

## **Bow Restoration 101** By Don Ward (AKA Bow Doc)

*VintageArchery.Org is grateful to the late Don Ward for his contributions to traditional bow restoration, and to his friend Nick McDade for compiling Don's bow restoration tips.*

OK I will stay on the topic of repair & restoration here.... but first I did want you to see something. Making a point when we think we got everything figured out (I did anyhow). This kind of stuff comes along and well you know. Here is a pic of the core wood of two almost same draw weight 1959's now go figure. The 1959 on the left has 3 layers of core wood and is 48#. The 1959 on the right has 2 layers of core wood and is 49#. Both bows are 1959 Kodiaks and both are 60". They must have run short on laminations one day and had to triple up to make weight??? Wow, what a trip. I thought I had the double tapered laminations all figured out. Fred you son of a gun...get them bows built one way or another.



Our goal will be to make these 2 Kodiaks look better than the one I own in this pic. Mine was done during spare time and spare materials and is in no way a primo job, unlike what we will do in resto 101.



Holy smokes, check this out



Did I say holy smokes? I meant to say holy cow.



Here's a couple item you will need to repair the cracked ibeam.



Ok, get a couple clamps preset with no pressure. This will save you a few minutes later. Remember don't squeeze yet.



I used a new syringe and the LT does have the cap on the bottle. This is to show keep your LT at a little angle while filling the syringe.

And for real...



It's best to raise the opposite end of the bow a little.



This is the 3rd syringe full it took to fill the I-beam. That's OK better then not getting any into the crack. But make sure the crack is filled and kind of flooding over a little.



Once you are sure you have the gap all filled with your LT. Start clamping from the lower limb up toward the shelf. Please note the LT up near the arrow shelf.



Add 2-3 more clamps wherever you can, Good idea to stay as near the crack as possible. 5 clamps with about 2-3 pounds of pressure each. Now wait about 12-24 hours until the LT gets inside the crack which is not getting exposed to the air so much will have plenty of time to dry



Now you can go ahead and fill the crack in the Purple Heart. Make sure its flooded good with glue, as there really is no way to clamp this one. Just make sure its full of LT and let it dry overnight.



You can go ahead and top off the crack the in the Purple Heart. Again make sure its full of LT.



Posted by **Shaun**

It seems to me that with tapered clamp blocks and leather or rubber pads and one could squeeze that riser window area when gluing. Is there too much risk of damaging the glass or other problems? I am sure that filing with SG will be stable and will look good but just wondering.

#### **the real bowdoc**

Shaun that Purple Heart cracked most likely from water getting into it rather than the crack. I did give it a pretty far squeeze and it would not move. At that point I was worrying about cracking the fiberglass.

Now you got to get the dry loctite off everything. I use a small scraper made of a piece of flat bar. Be careful to not gouge too deeply into the wood.



Once you have either used a small scraper or sand paper and removed all the dry glue. Most of the old finish will get scraped or sanded off as well. Check and see if the gap is filled. If not get a pick or small nail and remove all the uncured glue. Then fill it again.



The LT dries in less than one minute and in most cases just about on contact. OK you all got your crack picked clean? Now LT it one more time.

Ok you should be down to just a couple drops of LT to finish up the worst of the worst cracks. The one main reason for getting the worst places fixed first is to keep stuff like dust and loose pieces of glue from dislodging.



Two tiny little things I forgot to mention. One would be to record the info off the bow like serial number, length and draw weight. Two is to remove the coin. This will keep it from getting scratched when the sanding starts. If you are working on 4-5 bows at a time its a good idea to mark the coins to make sure they get back into the proper bow. I use a dremel engraver and just mark the back of the coins accordingly. The coins are glued into the bow with hot melt. If you get the head of a small bolt hot. Not red hot just good and hot. Place it on top of the coin and let the heat transfer into the coin. Wait about 2-3 minutes. Then place a stick of hot melt on top of the now hot coin. Just let everything cool down normally (No cold water) wait about 10-15 minutes. Then just pull the coin out, as it will be stuck to the hot melt. Make sure not to get any hot melt onto the riser wood as it will pull a piece of wood right out of the bow. Now just heat the coin a little to release the hot melt. Catch it in a paper towel and wipe off all the hot melt before it dries.



Ok now take your syringe with the LT in it and you may want to glue down any splinters or edge cracks. This will help prevent you from getting a splinter while working on the bow. Trust me fiberglass splinters are not fun. Ok got all your bad spots glued???? Don't worry about the stress cracks right now.



You boy's ready to get started sanding????????? I start with 100 and use it until I start to spray the first coat. Then its 600 wet dry. Final is 2000 grit wet dry. Here's a couple 1959 & 1960 all in different stages of work.



