
Making Ferrules

A custom rod builder who is competent in the art of making ferrules has unlimited choices regarding multi-piece rods.

story and photos by Ralph O'Quinn

A most learned gentleman with whom I have an occasional encounter describes the word ferrule as "a short tube or bushing for making a tight joint - as between pipes." I don't think that Mr. Webster had fishing rods in mind when he penned that description, but many fishing rods certainly do have as a ferrule, a short tube for making a tight joint, or something very similar and just as crude.

Ferrules are looked upon as a necessary evil by a very substantial number of fishing rod users throughout the world. However, for several generations the metal ferrules for bamboo rods have been well made and designed to smoothly transmit the forces involved with 2-piece rods. But for the most part the mass produced 3-piece rods contained a ferrule that left much to be desired. When fiberglass and then graphite structure for rods came into the picture, these metal ferrules were anything but a smooth transition of forces.

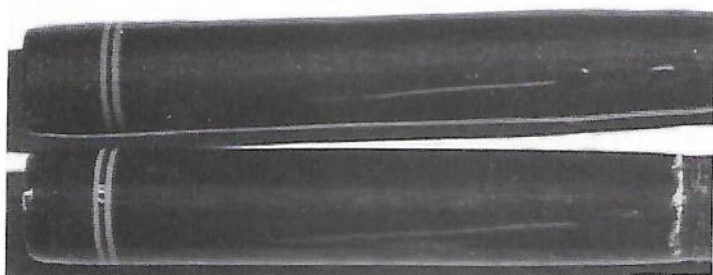
The Modern Era

Today's all-graphite and all-fiberglass rods contain ferrules that are truly an integral part of the unit. They are more than just a joint. Mostly, they are designed so that the rod flexes at the ferrule the same as it would if the ferrule did not exist. 2-piece rods feel and act as if they are 1-piece. 4-piece rods with 3 ferrules defy anyone to feel the difference from their 1-piece counterpart. I am speaking for mainline USA manufacturers - not the myriad of rods and blanks available for the price of a McDonald burger, which

are made offshore and which flood our drug stores and shopping malls.

It hasn't been too many years ago that most serious fishermen shied away from multi-piece rods, especially fly rods. A fly rod is a rod that you FEEL. More than any other type of fishing tool, a fly rod is judged first by how it feels, then second, how it performs. Ultra-light spin rods run a close second to fly rods for their "feel" characteristics and once again performance will take a second place to the feel. There was a time when the ferrule greatly influenced the feel of a fly rod or ultra-light, influenced it adversely. Not anymore. The ferrule of today can enhance the feel of a blank that would be either too stiff or too blah without the ferrule. These well designed ferrules have promoted a veritable explosion in the popularity of multi-piece rods. The 2-piece rod is no longer the only acceptable piece. Now three and four piece rods are just as popular. It appears as though the industry is settling on fly rods being of mostly 3-piece design instead of 2-piece, which means two ferrules instead of only one. And there is a wide acceptance of the 4-piece "travel" rods in both finished rods and blanks.

Some manufacturers have experimented with 5-piece rods but there is not the acceptance that is shown for the 4-piece and 3-piece designs. At least one of our manufacturers makes a six piece 8ft pack rod, for backpackers that fish the high lakes. As custom rod builders we have the ability to delve into this realm of multiple ferrule rods. I don't mean by simply purchasing a four piece blank and building a rod,



Two tip-over-butt sleeve ferrules. One factory made and one custom made. Can you tell the difference?

I mean actually constructing a 4-piece blank from a 1 or 2 piece blank. This, of course, will entail building a ferrule or two – but isn't that what custom rod building is all about? We also have the ability to take a finished rod, say a 1-piece, 8ft trolling rod, where experience has taught us that handling that 8ft length in our little sports coupe can be quite trying at times, and downright frustrating as well. If only it were a 2-piece rod we could handle the four foot length in our little coupe quite nicely. Rest assured, we have the know how and the wherewithal to accomplish that neat little trick, and the rod will never know the difference. Once we understand the effect of a ferrule on the blank, a whole new world of custom rod building will be open to us.

Goals

For the sake of brevity we will concentrate on two goals in the remainder of this article. First, making a 4-piece blank from an existing one piece blank. Second, making a 2-piece rod from an existing 1-piece finished rod. Once you have mastered the technique of these two separate conditions, you can apply your new knowledge to all sorts of different situations and a whole new world of custom rod building will be open to you. I know quite a few custom rod builders, and know that many are simply not cut out to make ferrules. Most are simply not equipped with either the tools or supplies to tackle the job. So before embarking upon what may be a frustrating journey to you – first determine if you have the necessary tools, supplies and frame of mind.

