This article first appeared in the Volume 6 #3 issue of RodMaker Magazine

*Please remember that altering a rod blank in any way, including extending it, may void the manufacturer's warranty.

EXTENDING ROD BLANKS

by Tom Kirkman

For many custom rod builders, building custom rods and performing rod repair just go hand in hand. And those who do offer rod repair become privy to all sorts of rod construction techniques that they might not otherwise be exposed to.

Early in my own rod building and repair career, I was asked to replace the dirty, worn, pitted and chipped cork grips on a Garcia Conolon 5-Star surf rod. I'd replaced grips before so this wasn't any particular big deal. However, as I removed the existing cork I found that instead of the expected rod blank, there was an aluminum tube underneath the grips and reel seat. Just an oddball I thought. Somebody's earlier refurbishing job maybe. By the time I'd found the same construction method in place on several more and similar surf rods, it became apparent that what I was seeing wasn't the work of another repair person or tackle tinkerer, but a routine rod building technique used by several highly respected commercial rod companies.

I could see the wisdom in building handle assembles on a separate piece and then mating them to the blank later - companies could assemble handles en masse in one place, make and wrap blanks in another, and then join them up as needed. The same handle assemblies could even be used on several different rod models, making for greater efficiency of scale in the workplace. I also saw something else - the ability for a custom rod builder like myself to expand the possible range of rod blank applications on custom rods by lengthening existing models with an extension. If it was proven to work on the best selling models of the highly respected commercial rod companies, then it might work on mine too.

First Attempt

My first attempt at extending a rod blank came at the request of a customer who was searching for some particular 9 foot spinning rods. He needed to be able to throw fairly light lures and plugs, maybe 1/4 ounce or so, and throw them a long way, but still have a ton of backbone and power for fighting his quarry - 75 to 100 pound schooling tuna. The guy had found a new way to take these fish from his boat but couldn't find the tackle that would allow him to do it. I immediately suggested a "hot-shot" style blank because of its very fast taper, light tip and tremendous power down through the mid and butt sections. We pored through blank catalogs and found a few models that had the power we were looking for, but none had the length. We were stuck at about 7 feet, 9 inches, which just wasn't going to do what the customer needed the rod to do.

Although most fishermen would never know it, the rod on top was constructed by joining similar pieces to those shown in the bottom of the photo. The handle was constructed on a section of aluminum tubing and the blank, fitted with foregrip, was then inserted and adhered to the handle assembly. Properly executed, the result is a one-piece assembly that is as strong or stronger than the rod itself. Being able to successfully extend rod blanks greatly expands the rod builder's ability to provide the customer with the required rod for any task.

It was at this point that I got the idea that since this particular blank seemed perfect, maybe there was some way to make it work. The idea of building a handle on a separate piece of material and then mating it to the existing blank seemed like a natural. Without explaining how I was going to do this, I just told the customer that I could build exactly what he wanted. That was good enough for him - he ordered the rods and agreed to a date when he could come by and pick them up.

Hot-Shot blanks, by their very nature, are excellent candidates for being extended. The tapers are generally very fast which results in a fairly heavy and non-bending butt section. This puts the "lock-up" point well forward of the extension junction and takes some amount of possible shear forces out of the picture. I was convinced the junction of the extension and the blank could be made to hold up under the type pressure he'd be putting on the rods. I just needed to decide how to configure everything so he got the performance and the length he had specified.

I looked at scrap pieces of fiberglass and graphite. But I saw a problem in availability and being able to duplicate these rods if they caught on with other fishermen and I was asked to build duplicates in the future. Rummaging around in a local hardware store I spotted some aluminum tube. I remembered the old surf rods and decided that this was a worthy material and method to adopt.

I needed 15 inches in additional length. Working with the measurements for the required butt length and necessary overlap between the tube and blank, I ended up mounting the butt cap, rear grip and reel seat on the aluminum extension, and mounting the foregrip on the blank. (There was wisdom to this madness, as you'll see as you read along.)