Here are a couple little tips that may help you out. Don't use any type Paint & Epoxy strippers on bows. Your bow is glued together with epoxy. The resin in the fiberglass is also a form of epoxy. Just DON'T DO IT.... Restoration work is a labor of Love so no epoxy strippers. Don't be in a hurry we'll get there. Tip two is when you purchase your sandpaper make sure and buy the kind for wood. Not the kind used on metal. The type of sandpaper for metal will remove too much fiberglass from your limbs. I buy 100 grit for wood.

Now you can rough sand your riser the reason is it will remove the old finish of course but will also remove oxidation from the wood and help bring the natural color out. Like this spot where a leather cap may have been taped on this 1959. You want to get all the natural color back in the wood as much as possible. While sanding your riser it's a good idea to double check for cracks.



Please try and look at her the beauty beyond that ugly crack she has. I know it looks bad but in no way will affect the shootability of this little gem. The crack has been all repaired and the bow is rock solid and could be shot right now if the tip overlays were good. You should have your riser pretty well clean up.



You got your wood cleaned and exposed to the air? Might as well do your tip overlays if needed. You will need to remove the old tip overlay. Remember I am just giving you some pointers you may want to sand your old tip overlays off carefully rather than removing them the way I do. If you do do them the way I do, do not gouge into the fiberglass.





This one is about flat and clean enough to start your new tip overlays



If your tips have any gap around the edges (pics above) most likely they've gotten water under them at some point. You may be surprised at how little glue was actually holding the original on. If your going to shoot the pre 1960's bows more then 50-100 times a year, I would replace the originals for sure. The original paper tip overlay color is not to far off from what you see now.

Here's a pic of bow #2. Please note the very small amount of glue holding the original overlay on. You will be able to spot it easy as that's the only place there is any red paper micarta left stuck down.



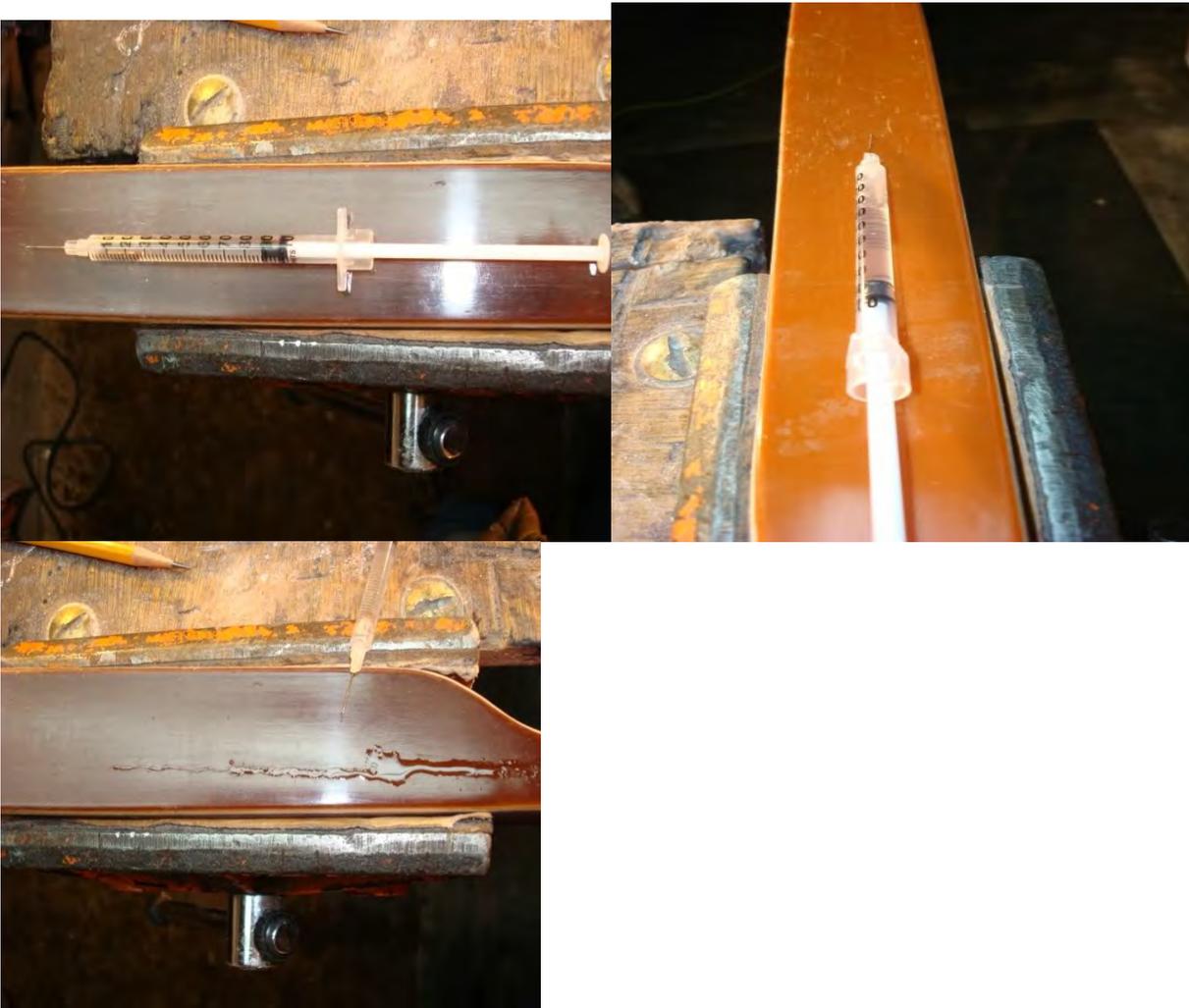
Please note the really very small amount of glue holding this overlay on. Now how many shots do you think this one would have lasted? Not many huh. This is even weirder. The bow that was delaminated is not the bow with the worst tip overlays. The one that looked Almost 100% shootable. Would have been short lived had the tip overlays not have been repaired. That's a trip.