- **Tools.** Cutting a fiberglass or graphite blank is best done with a dremel rotary cutting disk or a 3 corner file. Never use a saw of any kind.



- **Supplies.** A goodly supply of scrap pieces of fiberglass rod blanks is recommended.
- **Frame of mind.** Some builders simply cannot make themselves mutilate a perfectly sound rod blank, especially a blank which may have cost them considerable dollars. If you have any compunctions about cutting up a blank, don't get into making ferrules.

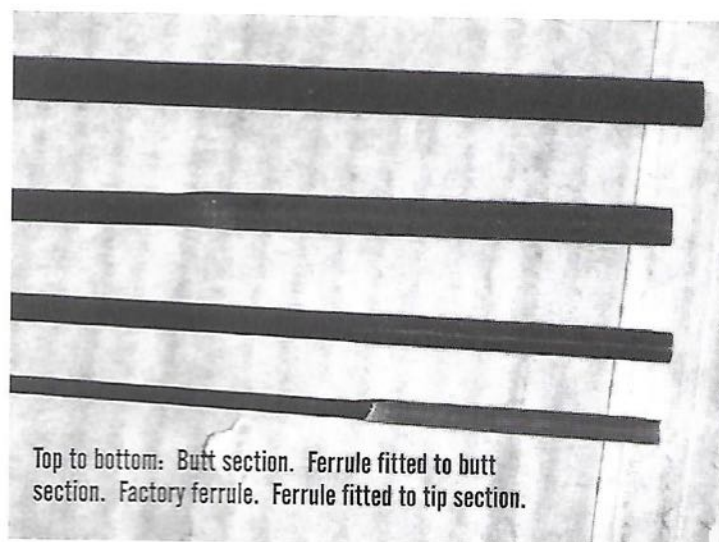
Design Principles

Before venturing into the actual cutting process it is best to be sure we understand a few basic principles about ferrule design. First and foremost, ferrules to me are always 'tip over butt'. This makes them external to the rod section, which makes them always a female piece fitted to the tip of the next lower piece of rod. I have experimented loud and long with plug ferrules, known as spigot or plug ferrules, and have concluded that they have no place with the "roll your own builder". I don't particularly like them, even on factory rods, but that's merely a personal opinion.

Ferrules are always made of *fiberglass* rod sections, never graphite. When we are modifying a fiberglass rod, the ferrules will be made of fiberglass – when we are modifying a graphite rod or blank, the ferrules will be made of fiberglass. Our making of ferrules utilizes existing rod blanks. Graphite is entirely too stiff for the making of ferrules, and it does not contain satisfactory hoop strength resulting in the splitting of many pieces. (ed. note - remember that all things being equal, a larger tube diameter results in more stiffness. With a graphite over-sleeve, the walls must be reduced to the point of greatly reduced durability if the stiffness is to remain similar to the section of blank it is being fitted to. Thus for anyone who wishes to make their own ferrules, the author's cautions about using graphite tubing for these type fer-



Top: Butt section of blank. Top half of butt section ferrule fits into butt section. Bottom: Top half of tip section ferrule fits into lower half of tip section.



Top to bottom: Butt section. Ferrule fitted to butt section. Factory ferrule. Ferrule fitted to tip section.

rules should be heeded.) A graphite ferrule will make an otherwise usable piece of graphite blank totally worthless as it stiffens it to an unacceptable degree. Graphite can be used for spigot ferrules - but I digress. We don't need to mention those unmentionables.

Since we are using basically the same material for the ferrule of both fiberglass and graphite, should we expect the same results? We can expect it, but that won't make it happen. Keep in mind that there is a little law of physics known as Modulus - Young's Modulus to be more precise, that overrules the best of our expectations. The fiberglass sections have a very low modulus, while the graphite sections have a very high modulus. Relatively, they are very far apart on the stiffness scale. We can take a piece of each, bend them and feel the difference in stiffness. This is why graphite can be made with a much thinner wall section, be much lighter in weight and still have more power to throw a lure than its fiberglass counterpart. So visualize taking a four foot piece of fiberglass - and a four foot piece of graphite both about the same outside diameter and approximate same stiffness to our senses. If we cut each piece into two 2-foot sections and join the sections again with our fiberglass tip over butt ferrule, the fiberglass piece will be stiffened - while the graphite piece will be softened. Recognition of this basic parameter is essential for successful building of multi-ferrule rods.

