16 inch in diameter and about 3.625" up to about 3.75" inches long. The final dimensions are determined by the requirements of the rod and tastes of the builder. Rods built for general service will be found to have the larger seat inserts. Special, short or lightweight rods for light lines may have a smaller, shorter type of insert. My work is limited to trout weight rods and permits me to use a single turned blank design. In this way, tooling used to produce butt caps, rings, and grip checks is kept minimal.

The basic insert is a simple round turning or cylinder. A pocketed cap, normally located at the butt end would capture one foot of the reel. The remaining reel foot may be managed by a simple ring, which slides along the insert. If one wished to employ a nut in lieu of a sliding ring, then he would alter this cylinder by turning a reduced diameter to accommodate a short portion of threaded tube. These types of inserts are easy to make, but their usage is complicated by the need for a pocketed cap.

The mortised insert offers more style and permits the use of a simple round butt cap. It also moves the mass of the reel slightly closer to the rod, which improves balance a bit. A mortise may be fabricated by either turning a portion of the insert eccentric or by milling. The eccentric turned mortise is easily made with the use of a fabricated tool that holds the insert slightly off axis in the lathe. This tool and a lathe cutter ground to an ellipse or full radius in order to provide a pleasing form at each end of the cut can be shop built. The blank converted with this method would need to be longer than the finished part as the insert holding fixture will hold this extra length in order to adequately present the blank to the cutter. It would then be trimmed off after forming the mortise. Cutting the mortise with this method will require patience as small amounts of material should be removed with each pass as the insert, being unsupported at one end will deflect a bit and also vibrate due to the interrupted cut. Speeds and feeds should be kept minimal. Insert blanks should be chosen with concern for the direction of grain when using this method as the deflection could cause the blank to break. Grain should run along the length of the part and not diagonally through it. Straight grain woods will provide better results than woods with burls and complex grain as the nature of the cutting may chip out some portions.

Photo: several insert types: UN-turned blank (cherry), turned blank (Apple heartwood), turned blank for screw lock (butternut).

The milled mortise is commonly found in production rods as this style permits efficient volume manufacturing. It has the added benefit of precisely locating the reel foot on the insert and of looking crisp and stylish with sharp lines paralleling the rod

axis. The making of the milled mortise requires several special tools. It also requires that the blank be both turned to finished size concentric to the previously drilled bore and trimmed to finished length. Once the blank is prepared it is then transferred to the milling fixture where it will have the mortise milled into it. In addition to this milling fixture and centers, a purpose-designed cutter will be required. The mortise may be milled along the entire length of the blank or may be stopped close to the grip end, permitting a short portion of round insert to remain. After milling, sand carefully to avoid rounding off the sharp corners.

Tools and Fixtures

Eccentric turned mortise

An eccentric turning fixture may be made from steel or aluminum. The selection of a better grade of steel or tool steel will yield a tool able to serve well over a long period of time. Softer materials could be marked or deformed by chuck jaws effecting the location of the fixture in the chuck and the alignment of the insert blank to the chucks' center of rotation over time. The photo shows a steel fixture I have used successfully. The hole bored to accept the insert should be sized to fit your blanks with minimal clearance. This hole should be slotted through to the outside diameter. The smaller holes permit the fixture to flex around the blank as the chuck jaws are closed on the fixture. They too are slotted to the o.d. The height of this fixture should suite the capacity of your chuck jaws. Keep the cut as close to the jaws as is reasonable for support.

Photos: (l to r) Eccentric turning fixture; two insert blanks (one as turned, one finished); fixture in lathe with insert.

Milled Mortise tools

Blank turning centers

The blank first needs to be turned to size concentric to the drilled bore. To do this, special centers are required. Those that I use are made from tool steel and are designed to work as follows. The tail stock end center has a short projection sized to be a wring fit into the insert blank. The larger diameter portion has a center drilled into it which is applied to the tailstock center in use. The head stock center is made to be gripped by a collet. Projecting from it is a portion of a 5/16 inch hardened dowel pin which also is a wring fit into the insert blank. The face of the headstock center has cross ribs milled into it. These ribs grip and drive the insert. After the outside diameter is turned using the centers, they are removed and the blank is chucked or colleted permitting the insert to be finished to length.

Photos: blank turning centers; blank with centers in lathe.