One other note: did any of you note in the above pic there are lines running from edge to edge where I removed the overlay? I did remove one very carefully to show you guys a close up pic. We're talking on pre 1960 model bows OK? That is NOT actually the layer of epoxy of which the overlays were originally glued down with. Nope it's a layer of epoxy that was added to the fiberglass, combed and dried to create a ridged surface for the tip overlay to be glued to. If you have been following along you may have caught that in the earlier pics. One other thing to note is how well that epoxy layer did not work. You must sand that layer somewhat smooth and clean for the modern day epoxy or super bonders to stick to. If that layer of epoxy is chipped up you may have to completely remove it down to the bare glass. No biggie but lots more sanding as that layer of epoxy was baked and is super hard. You may also do a little damage to the fiberglass edges right around the tip if you get too aggressive sanding the epoxy off. If its not damaged its best to leave it.

Notice the string grooves. They are not equal. 90% of pre 1965-ish Bear bows are not equal as they were cut by hand with file until around 65-ish Bears bowyers reasoning behind that was, the string is pulling really hard when at full draw and only making contact with a very small area of the limb tip overlays and not into the string grooves really. So in the braced position it really does not have much pressure pulling either way from the out of alignment string nocks. There's only 1/4 of the braced poundage pulling either way on any string nock. However it does cause bad uneven string wear...I always try and straighten those out as much as possible when I make the new tip overlays.

Anyway we better fix some stress cracks today. Got your other syringe filled with LT ready? The syringe will give you great control over the LT. If you squeeze a full bottle of LT with a little hardened glue stuck in the tip and she blows, you will be sanding forever. Just buy the syringes 3.00 for 10 there cheap compared to getting LT all over your bow not to mention your blue jeans. Lets get ready.



See those? Bear Archery would tell you to break those off with a pair of needle nose pliers so they do not snag on anything and paint over that spot with some clear finger nail polish. I like to glue them down and wait 24 hours and then pick at them with the needle of the syringe. If any are not glued down, I normally try and sand them out when ever possible.

After sanding your going to have to fill some cracks again. Those limb sections were sanded with 100 grit. Just keep working slowly.



Yes, I know that LT is very difficult to sand but the bowdoc brung ya'all this far I ain't gonna make you sand all that LT off. I'll give up the trick when we get there. Because the Loctite or any super glue for that matter is so hard when it dries you may end up sanding the fiberglass off before you get the Lt off...no joking.



Ok I used the sanded limb, as it seems to photo a little better with no shine. I told you I would share the tricks of the trade with you and here is one of them. Please note the very small curved cabinet scraper in the pic. That curved scraper can be used to remove the dry LT. Weather you've removed the original finish or are on your second application of LT. You can use the scraper. Just DO NOT use the scraper against the fiberglass. Only scrape the glue off. It's actually quit easy to remove the hardened super glue without screwing up the limb. Do not get lazy and use the scraper to remove all the finish down to the fiberglass. Again you may end up scraping off fiberglass. DO NOT get lazy on me now. I've been doing 5 bows this whole time. Hang in their baby were almost to good stuff.