Getting Started

For starter's let's go with building a fiberglass travel rod from a 1-piece blank. We want to make the rod a 4-piece rod and we want to wind up with an 8ft fly rod, probably about a 4 or 5 weight model. We noticed that sale advertised by our favorite distributor and wisely picked up two identical blanks at give-

away prices because they happened to be seconds. Since we intend to cut them all to pieces anyway, they could be thirds or fourths and we couldn't care less. There just won't be any blank out there that is not structurally sound. They may be crooked, have blemishes in the finish, maybe slightly out of tolerance on the taper, or any of the many cosmetic quirks that haunt blank making - but they will be structurally sound or they wouldn't be out there. Chances are very good that when we have finished with cutting the blank into pieces, any cosmetic blem that caused it to be a second will have disappeared.

We have in our possession two identical fiberglass blanks 8ft in length. One will be sectioned for the 4-piece blank, the other will be used for the ferrules. Choose the one that is to be used for the blank; measure it to be sure that it is exactly 8ft in length. If it is an inch or so longer that means that there is probably tooling excess that has not been trimmed from the base. This excess will be a handicap later on, so it is best to get rid of it now by cutting it off. With your blank measuring exactly 8 ft, make a pencil mark at the exact mid-point, then measure 1 inch toward the tip and make a scribe mark. Wrap a piece of masking tape around the blank at this scribe mark to act as a cutting guide and cut the blank in two. I use a flexible shaft Dremel with an abrasive cutting wheel - or sometimes a 3-corner file. Do not use anything with teeth - such as a hack saw. When you have two pieces of blank instead of one, square off the ends with a sandpaper block. Treat these ends with care. Now take the tip section and cut it exactly into two equal pieces. You now have 3 pieces of blank, one of them 49" inches long, and two of them each 23.5 inches long. Your butt section needs a slightly different measurement than merely cutting in the middle. We want all four pieces of the finished rod to be the same length - within reason. Visualize at this point,

your 2nd, 3rd, and 4th sections. They will have attached to their butt ends a ferrule which will extend the length of that section by 1&1/2 to 2 inches. If you cut your butt section the same length as the 2nd section, the butt section will be 2 inches shorter, unless you extend the handle in which case the finished rod will be 8 feet 2 inches and we are shooting for 8ft total. So it is necessary to cut the butt (handle) section so that it will be the same length as the 2nd section with ferrule attached.

Your tip section has been cut into two equal lengths. When they have a ferrule attached, that will extend them about another 2 inches. So your pieces are each going to be about 26 inches long, give or take a half inch or so and since this is our very first attempt let's not quibble about a 1/2 inch here and there. So now, we can measure from the butt and make our mark 26 inches from the end, or we can use one of the two pieces from the tip section – measure from the high end and cut it to be the same length which should leave our butt section at 26 unless we screwed up somewhere (which is quite common for me when I get involved in all this higher mathematical stuff).

Remember now, we agreed that a half inch or so here and there is nothing to quibble about on this, our first attempt. We can be more accurate on future projects once we get the hang of this Quantum Physics mathematics. For now if we're off a bit here and there let's just split the difference, with the goal in mind, that all four pieces will end up at about the same length, and they will all be about 25&1/2 or 26 inches when completed.

Putting It Back Together

So now let's put it all back together. So far we have cut up one blank and utilized every inch of the cut up blank. Now we are going to cut up our second blank and utilize less than a foot of the entire blank and throw the rest of it away. (Don't throw it away literally – merely figuratively. Save all the pieces for future similar projects.) This program will give you a feel for what it takes to do this type of customizing and if it turns out to be your cup of tea you will be collecting boxes and trunks full of similar pieces. A real handy tool to have about now is a good quality micrometer or caliper. If you have one handy, measure the OD of the extreme butt end of your tip piece. It will probably come out to be something in the neighborhood of .200 inch, give or take about .020 thou or so. Lets call it .200. Now with your caliper measure the wall thickness at the butt end. You will find that to be about .020". This is the exact spot that we want to apply our first ferrule which will be external to the rod section. This means that the ID of the