The customer was immediately impressed with the finished product. Test casting the rod outside my shop, on his first cast he overshot the available casting area and tangled a good casting plug in some electrical wires which he had figured to be out of range. Two weeks later he was back with reports of no less than two 100 lb+ tuna taken from his boat with 3/8 ounce plugs and just 17 lb line! That did it - I got several more orders from his buddies to make identical rods for them.

Why Extend?

This particular customer had talked to several rod builders before me and none had been able to come up with what he wanted. They could get him a blank in the length he wanted, but not the power and action, or get him a blank with the power and action he wanted but not the length. This is the very predicament that confronts many rod builders in trying to build specific rods on blanks that just don't exist. Being able to extend a blank, in a structurally sound manner, suddenly expands the number of rods that can be built from the same number of available rod blanks.

Extending a blank isn't hard - you need a good candidate for extending, sound construction methods and a little bit of pre-planning. Other than that, it's easy and allows you to create rods that otherwise couldn't exist.

Common Sense Required

In some ways, it is impossible to outline every possible scenario relating to the extension of various blanks and the pieces that might be used to lengthen them. Your own common sense must be relied upon in determining whether you have a good candidate for extending and whether the pieces and strategy you have chosen for the job will hold up.

Many of you reading this article will immediately see the folly in mating a rigid, heavy-walled extension piece to a highly flexible and very thin-walled blank with a junction point up around the the middle of the completed rod. Likewise, you'll also be able to predict what is likely to happen if you choose a light, thin-walled extension piece to mate with a heavy-butted, stiff and powerful blank that is expected to see use against powerful fish in a high-leverage situation. On the chance, however, that neither of these scenarios seems particularly disastrous to you, then extending a rod blank is not something you'll want to undertake without a bit more thought and reasoning. This is not meant to discourage anyone, but only to point out that a fishing rod is a structure that undergoes certain stresses during use. Any attempt to lengthen a rod with an extension that changes the overall structural characteristics of the rod is likely to result in a failure.

During my time spent building and repairing rods, I have seen some of the most oddball structural modifications that you can possibly imagine. This includes rod lengthening by the use of extensions. Sometimes I've been completely perplexed as to how the person who fabricated such a nightmare could possibly have thought that it might have stood any chance at working. Other times I marveled at how the maker spent a great deal of time and effort pouring in every conceivable method to add strength and durability, only to have these very things cause a failure. In every case of failure, the cause was the same - a failure to understand the forces that would be placed on the rod and how they would react upon the mating of the rod blank to the extension.

Armed with the information that follows, you can extend a rod blank and expect it to function normally and without failure. But I will repeat my earlier statement that due to the wide variety of pieces involved, good common sense should rule the day when deciding upon the best materials and methods for extending a rod blank.

Good Candidates for Extending

Remember what was said earlier about the forces that are placed on a rod and how we seek to maintain the way the rod handles those forces. If you have a structure that is flexing and it suddenly comes into an area that won't flex, well, you may have a problem. Yes, you can fashion an extension much like you might an oversleeve ferrule, sizing and tapering its leading edge so some continuity of properties are maintained across the blank and extension junction. But in most cases, we are not working with blanks that flex that deeply into the butt, not even under the heaviest expected loads. If we are, then you will have a more difficult time extending your blank and need to keep in mind the continuity of properties needed in your extension and mating methods.

In most cases, rod blanks are designed and constructed so that handles can be built on them and not create areas of stress which will lead to failure. This is usually accomplished by building the butt section of the blank in such a way that the taper and flexibility have pretty much run out before reaching the handle area. Any blank that is of medium to heavy-walled construction, and under full load shows little or no flex in the butt area, is an excellent candidate for extending.