One thing I did forget to mention was if you wanted to try and make repairs on some very small cracks without restoring the whole bow; you could wipe then clean with some alcohol a couple times then apply the LT with the syringes. The LT will kind of not remove too easy from your finish cleaned or un cleaned. The cleaning will really help get the wax out of the cracks more then anything. It's still best to use the syringe and keep as much LT as possible off the original finish. If you use the alcohol to clean the cracks you should let it dry for about 10-15 minutes before applying the LT.

Here is another tip to help make the job just a little better. I added a super thin layer of LT in the small cracks under the tip overlay. With adding new tip overlays there will be plenty of support.



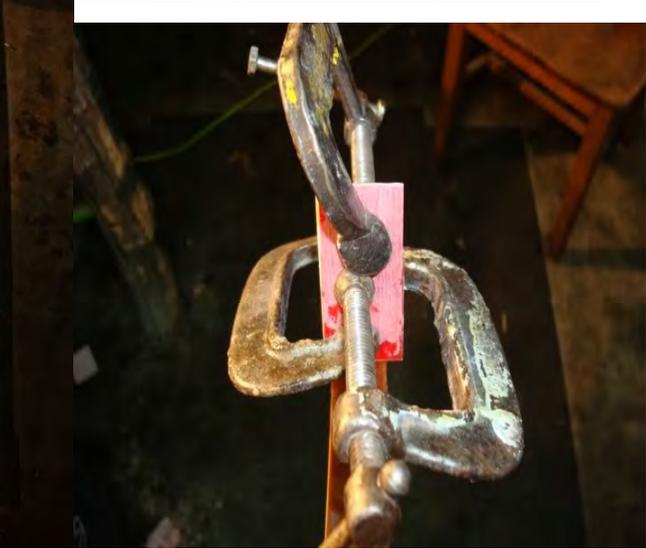
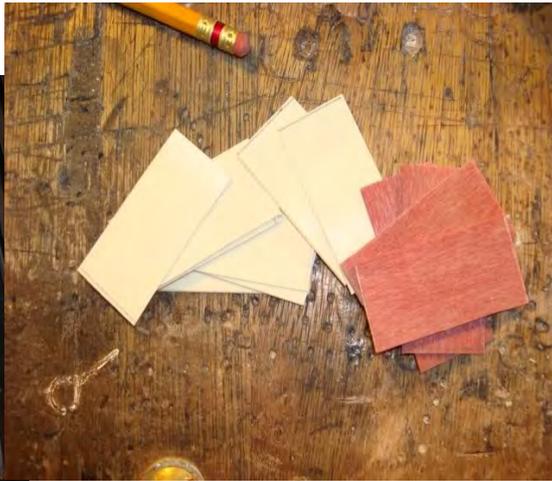
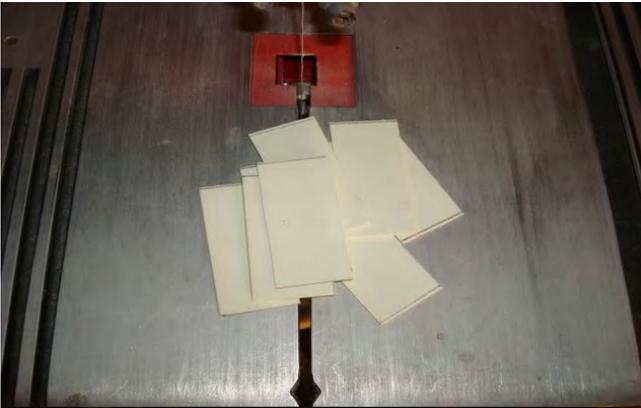
I have another 1959 K that's getting some fiberglass tip overlays so we can work on those too. The replacing process is the same. Just a couple of different steps. You will need to get some glue and the pricier the glue the better the glue. I buy loctite at home depot for 3.00-4.00 bucks (see pic) I buy the 420 at a bearing supply company. 420 is industrial grade. If you have a Grainger near you they carry 420 also. I have never had it fail if everything is clean and clamped.