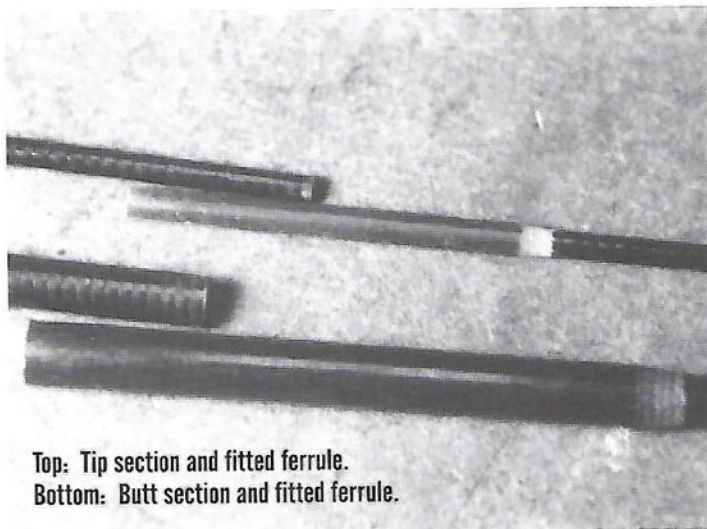
ferrule must equal the OD of the rod at this point. However we have nothing but a complete uncut blank with no way of measuring the ID at the point of interest. So let's do it with the OD which we can measure with our calipers. We want our ID of the ferrule to match the OD of our tip end. With your calipers find the location on the uncut blank that is .240 in dia. And that point will be .200 ID. How did we arrive at that figure - .200 plus .020 wall thickness, twice and we have located the point on the uncut blank that matches the butt end of our rod tip section. If you match your rod tip section with the tip of the uncut blank, (lay them parallel to one another) you will find this point to be about 10 inches or so from the butt of your tip section. So you are safe if you measure about 5 or 6 inches down the blank from the butt of the tip and make a cut. You are cutting off the top 29" (approximately) of the blank. Set aside this cut off piece as it will not be used in this program.

All of these numbers are only approximate. They will vary to a great degree with the weight, length, taper, and resin makeup of the blank. These numbers are meant to give you a general idea of where to start. Now with one end cut off from our ferrule material blank, we are ready to fabricate the first ferrule. Take your tip section from your blank pieces, and drop it down through this ferrule material blank, tip end first, until it emerges out the other end where you cut off the 29 inches. It should protrude through the cut-off area until about 6 inches of the butt end jams and won't go any further. This might be 4 inches, or 6 inches or whatever. This area now defines our first ferrule. Examine and measure how much of the tip section is jammed into the ferrules blank. Make a mark where the butt end of the tip section can be seen through. Sometimes a strong light in the background is necessary.

Now remove the tip from the blank and wipe it off very thoroughly. Clean it good. Reinstall it the same as before and see if there is any difference in its location. A very small amount of buildup on the surface of the rod section will cause an unacceptable variation in the positioning of that section. Be very sure that the surface is free from any foreign object buildup on its surface. You are playing with two nearly parallel surfaces. Residue from the cutting or sanding operation is sufficient to prevent the surfaces from matching at the proper point.

Careful Cutting/Measuring

If we were matching two exactly identical parts, we could cut our ferrule net at this point. However the two pieces do not match exactly so it's best to be a bit prudent in the cutting. Your first ferrule - the tip sec-



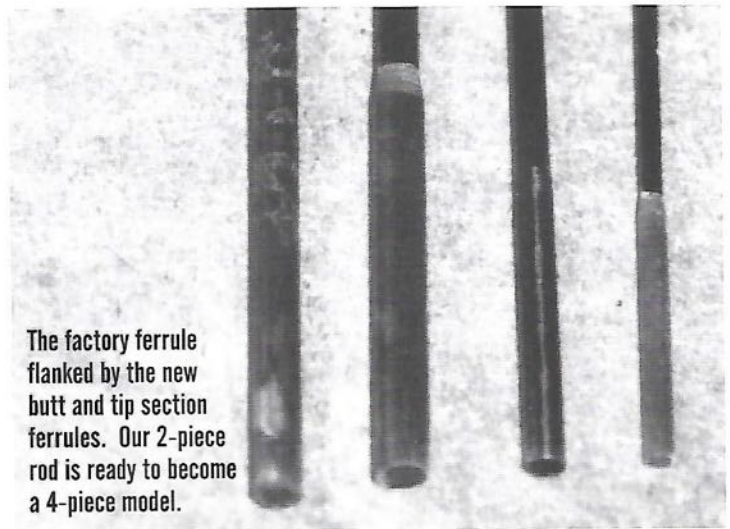
Top: Tip section and fitted ferrule.
Bottom: Butt section and fitted ferrule.