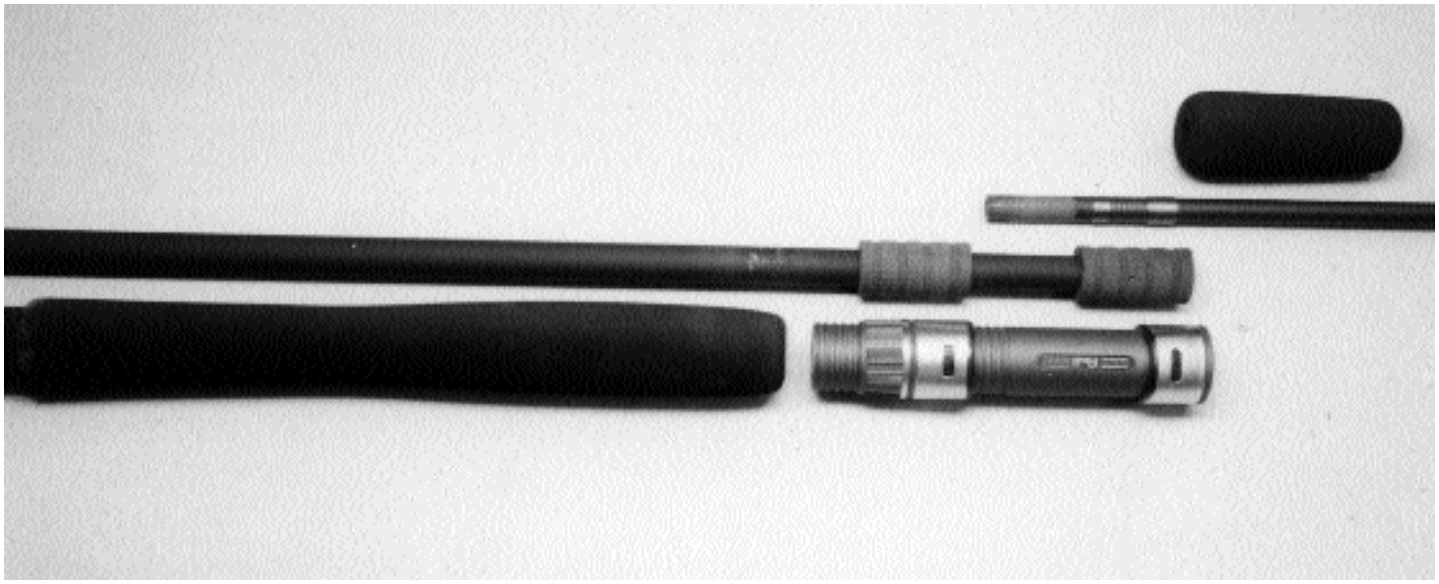
Don't, however, read this the wrong way. Even an ultralight blank which may seem too light and far too flexible to be a good candidate for extension may be safely and effectively extended if the flex and taper run out before reaching the area of the blank where a handle would normally be built. It's not so much the power of the blank that makes one blank a good extension candidate and another a poor one, as it is the particular characteristics of the blank. These would include the action or taper and the wall thickness to some degree. Generally speaking, fast and medium action blanks are better extension candidates than are slow tapered/action blanks.

When and When Not To Extend

Extending a rod blank would be so easy if rods weren't expected to ever bend. But they do, so our task is reserved only for the proper patients. Blanks that flex very deeply, well into the butt area, may not be good candidates for extending. Any time we suddenly alter the wall thickness, diameter or material at a point along the rod blank, we run the risk of disaster when the blank is flexed to that area. Luckily, we're not usually running our extension into the more flexible area of the blank. Most times, our extension is well back in an area of the blank that sees very little flex. If your blank's "lock-up" point (point after which the blank no longer bends even as more load is applied) is well forward of the extension to blank junction, you've got a good candidate for extending. If not, you had better select another blank, or carefully craft an extension that will provide similar flex characteristics to the blank at that point (the article on making ferrules in the Volume 4 #4 RodMaker may prove helpful in this regard).