You should have the ends of the bow all clean and a smooth flat even surface. You'll need to cut your fiberglass now too for building your overlay. I cut mine 2" long by 1" wide. I have the cheapest 99.00 Ryobi band saw and I use a blade designed for cutting metal and it works great. Always sand both sides of whatever your going to glue. Use at least 100 grit sandpaper just to make sure their both clean and roughed up a bit. I clamp the bow in my bow vise, which really helps. The vise has wood and leather jaw covers. It really steadies the bow. Just take it easy. If you're not sure about how hard to crack a vise closed on a bow limb than stick your hand in there and well you know. You'll figure it out. We gotta glue these down one layer at a time because 3 layers of 2" long X 1" wide fiberglass laminated together is pretty darn hard and tough to bend so it will match the contour of the end of the limb. You may end up cracking the end of your limb in the string groove by tightening the clamps to hard to get the

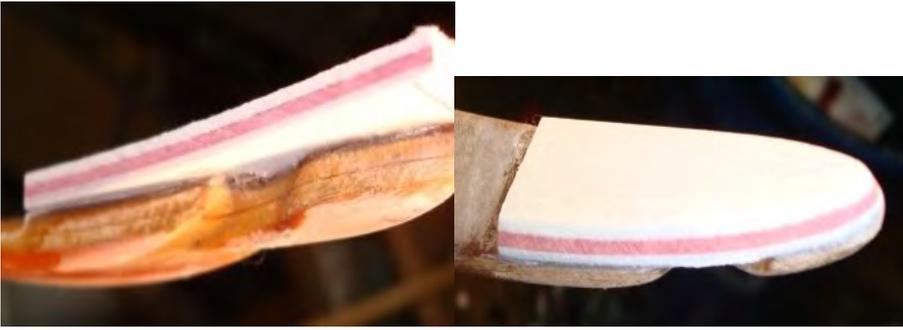
overlay to lay flush. Are ya with me so far? OK get your glue, fiberglass or wood, antler bone, ivory, KB-5 whatever your using for tip overlays material and 3 small clamps. Lay the overlay piece on a clean flat surface and apply a medium layer of glue to that. You should still be able to see where the old tip overlay was on the limb and can apply about the same amount to the limb tip surface. Now whatever you do DO NOT go answer the phone, go for coffee or any of that other goofy stuff that can cause one to say to oneself what the hell was I thinking. You got glue on the overlay and the limb tip surface.

I like to start from the limb and clamp towards the limb tip to kind of squeezing the excess glue out. If you use 3 clamps this way you will see how they slowly contours the layer of tip overlay material to conform to the shape of the bow.

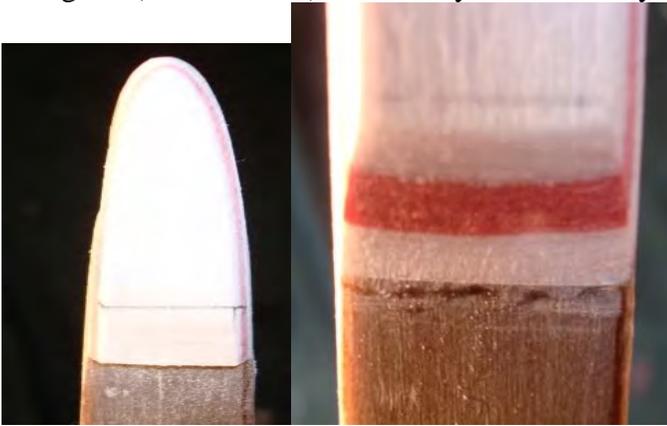




Kurt it's actually fairly flexible as is ...here's a pic of some glued to the bow and rough shaped.



I trimmed this to the width of the limb tip. I use a drum sander and then a dremel tool but you may want to start out with something like a file on your first one or two jobs. It's way safer. Once you have the overlay shaped pretty well, I mark off about a 1/2" up the overlay with a pencil. Then mark across the overlay. This line will give you a guideline to follow. Again I use a dremel tool to taper the overlay down to the limb surface then finish it off with sandpaper. If your dremel tool slips across the limb surface it can cut right into the limbs fiberglass (NOT GOOD). Just take your time. Hey most of bears tip overlays did not match from the factory.



If you're ready to start working along the edges of the limbs you will want to be pretty careful. You can remove lots of weight by sanding in one spot too much on the edges. You will see when the finish starts coming off and the corewood shows. I like to sand the corewood first and then the little kind of beveled edge along the fiberglass. As mentioned, do be careful. You can blend in some little chips and dents now. I had to use a pic of a Super Kodiak I could not get a good pic of the edge of a 1959.



Fiberglass has a very dull surface and actually makes a bit different sound when sanding the bare glass also. As for the black lines in the orange fiberglass that is years of dirt and grime pounded into them. Some of the odd colors like orange greens and white will all show the black lines after the loctite. You can touch them up a little with some orange paint also.

The Lt 420 works great on the fine cracks and sets rather fast. For tip overlays and things where you may need a minute or two to set clamps I use the gel formula. The epoxy will work for tip overlays also but it's too thick to get into the cracks.