tion ferrule - will wind up about 2 to 2½ inches in length when it is completed. About 1⅛ inches on each side of the butt end. So make your first cut on the ferrule-to-be at the point which overlaps your tip section about 3 inches. Be sure your surfaces are clean when you fit them again. Cut off the piece so that you have about 3 inches of ferrule on the other side. You now have your ferrule-to-be, free from the main piece and it is about 6 inches long. There is a lot of wasted material here, but this is better than making a wrong cut and seeing your ferrule slip off the end of your tip into oblivion. You will get a better feel for these cuts as you make more of them.

Now with a 6 inch long ferrule in our hands the next task is to whittle it down to size. Do this very carefully and cautiously. First fit the end that will attach to the tip section. If you still have 3 inches there, cut off an inch and fit it carefully and be sure that both surfaces are spotless when you do your fitting. If it fits well, cut off the other end and leave about 2 inches for ferrule. Now your ferrule-to-be is about 4 inches long and should fit and look pretty good. It's time for a final fit.

Final Fitting

The inside of your ferrule needs to be cleaned. Just before final fitting is the best time to do this. A rotary sandpaper tool is the best thing I have been able to come up with. Take a piece of dowel or a piece of scrap rod section, slot one end and install a ½ inch wide piece of medium grit sandpaper, about 280 grit. The other end can be chucked in your lathe, used with a hand drill, or merely twisted by hand to clean out the inside of your fiberglass pieces. When the piece is clean on the inside and the tip section is nice and spotless on the outside, match them one more time and make your final adjustments.



The factory ferrule flanked by the new butt and tip section ferrules. Our 2-piece rod is ready to become a 4-piece model.

A tip section of this size will need about 1¼ inch of ferrule length and about 1 inch of bond length so your completed ferrule will be about 2¼ inches long. Now we do need about ¼ to ⅜ inch for taper on the bonded end but this taper section can be included in the total length rather than added to it. The taper at the ends of each ferrule is very important not only for aesthetic reasons but also for structural reasons. The taper will help distribute severe bending loads that would otherwise be concentrated at that point. Concentration of these loads could result in a broken rod.

A disk sander or belt sander is ideal for tapering the ferrules. The end which will be bonded is the end that is to be tapered. Hold the finished ferrule by its other end and with a twisting motion sand the end into a very flat taper, as flat as you can manage. 15 degrees is ideal. Taper it down to a feather edge. If you do not have a power sander, the edge of a power grinder can be used. If you have no power tools, you are stuck with doing the tapering by hand. A sanding block is essential for this job and you will need a medium/coarse grit sandpaper. About a 180 to 220 grit does the job just fine - it just takes longer, is all. Apply the ferrule end to the stationary sanding block, twisting and rubbing until it is tapered to a feather edge. During the tapering operation a lot of sanding dust will accumulate inside the ferrule. Be sure it is all cleaned out before any fitting operation is performed.

The Other Ferrules

Actually we're getting a bit ahead of things; this tapering operation should be performed only after all the ferrules are fitted to a net size, so let's get at the other two ferrules. You now have in hand one ferrule which fits over the tip section, overlaps the butt end

of the tip section by about 1&1/4 inch or thereabouts and in which the top end of the next section nicely fits into that overlap. It should fit into its ferrule snugly to a distance of about 7/8 inch and the two pieces should have about 1/4 inch between them. This space will be reduced to about 1/8 inch later. Now take your second section, the one which fits into the tip ferrule so nicely, and drop it down through the ferrule material blank so that it protrudes from the other end with several inches of overlap. Just the same as we did with the tip section. This ferrule wants to be a little longer than the tip section ferrule. There are more stringent bending loads and the diameters are a little larger. In this case the finished ferrule wants to be about 3 inches long. The ferrule will wind up about 1&1/4 to 1&1/2 inches and the bond area about the same. Creep up on the final length in stages just as we did with the tip section.