Junction Location

In most cases, and considering the wide selection of blanks available today, it is rarely necessary to resort to any wild measure of lengthening to the point where our blank and



This photo illustrates another method of extending a rod blank. A scrap piece of graphite rod blank is used for the extension. The rear grip, rigid arbors and reel seat are mounted on the extension. The main rod blank has been slightly shimmed with thread in order to better match it to the taper of the extension piece. Epoxy is applied to all mating surfaces and the blank is inserted tip-first into the butt of the extension. It is then slid out until it seats in the forward area of the extension. After the epoxy has set, the foregrip is mounted on the rod blank and seated against the reel seat and extension piece.

extension junction ends up mid-point on the rod. In most cases we are dealing with adding just a bit of extra length and can do so, safely and effectively, working in the area of our handle assembly, or just forward of that area.

This is not to say that you cannot lengthen a blank much more and have a junction mid-point in the rod, but at that point you are faced with a more daunting task, much like constructing a ferrule on a multi-piece rod. We'll reserve such extension lengths for a later article.

Oversleeve or Innersleeve?

In almost all cases, your extension should oversleeve the blank, rather than fit inside it. This is not to say that an extension fitted inside of the blank can't or simply won't work - sometimes they do fine. But from the basic principles of stiffness to diameter relationship along with the resulting forces that come into play, an oversleeve is the preferred method in most cases. There is one instance where it may not be, however, and we'll cover that a little later in this article.

Good Extension Material

What to use for your extension section? The two best materials will be heavy walled rod blank sections and aluminum tubing. Let's explore the pros and any possible cons of both.

Aluminum - If you have a good hardware store nearby, you may be surprised to find just how many diameters that good aluminum tubing is available in. I have long preferred aluminum tubing for making rod blank extensions. Unless we're talking about something like big-game offshore rods, the chance of a split-out is nil, and we have a piece that is as strong or stronger than the blank we're mating it to. It's easy to mount components on such a tube and the length is easily arrived at by just cutting it to whatever length you desire.

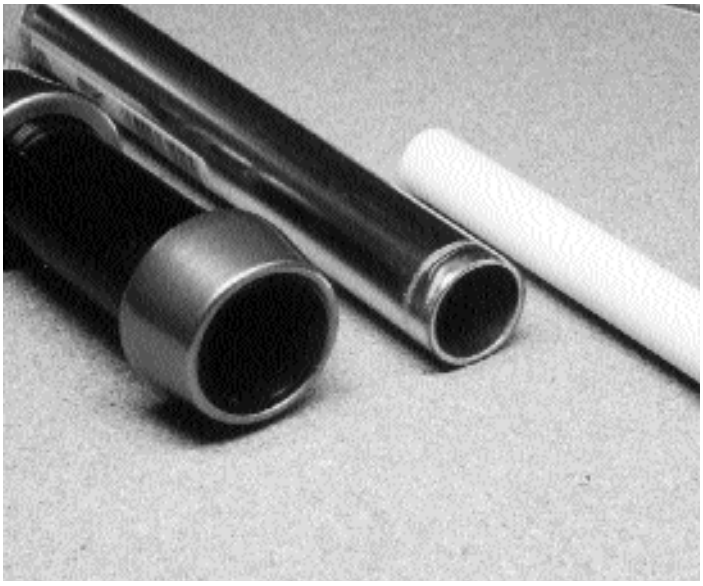
There are some special considerations when working with aluminum, however. The easiest way to cut the tubing is with a simple tubing cutter. By the nature of how they work, tubing cutters will leave a slightly dimpled and possibly sharp edge on the inside of your new extension. You need to remove this as it can damage your rod blank down the road. Use a file to cut/shave/deburr the inner edge and make sure the inside diameter at the mouth is uniform with the rest of the tube.

You also want to thoroughly clean your aluminum extension with alcohol and then scour the mating areas, inside and out, with a fine Scotchbrite pad. (See the RodMaker article on Water-Break-Free surfaces in the volume 5 #2 issue for more info on properly preparing surfaces prior to bonding.

Due to not having any taper, your rod blank will have to be fitted to the tube. Normally if you select an appropriate sized tube that is very close to matching the rod blank you won't have much to do. But the rod blank butt must be relieved of any taper in order to mate properly with the tube. Do NOT sand or file it however - we'll create a non-tapered area on the rod blank butt which will perfectly match our aluminum extension.