One note to make for doing your new tip overlays: Always follow the original lines of the bow. Sometimes the original tips are not always straight or even. I find it's best to stay with the original shape and depth of the string grooves. I also try and keep the thickness of the new overlay about the same, as the originals were unless the limb tip is damaged you might need to add one more layer for strength. I cut all string grooves in all bows with a 5/32 chain saw sharpening file. A chain saw file is not tapered. If you use a rat tail file it's hard to keep the grooves even depth because of your file taper. Please see above pics. Bear Archery string nock cutter dude's used rat tail files noted by the pic of the tip overlay on the left has more of an opening on the left side. I try and get the corewood to show completely around the edge of the new overlay just like the originals did.

Those tips do need a little finish sanding but I try and keep everything as smooth as possible to prevent string wear.

The riser overlays come back to about 80-90% original looking color. One thought on removing them or replacing them rather. It's kind of hard to follow the original bend on the back of the bow right at the shelf without a form. If you do use clamps you will see dimples in the new overlay from the clamps they are hard to sand out. Plus it's hard to get a good bite with clamps on the back of the bow because of the limb angle. You can make a small form that will bend the overlays fairly well but they were original formed with the air bladder system.

Ya know I almost forgot one other thing. If you have a factory quiver bushing in your bow, it's best to remove it first before sanding. Sanding the head off the bushing is not good. The bushing was also installed after the leather grip to create a real nice looking edge. There was a factory tool for installing the bushing that was normally supplied to Bear dealers or if you ordered a quiver bushing kit the tool came with it. I know I got one some place but darned if I could find it right now. I have a tool I made that works pretty good and a bit easier to use maybe. It's just an old square shank screwdriver I cut the flat blade off. I think that it's 1/4" but I will

double-check it. The square shank fits the quiver bushing real nice. Sometimes the bushings get stuck and you may split the wood by forcing it to hard. I stick the end of the screwdriver in the torch for a few seconds and then place it inside the bushing and let a little heat transfer to the brass bushing. It only takes 20-30 seconds. They normally will come right out then. Just don't force them.



You may find them around somewhere. I've also plugged a few bushing holes in bows and got a couple that way. It's not the tapered hole stem seat. There the straight threaded so the quiver mounting screw will screw flush rather than the pipe thread type.

OK you should be about ready. Got all you little spots glued and sanded clean? Final inspection. I am thinking we will start putting the first coats of finish on real soon stay tuned

Another thing you may want to do. Is get your finishing area all real nice and clean. It really does not matter what type finish you use. The cleaner the work area, the less airborne particles floating around. New finish of any type is almost like fly paper. Anything and everything will stick to it.

I will be spraying a 3 part with a flex agent mixed in so I guess you might say a 4 part. Ted told me Birchwood Casey gun stock finish comes in a spray can I've not tried it yet but several guy's I talked with seem to like it. Its sprays on fairly thin so and a person may have to add 3-4 extra coats.

In most cases I can feather the finish back on the limb and then place the transfers then spray over that spot only. As mentioned above I usually wet sand the entire bow and add 1-2 final coats over everything to blend it all together. When I set the decals on the first operation I finish up the riser and wood sections first as they will soak up lots of finish. Then when that's done I add 2 thin coats right where the transfers are going. I let that set a few minutes up to half an hour. Place the transfers down and then spray 1-2 coats over them. Let that dry

24 hours and then finish spraying the whole bow. If you are using brush on or wipe on type finish, make sure to go over your transfers with a very thin app. the first 3-4 times and do not brush or wipe to hard as it will wipe the new transfers off. If your using Birchwood & Casey tru oil gunstock finish its best to maybe get the spray can. That way you can spray over the transfers with out damaging them.

For serial numbers it's best to remove the lettering and rewrite it. If you leave the lettering there will be a yellow circle around it from the original finish. The wood part of the bow needs to be almost all finished before you apply new finish to the limbs. The wood will soak up 5-10 times the amount of finish needed on the limbs. After I have the wood pours filled fairly good 4-6 coats I wet sand where I am going to do my lettering so it's clean and smooth. There are several good brands of gold pens on the market. Maybe someone has the brand names of them. Myself I use testers gold model paint and a calligraphy pen. Its a bit more work but looks OK I think. When putting finish over the lettering no matter what type pen paint or ink you use to letter your bow with you will have to apply your new finish in several real thin coats.

If you are brushing your finish on you will want to kind of blot the finish over the new lettering silk screens or decals and let it dry like 24 hours. A regular paintbrush or those sponge brushes may brush the letter off maybe test a small spot first. The sponge brushes may work a little better then a regular paintbrush.