Repeat the same operation for the butt section ferrule. Now it should be apparent why you cut your butt section an inch or so longer than your other 3 sections. The ferrule for the butt section wants to be a little longer than the second ferrule. It will probably wind up being about 3&1/2 inches long. You will want the ferrule section to be about 2 inches and there will be about 1&3/4 inches of ferrule with about 1/4 inch of space between the two sections. All of these numbers are approximate. Make them pretty and proportional. Keep in the back of your mind that each ferrule wants to have about 5 diameters of overlap to be structurally sound and much more than that will unduly stiffen the assembly and is simply not necessary.

Bonding

Now you have 3 ferrules, they are all cleaned inside, and fit each piece nice and snug. Time to make a permanent joint. I have experimented with several bonding methods but haven't found anything to equal our rod building epoxies for this job. I use only Rod Bond, not because I'm partial but because it actually wets better than any other product that I am aware of. (Surface wetting is important for proper adhesion.) Some of the epoxies are much too dry while others create an unsatisfactory thick glue line, raising havoc with our painfully acquired tolerances. Rod Bond wets well, needs no allowance for glue line, and the finished assembly is indestructible.

Fit your finished piece of ferrule over its mating tip and mark where you want it to be when the glue has cured. A pencil mark adjacent to the tapered end is satisfactory. Now slide the ferrule out of the way and apply your mixed adhesive onto the rod section; be sure and coat the area 100%. Slide the ferrule over

the coated end and twist it several times in order to thoroughly coat both surfaces. The adhesive will act as a lubricant between the ferrule and the rod which is why you marked the area for the ferrule to be located. When you have both surfaces coated and the ferrule assembly located in its proper place, you have to clean out the inside of the ferrule which was coated with your epoxy bonding agent. Small ferrules can be cleaned out with a cotton swab. Use a dab of alcohol - either IPA or denatured - then finish by taking your piece of rod section that fits into the ferrule, insert it into the ferrule and twist it around a few times. Remove and wipe off the tip (male section). Now you are sure that your ferrule fits and has no obstructions left over from the bonding job. Bond all three of your ferrules in this manner and set aside to cure.

The ferrules must now be wrapped with rod winding thread. Before wrapping, check the junction between the tapered portion of your ferrule and the rod section. It must taper to a smooth transition with the mating surface so that the thread will have a smooth uphill road to follow. If you have a rod lathe the job is simple. Smooth out that area by turning it on the lathe and honing it with whatever tool you use for that job. I use a tiny chisel tool which I made from an old discarded dental tool. If you do not have a rod lathe, the best "dresser downers" that I know of are the big sandpaper fingernail rasps that the gals (guys too I suppose) get in most drug stores for about a buck apiece. They are perfect for this kind of job. A smooth transition in this area adds greatly to the final product.

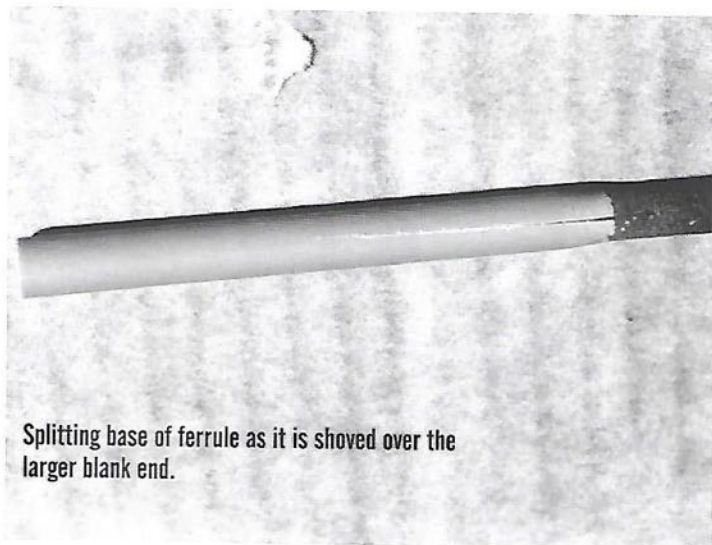
Now wrap each ferrule with your chosen color of thread, apply your favorite rod finish and VOILA! You have in your hot little hands a neat four-piece travel rod blank ready to be made into a genuine fishing tool. You now have not only a neat little 4-piece blank ready to be transformed into a thing of pride and beauty and which just might catch a fish or two in the process but also several odd pieces of cut up blank with no apparent usefulness. If you think that this blank cutting business might be your bag, never throw away any piece of any blank. Their usefulness will become quite apparent as you delve deeper into the art blank destruction! I know of many quality custom builders who look upon this mayhem as pure madness. So learn to tread gently and speak softly when venturing beyond your own borders.