With luck, the outside diameter of the extreme butt of your blank will hopefully come close to matching the

Good quality aluminum tubing (left) is excellent for use as a rod extension. Heavy-walled rod blank sections (right) can also be used successfully for making extensions. Rod blank sections, however, should be reinforced at their forward edge to guard against a split-out under load. You can do this by tightly wrapping the forward edge with rod wrapping thread and epoxing the resulting reinforcement wrap.



An ideal situation is created when you can mate your rod blank to the extension and locate the reel seat directly on and at the junction of the blank and extension piece. Here, a boat rod blank will be fitted and adhered inside an aluminum tube upon which an alumiunm seat will be located. Due to the straight taper of the tube ID and the tapered OD of the blank, some shimming will be required.

extension's ID. If it does, you can probably use thread bushings to increase the diameter as needed, as you move up from the very butt end of the blank. For instance, you may find that you need one layer of D size thread a inch or so up from the butt end. And then 2 layers of D sized thread an inch or so past that first thread bushing. Get the picture? Your thread bushings need to be layered so that their final OD, when wrapped at any point along the blank's butt end, is the same. This creates a non-tapered butt for insertion into our extension.

You can use other materials for this same job. Fiberglass drywall tape is excellent. Brick foam arbors, bored, reamed and mounted to the blank, are great when you have a lot of space to take up between the ID of the extension and the OD of the blank (but again, size your tubing so that this sort of thing is kept to the absolute minimum).

The one area where I would caution against an aluminum extension would be for use in offshore trolling or boat rod type fishing where the rod will be support in a rod holder during the strike. Most of the common hardware store type tubing that I'm talking about here is more than adequate for most types of fishing, but a rod held securely in a holder while a large and powerful saltwater fish makes a powerful strike can crumple the extension piece. This is just one more area where your own good judgment relating to what your various pieces can withstand is extremely important. Certainly there are ways around this - heavier walled tubing, double sleeving, stronger aluminum tubing, etc., but again we'll save that for another article and the slightly different techniques required for extending any of these heavier, more powerful type rods.

Rod Blank Pieces - A scrap piece of blank can work fine and if it's tapered to match your blank then the fitting of those two parts will be much easier. But if you choose to use a scrap piece of rod blank, it is recommended that you select one that has fairly beefy walls - at least as beefy and hopefully even moreso than the blank butt you are working with.

The fore end of your extension should be wrapped tightly, similar to the way you would reinforce a female ferrule, in order to reduce the chance of a split-out occurring at that edge. Here, however, it is almost impossible to use too much thread tension. No need to go overboard, but feel free to wrap your thread much more snug, or tight, than what you would normally use for guide wraps.

There are other ways to reinforce that forward edge as well. Strategically locating the forward edge so that it falls under a snug fitting reel seat, or so that a reel seat arbor sits directly right on top of it, are two excellent ways to make certain that the extension to blank junction is immune to split-out woes.

Heavy walled rod blank sections of either fiberglass or graphite do make excellent extension pieces. It is important that whatever material you choose, the piece is fairly strong and stiff within the confines of the rod you're creating. By this I mean that what will suffice as an extension on an ultra-light rod won't necessarily be strong enough for use on the type rod I began this article talking about. Always err on the side of too much, rather than too little in regards to your extension piece. The extension piece

Another photo of a rod blank being extended by use of a heavy walled graphite rod blank section. As the taper of the rod blank does not exactly match the taper of the extension piece, shimming with thread is required to obtain the proper fit.

In the preceeding photo, you will note that a reel seat arbor is located directly on top of the blank to extension junction. This helps to prevent a split-out at this critical point. The foregrip is then mounted to the rod blank in the usual manner and slid down against the reel seat.

should certainly be as stiff or stiffer than the rod you're mating it to. Decent wall thickness is a must (large diameter pieces with thin walls can be stiff, but not very strong).