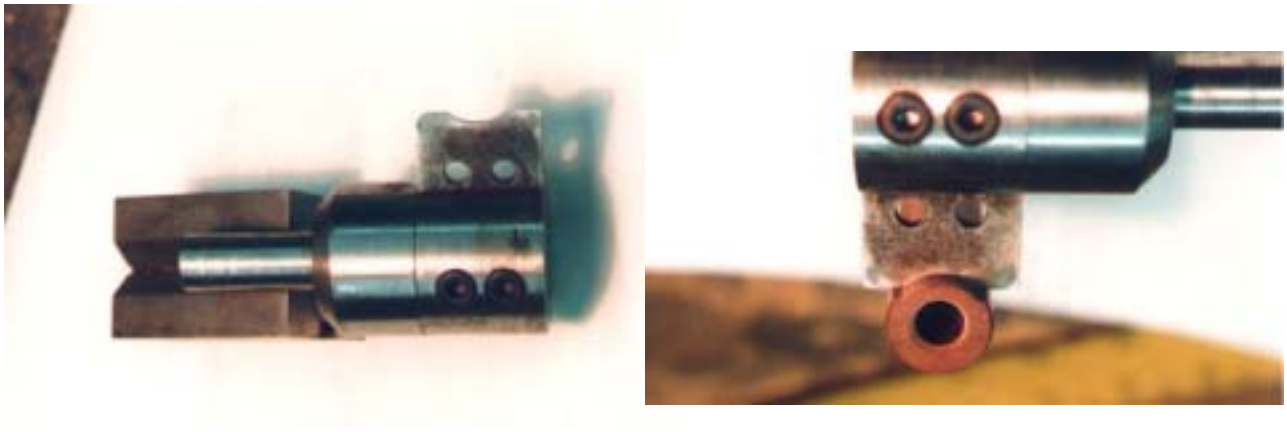
The milling fixture

I machine the mortises in a vertical milling machine. The fixture described here is intended for this purpose. Those who mill in the lathe can alter this design to suit. The fixture body is made from one inch thick steel. A notch is cut into the top to accommodate the length of the blank and a bit more for a sliding clamp detail. A pair of holes is bored through the two ends, near the top of the remaining columns. These holes should be parallel to the bottom of the plate so as to be able to support the blank truly horizontal. One hole is a clearance diameter for a round support mandrill, the other about 1/8 inch larger to accommodate a sliding clamp detail. The clamp detail end column (left column) is drilled and tapped for small clamp screws and slotted to permit clamping the sliding detail. In practice, one would insert the support mandrill through the fixture columns, sliding clamp and insert. Then clamp the insert to the right column by turning the nuts tight. Finally clamp the sliding detail in the left column. One column needs to be clearanced on the cutter side to clear the rotation or run out of the cutter when at the end of the cut.

Photos: Fixture with blank in mill; fixture disassembled

Mortising milling cutter

The cutter that I use is shop built and a simple single flute type that operates somewhat like a fly cutter. It is made bulky so that its mass will minimize any vibration and chatter that may result from the unbalanced design. When run at moderate spindle speeds it will make adequately smooth cuts. After the design of the mortise has been established, the cutter blade may be made in accordance with good tool design and making practices. Choose a heat treatable steel and make quite hard after machining to form. My cutter design locates and retains the blade to the cutter body with a pair of allen head cap screws. The outer clamp section is made to be as thick and robust as possible to provide support to the blade while cutting. The body of this cutter is made from tool steel and hardened.



Photos: Mortising cutter; close up of blade and insert

Milling a mortise

Set up the cutter and fixture in the milling machine making sure that the centerline of the cutter mortise radius is on the centerline of the fixture support mandrill. Apply the insert blank to the fixture. Rotate the blank on the mandrill to present the side chosen to be cut to the cutter and clamp in place. Be aware of the grain direction of your blank. Some woods prefer to be milled in one particular direction. Trials may be necessary to gain experience with your tools and woods. Run your cutter at moderate speeds and be careful. Remove minimal amounts of material keeping in mind the unbalanced nature of the cutter. As you approach the finished dimension take lighter cuts. This will minimize any tearing and leave good surface finish.

cutter, fixture in mill with blank

Conclusion

The use of purpose built tools and fixtures in the manufacture of reel seat inserts permits such parts to be made with relative ease and consistency. The time spent building such tools is a good investment in the quality of ones rods and supports the ethic of quality craftsmanship. The solutions presented here are not intended as being correct for every case and craftsman but are an opinion offered by one and should be considered guidelines.

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