OK you guys should be bouts ready to put your finish on. One thing to make sure and do is get your bow nice and clean. Myself I do not like to wipe the bow down with any solvents cleaners acetone or anything like that because those types of solvent will bring natural oils to the surface of the wood and can cause problems. The solvents can also leave stains on the fiberglass. I just give the bow a good light sanding from tip to tip and then blow it clean with my air compressor...I have several bows to set up this AM and will try and get some pics starting with the riser sections first.

You got your wood sections all sanded clean and all the dust blown off and did you reset the coins yet? I start off with a thin first application of finish on the riser. The wood will take 5-6 times more finish then the limbs. First application is thin and I wait about 20-30 minutes. This is with the type finish I use. Always follow the instructions per manufacturers product.

20-30 minutes later another thin app of finish wait 20-30 again and apply a 3rd. So you will have applied a total of 3 layers again this is what I use. 3 applications are actually one layer now about 3 mils thick. If your using gun stock finish or Danish oil type finish you can only apply one coat of those type finishes and you have to let that one dry 100% before you apply another. Those finishes and any finish your going to apply a 2nd or 3rd application should be wet sanded after 24 hrs. or so cure time.

Please note the maple sight window 59 Kodiak has 3 applications of 3 thin coats per app. total of 9 coats on the wood and the pores are about half way filled (damn rosewood).

However that's the best way to bring the true rich colors out in the rosewood and Purple Heart both or any wood. Sand it good and blow it clean with compressed air. Let the bow set in a warm room temp area for 2-3 days while your working on other little projects. Then apply thin layers of finish at first so it will penetrate. If you apply to thick of finish it will harden before it really soaks in good. Wood sealers and fillers suck and they are for guy's looking for a short cut.



The best way to remove the grip is just peel it open at the seam and peel it off however you can. Sometimes they are a little stubborn and you will have to actually scrap the old leather off. I use a small wood scraper on lots and lots of leather grips.

I managed to get all the wet sanding done early this morning and enough time to add 3 more applications to most bows risers this afternoon. The maple sight window now has 12 super thin layers applied in 3 applications 20 minutes apart over 4 days. I wet sanded with 600 grit in between each spraying. Still showing some pores in the rosewood.



Ya got your wet sanding all done for today?? I got one more bow to go and then spray time again. Now is a really good time for you to inspect all the glue joints around the riser and loctite them if need be one more time. The closer you get to being finished with the riser the less you will want to be screwing around with loctite 420 or any super glues.

Loctite 420 will burn into new finish so fast you cannot even wipe it off before it dries. I know if any of you guy's ever used any kind of super glues they are great but they can get ugly fast.



Several hours later they all look shiny again curing before another wet sanding in the morning. Won't be long now.



I did add a couple extra pics of extra bows besides 1959 Kodiaks for several reasons most of those bows in the pics do belong to TG members except 2. If your working on your own bow please note again is that I've been applying the finish as I said 3 thin layers 20 minutes apart. I do that within a time limit so the finish will stick and melt to the two first thin coats making one 3 mil thick coat each time your finished for the day. I've wet sanded at least one of those layers off each time in the morning when its cured...that building up of those thin layers and wet sanding in between will give use just that super smooth nice level surface when were all done.

Putting lettering back on today maybe. One thing to remember is you will need to put some finish over the lettering so it doesn't get rubbed off. I will wet sand that area with 600 w/d and wipe it with a soft dry cotton towel. I stick a post-it-note to the riser or limb wear the lettering is to be applied. The post-it is a bit sticky and kind of stays put and will remind you where your lettering goes. It will also give you a somewhat straight line to fallow. I use a calligraphy pen and testers gold paint for the gold lettering and a little smaller pen and black India ink for black lettering

About back to normal around here today and I got a bit more work done. I have at least one 1959 that will be ready to wet sand and then move onto the limbs tomorrow. Before putting any finish on the limbs you may want to wet sand the fiberglass kind of gently more so to get it nice and clean but the wet sanding will really help remove any dust in the pours and that will help the finish stick much better. Make sure and use the very least amount of water you can and try and not get the corewood to wet. If you do get a little moisture here and there make sure and wipe it dry ASAP.



I do install the coin first. If you don't install it before spraying and get any finish in the hole it will build up and can even make the wood swell a little and the coin will not fit. On the raised plastic buttons I install those after all the finish is on. Some finishes will react funny on plastic.

The problem is I will have to wet sand about 13 bows Monday again before I can spray. I am more than certain there would not be any problem getting the finish to match. It's those tiny specs of dust that will end up under the new finish on Monday if you don't make sure they are nice and clean. The best way I've found to make sure they are super clean is with a light wet sanding.