I like graphite pieces in most cases. It will be stiffer than pieces of fiberglass of the same diameter and wall thickness. Unlike when we choose pieces for making oversleeve ferrules, flexibility is not needed here so graphite is an excellent choice for a good extension.

If you can find a piece that allows you to slide your blank inside it and fit taper to taper, much like commercially made collapsible rods (bass flipping sticks are a good example) so much the better. If not, then you'll have to fit the rod blank into the extension piece by similar means to that referred to earlier in the section on aluminum extension pieces. However you do it, strive for maximum contact area between the pieces.

Adhesive

I have successfully used both the liquid thin-viscosity epoxy as well as the gel type (Rod Bond). I would recommend Rod Bond as the first choice but don't be afraid to use standard two-part liquid epoxy if that is all you have. If you follow correct bonding procedure - parts are cleaned, scoured/deglossed, and all mating surfaces are carefully coated with adhesive, you can be assured the joint will stand up to normal fishing use. I greatly prefer the Rod Bond's gel consistency and the fact that it retains excellent strength in joints where the fit is not perfect and thus use it when any discrepancy between mating surfaces exist. However, when the fit is perfect or at least extremely close, or I have used brick foam arbors or a scrap blank section bonded to the blank and then sanded/turned to perfectly fit the inside of the extension piece, I have no qualms about using either of theses types of epoxy adhesive.

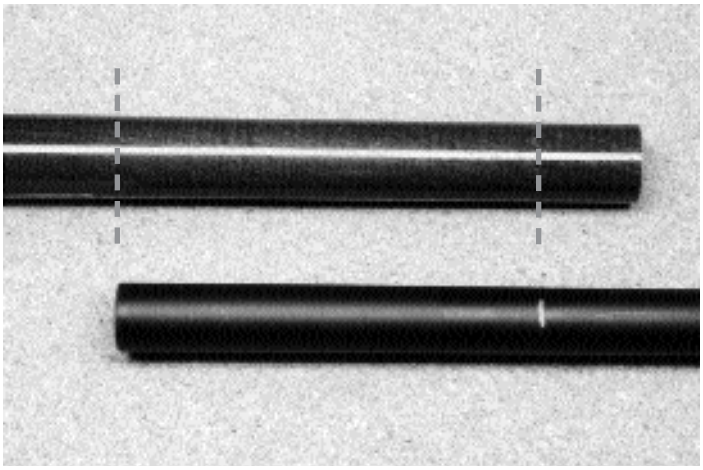
Overlap Length?

Well, if you don't have enough overlap at the extension to blank junction you're asking for trouble. And if you have too much, you're wasting material and adding unnecessary weight to the finished rod. So how much overlap is necessary?

Yes, there are ways to calculate the proper overlap, but there is no single formula to use when you are working with a wide variety of materials and various wall thicknesses. And let's face it, with so many various blanks and extension pieces of varying materials, strengths, diameters and wall thicknesses, the absolute in one case may not be correct in another. What we rod builders need is a good rule of thumb that will work for almost anything and everything we're likely to employ when extending a blank. And we'd like to ensure that it provides just the slightest margin of overkill for just about any good extension candidate that a rod builder is likely to use, regardless of the myriad variations in blank diameters, wall thicknesses, etc.

Because I can't control what anyone reading this article might choose to do with the information, nor be there to check the suitability of the pieces you have selected for extension purposes, the ratio of diameter to overlap I'm going to supply you with will, in nearly all cases where suitable pieces have been selected, contain a bit of overkill. Since we're working down low on the rod, in the handle area where just a bit of extra weight won't really affect rod performance or balance, this isn't necessarily a bad thing. I will mention that using any amount of greater overlap than

Any mis-match between pieces must be taken up by shimming in some manner. Most of the time, bushings of fiberglass drywall tape, or even simple thread bushings (shown above) will suffice. Notice that in the photo the extension piece has been shimmed with thread to properly fit the reel seat.