Another Ferrule Application

Now let's take a look at that 8ft one-piece trolling rod that your friend with the sports coupe has such a bad time transporting from home to boat. We want to install a ferrule at the mid point of the rod or a close



Relative sizes of 3 ferrules for 4-piece rod.



Splitting base of ferrule as it is shoved over the larger blank end.

as is practical taking into consideration guide location. First, locate the midpoint of the rod, then make a pencil mark about 1 inch toward the tip. Check to see if that point is at least 6 inches from the next guide toward the tip. If that next guide is 6 inches or thereabouts from your mark, go ahead and cut the rod in two at that point. If you are too close to that guide then you will have to move your point toward the butt, and the two pieces will not come out even, which is no big deal. You want to be about 6 inches from the next guide toward the tip and about 3 inches from the guide toward the butt to make your cut. Make this cut very carefully and dress off both ends as this is still your finished rod. There is no excess here.

Good Hunting

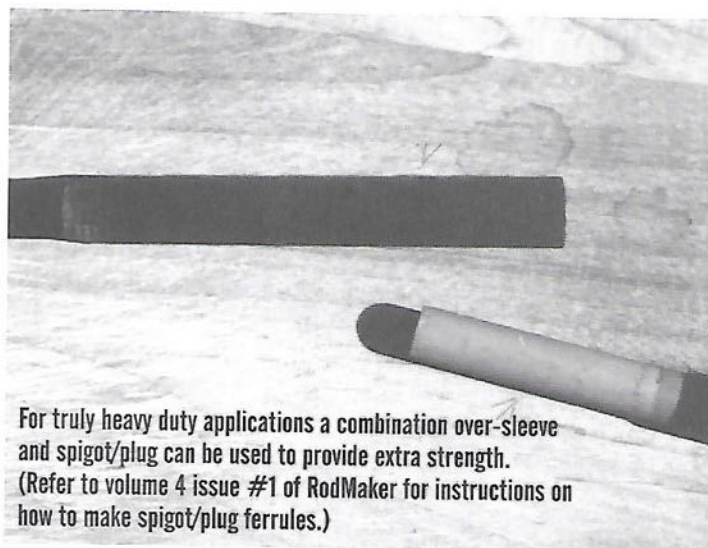
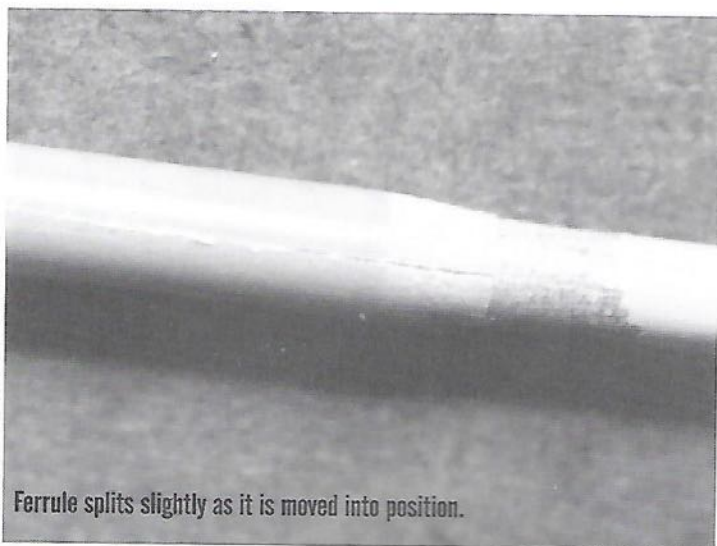
Now take the butt end of the cut-up rod and let's go looking for a ferrule. The cut end of this piece will become the male portion of the ferrule-to-be. Be sure that this area is dressed properly so that the contact area is the "resin of the rod structure" and not a decorative paint. If this is a painted rod remove the paint for a distance of about 2 inches from the end. Take a look at all those cut up pieces from your 4-piece travel rod that you just completed. That excess piece from the butt end looks about right. Try and fit it over the butt end of this rod. How about that! It fits pretty good!

There is about 3 inches of overlap on the butt and you need only 2 inches so were in good shape. The length of the scrap piece is about a foot, so we have all the makings of a ferrule. Make sure that the taper is satisfactory. Twist it on and off the male ferrule several times and note the markings. If they are uniform and you cannot detect any apparent wobble, the fit is satisfactory. But if the markings are all on

one end and you detect a wobble, then we have to look for another piece. (But this piece looks good so let's go on with the project.)