In more demanding applications, you should strive to obtain 100% surface contact between all mating surfaces. One excellent way to do this is by oversleeving your main rod blank with a section of scrap rod blank (above) and then turning/sanding to perfectly mate with your extension piece (lower). In this case a tapered rod blank was fitted with an oversleeve which was then sanded to perfectly fit the interior of the non-tapered aluminum extension piece.

what I suggest won't buy you anything else, however, except extra weight (your extension junction will not be any stronger or more secure) which at some point definitely will begin to affect things like balance and performance. So if you must use more, please be conservative, and in no situation, should you use less.

So, let's set the overlap distance so that it is a length which is equal to 6 times the blank's butt diameter. This general rule of thumb will serve you well in almost any well thought out extension scenario. Again a bit more won't really hurt anything, but in no case should go less.

So if your rod blank's butt is about 1/2 inch OD, you'll want a total overlap of not less than 3 inches. If you've got a blank with a butt diameter of around an inch OD, then you'll need about 6 inches of overlap. Again, if you feel the need, you can go more, but don't overdo it. It just isn't necessary. This 6 to 1 overlap ratio is more than sufficient for any well thought out blank extension project which has been coupled with suitable pieces.

Assumptions

Thus far I've made some assumptions which I cannot possibly control at your end. I have assumed that the piece you have selected for your extension is either a fairly heavy walled piece of rod blank or an aluminum tube. In the case of a thin walled section of rod blank, or tubing material of less rigidity or strength, you have a situation where simply altering these procedures or the amount of overlap may not help and only prove futile. There are three main areas to be concerned with:

1. The point where the rod blank enters the extension. If the blank is thin walled and/or flexes well down into this area under the heaviest expected load, you could have a stress failure of the blank at the point of the junction.

2. The forward edge of your extension. Again, if the rod blank flexes heavily into this area under full load, and is capable of withstanding the sheer forces, then the extension must also be. Otherwise, the extension will be the part to fail.

3. The point where the rod blank butt contacts the inside of the extension. Much like a multi-piece rod ferrule that slips out and doesn't have sufficient overlap, you can create all sorts of problems if your pieces can't stand the strain here. The extension can explode where the butt of the blank resides in such a case.

Thus, you need to keep in mind that if you are going to extend a rod blank you need suitable pieces coupled with sound construction methods. Stray too far from what is outlined here and you might still be successful, but the risk of a failure increases tremendously.

Strategy

Once you determine what your total finished rod length should be, you can make a plan to strategically locate your extension and its length for the best results. In the photos you'll see two ways that I really like - running the extension the full length of the handle to the foregrip edge, or to the forward edge of the reel seat and allowing the foregrip to be mounted on the blank.

But what if this doesn't result in the finished rod length you wanted? Be creative. Trim the blank from the butt so that when mounted in the extension, you have the length you require. (Don't forget to allow for the length of blank that will be inserted into the extension nor trim so much that you end up mounting a highly flexible section of your blank into your rigid extension.)

When To Use An Inner Sleeve

Earlier I mentioned that there was one occasion when an inner sleeve might be a better choice than an oversleeve. Let's say you have a finished rod that needs to be lengthened by just a few inches. Let's also say that it's a fairly large diameter rod at that. Now we could cut off the rod behind the foregrip, build a new handle on an extension that provides the length we need, remove the foregrip (which will now be located on our extension), and mount the blank into the extension. A lot of work to get that extra inch or two. So, what we could do, is just pop off the butt cap, insert an inner sleeve into the butt, and put a longer cap on or add some length to our grip. (Another place where you need to be creative.) This is quick, easy and usually durable enough so that the rod can continue to perform as before. But be careful - don't think you can get away with too much new length behind that rod butt. I've seen surf rods built on inner sleeves of a foot or more in length, stuck in a sand-spike and obliterated on the strike of a good fish!