Make sure that your male piece is fit to the "ferrule to be" nice and tight, then mark and cut it so that you have 2 inches of ferrule. Trim it net carefully as this is your NET ferrule. You will need 2 inches plus a taper on the other so make a mark and cut your ferrule to a length of 4 & 1/4 inches. Now you have a ferrule which fits the butt end - male ferrule - but is not attached to the tip end. Since there is a taper in the rod, the ID of the ferrule is smaller than the OD of the tip at its end. So how do we get it to fit? We could remove all the guides and slide it over the tip and bond it in place, then replace the guides, but there is a much more simple and quicker way to achieve the same goal. Here is where you need to learn good sound tapering technique. You need to taper this ferrule very long and flat. A power sander is almost essential. I have never been able to accomplish this feat by hand. Taper it to a feather edge and the taper section should extend about 3/8 inch long. Now fit this feather edge of the ferrule against your tip section and force it onto the rod. Since the feather edge is quite weak and fragile, it will not offer much resistance. The further you force the piece onto the rod the more resistance will be encountered. After you are onto the rod about a half inch or so, it will be quite tight. You might have to use a hammer at this point. Use a rubber or nylon hammer and actually pound the ferrule onto the mating section. This will split the ferrule, but it will split only on the lower third. After the ferrule has split, it will easily go on the rest of the way.

Now you can see why you need to be about 6 inches away from that next guide. You will have to slide the ferrule toward the guide so you can expose the area to be bonded. You are now in for a rather



tricky operation. You have to bond the ferrule to the rod with a good epoxy rod bond, but you must tightly wrap the ferrule over the bonded area while the epoxy is curing. I take a piece of scrap that fits the ferrule and use it as a chucking tool, then start my wrap about an inch below the ferrule to get a good grip on the assembly. Use size D thread and wrap very, very tight. You want to try and close the crack/split you just created in the ferrule. There will be a lot of adhesive squeeze-out from the split but just leave it. It will be cleaned up later. This is only a temporary wrap for the purpose of applying pressure for the bond.

Extend your tight wrap the full length of the bonded area and tie it off. Remove your chucking tool (if used) or you may find it bonded in place in short order. Clean out your ferrule while the epoxy is still uncured. When the epoxy has cured, cut off the temporary wrap and clean up the ferrule. Smooth out and dress down the split area and the taper area. Now wrap the ferrule with a permanent wrap. Coat with your favorite rod coating and you are there.

Be sure and fill the hollow end of the butt section with the same Rod Bond that you bonded the ferrules with. Fill the end to a depth of about 1/2 inch. This supports the blank as it compresses each time it is inserted into the ferrule. This constant compress and release can cause the ends to exhibit a frayed condition and/or tiny cracking and eventually the ends will split.

Further Projects

You have now been introduced to the basics of ferrule manipulation. Your next project should be to take a two-piece rod and make it into a four-piece by making a ferrule for the cut-up tip section and another ferrule for the cut-up butt section. Only this time you will have to scrounge up ferrule materiel from what-

ever scrap pieces you are able to accumulate. If you decide to get into this type of madness you will find yourself accumulating scrap pieces by the bushel. After you have collected a bushel or two, you will learn when to use a heavy-wall piece and when to make it a light structure. What tapers are the most useful and which ones are useless. So much to learn and all from scrap heaps of junk.

What To Expect

I have flexed, to destruction, many of these home-made ferrules and cannot see any difference in the bend strength between these and factory ferrules. I have found that on the heavier graphite rods the fiberglass ferrule should be double wrapped. This is never necessary on fiberglass blanks, however.

On the much heavier and very powerful type graphite rods, it is sometimes desirable to add a spigot to the butt section, which goes inside the tip section and works in combination with the external "tip over butt" ferrule. In essence a double ferrule which will withstand the most extreme of bending loads.

If I was more mathematically inclined I could probably calculate the break point of the two different designs and make you a chart showing why the square root of the sum of the diameters squared, is equal to the square root of the sum of the lengths, times the mass of the blank before cutting. However this wouldn't make you a better rod builder, nor a more efficient ferrule maker. So we'll stop here for now \angle

The author is a retired Boeing employee and remains the formulator for the Trondak U40 line of rod building products. He spends a great deal of time perfecting rod repair and modification techniques.