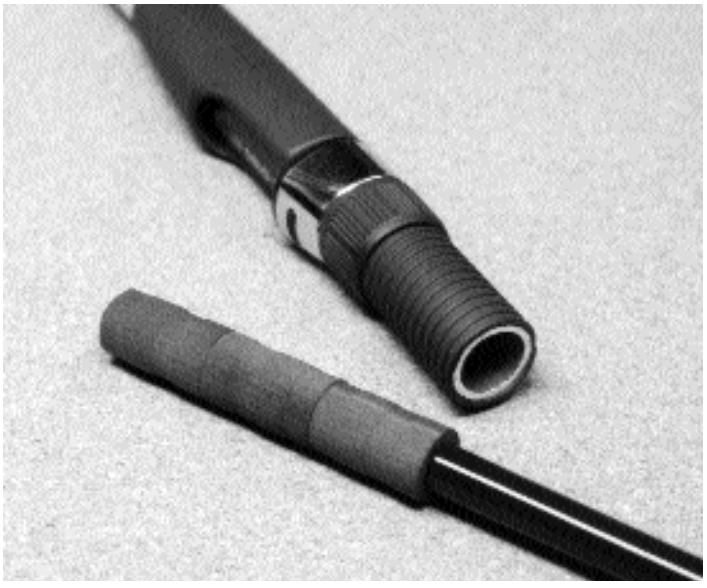
For this and similar reasons, I usually limit the use of an innersleeve to those occasions when I need just a few inches added to an existing finished rod. Use the same rule of thumb for your overlap on an inner sleeve as you do for an oversleeve and make a reinforcement wrap on the rod blank butt for peace of mind against a split-out.

I do want to emphasize that I am in no way saying that you cannot use inner-sleeving to extend a rod to any length you want and get good results in so doing. You certainly can and some do it regularly. But I will say that a properly executed oversleeve is usually superior in terms of overall performance and strength.

The ability to extend a rod blank opens up a myriad of possibilities for new rod designs and types. Learn to do it effectively and keep it in your bag of rod building tricks and you'll have one more way to satisfy specific rod requests. ✍

Ideally, when using a section of heavy-walled rod blank as an extension, you would like to have matching tapers between the inside of the extension and the outside of the main rod blank. If not, try to match as closely as possible to reduce the need to shim or fill voids with epoxy. Perfectly matching surfaces create a stronger joint. In the event this is not possible, shim with fiberglass drywall tape or small diameter rod wrapping thread.

Notice that in this photo, the extension needed to be longer to allow us to achieve the desired overall rod length. Thus, the foregrip is built onto the extension rather than the main blank. This also means that our seat and/or seat bushings will not be on top of the junction to provide strength to this critical area. Thus, the forward edge of the extension section has been reinforced by tightly wound rod wrapping thread. It will receive a coat of epoxy adhesive at the same time the foregrip is mounted. Except in very demanding heavy-duty situations, this is usually sufficient for a successful extension



When larger discrepancies between blank and extension diameters exist, shimming should be done with rigid materails. Here, brick-foam arbors have been carefully fitted to the rod blank and will be turned/sanded so that their OD perfectly matches the extension ID. *In this photo, the seat has been mounted in a "downlocking" position.

Construction Note...

When attempting to extend a rod blank with any number of various items and/or materials, the correct amount of material overlap will vary mathematically depending on the materials involved, along with the thickness, diameter, strength, etc., of those materials. Thus, the amount of overlap recommended in this article is based on a broad spectrum of those materials most likely to be encountered within the confines of custom rod building. In some situations, as little overlap as twice the diameter at the junction point would be sufficient. In other situations, an overlap of four to five times the diameter at the point of junction would be required.

Because the optimum amount of material overlap cannot be given to the reader without knowledge of the materials and sizes involved, the author has provided a factor that includes sufficient "overkill" to provide known durability and functionality in nearly all reasonable situations likely to be encountered in this task as it relates to fishing rods and fishing situations. In some cases the amount of overlap specified will be too much, but in almost no situation will it be too little. Thus, using less overlap is not recommended unless the reader has the same structural expertise as the author. And... using more overlap than recommended will not be necessary in any extension project where the reader has followed the article guidelines as to the proper pieces which make good candidates for extending and/or for use as an extension.