We'll be going over prepping your silk screens or decals before spraying over them. 90% of pre 1965 Bear Kodiaks only have one or two coats of finish over the original silk screens. We'll need to remove the top layer in order to get our new finish to stick good.

Shaun I would blow that clean with only 6-8 pounds of air pressure mainly to not dislodge anything and get it stuck in the gap. When you do glue it do not put too much pressure on your clamps. Just enough to close that gap is all you need. That way it will not deform your limb.



Here are a few more pics of tip overlay repair for Shawn. The 60" 1957 Kodiak Special has factory wood & paper tip overlays. I had to replace one and used wood & black fiberglass to make the repair. The red canvas micarta in the pic will be to make underlays for the 66" KS. It has a tiny bit of fiberglass damage on the belly side right near the string grooves.



Hey Shawn if the color is not coming back to good. You can use a small scraper and shave off like 1 MM of the wood with no problem's that really helps bring the color back. Then let the bow set at room temp or up around 80-90 degrees even for 3-5 days that brings the natural wood color back.

Here's the trick to restoring the color of rosewood and Purple Heart. If you use this you got to be a little careful but not to careful just use common sense. Once you have used the fine scraper to remove a thin layer of wood to remove the oxidation from within, then you do all your sanding on the riser with 100 grit sand paper no more no less. Now I use and it's up to you what you use. I am only telling you how I do it. I use a set of those 1500-watt shop lights to spray. If you will hang your bow in front of those lights being somewhat careful to not over heat

it 12-24 inches away from the lights. The heat from the lights will draw just a fine bit of the natural oils to the surface. There should not be any problems getting your finish to stick. At least I never have. This process really brings the color back nicely.

Here's a pic of the new tip overlay and the underlays on the 1957 Kodiak Specials



Anyone have a bow with these splinters up near the recurve???



Lots of different ideas of what they are or even what caused them. I've seen those on about 1-2% of the bows I've worked on all makes. The latest model I believe I've seen with them is 1973-74 KH. So they were not any certain years only. Maybe there was no protective wrap on the fiberglass like wax paper or masking tape. Little bits of glue get stuck to the back of the fiberglass and then were kind of chipped off pulling tiny little splinters of glass off with the hardened glue. Someone mentioned maybe the glass got crunched in the form type fractures. But I think if it were from the forms you would see it on lots more bows. I have never seen any problems with them causing the bow to break there or even lifting the fiberglass right there. I've glued dozens of them and they do not absorb any glue at all so they are only on the surface but too deep to sand out.

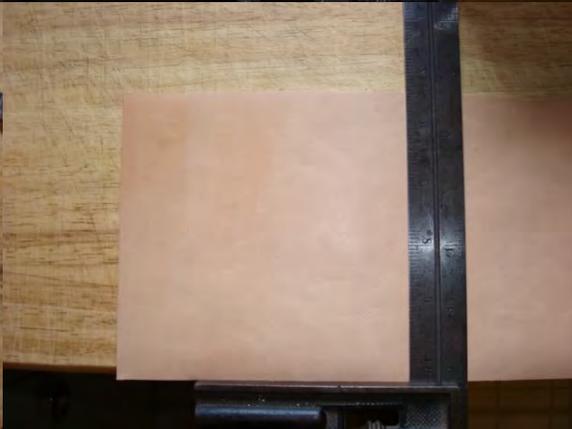
Here's a pic of Franks 1956 Kodiak Special that had the back glass along the string grooves cracked and raised a bit. 90% of those bows damaged there are repairable and 90% that got damaged right there were caused by sliding the bow along the ground or leaning the bow against your truck or a tree something along those lines and it slides down which dug into the glass along the edges of the limb tips and pulled them loose. We've all been there.



If your wondering if your bows tips are a loss and in need of repair then slide your bow tips along your carpet and you'll find out. They will snag the carpet real fast. So its best to use a cotton towel and slide it from the limb tips towards the riser with a little edge to edge pressure and if it leaves fuzz along the limb edges its in need of some glue. You will want to be super careful to avoid getting fiberglass splinters yourself. Those hurt real bad and are a SOB to get out believe me. What I do on those type repairs is reglue with super glue the original fiberglass and let it dry over night. Once it's cured over night, then I sand it clean and smooth with 100 grit. Then add the canvas tip underlays to make sure to hold the original fiberglass down. That red canvas underlay material is the same used in the middle lamination of Black Widow bows. Its works out real good and is stronger then it was originally. You can add some new life to that old bow you thought was a goner.

How thick is that canvas? 030 and I used to buy it from Black Widow.

OK TGers I got to wait for the temp to get around 65-70 in my shop before I can spray. So we may as well work on some leather grips. If anyone has any better ways of doing these I would love to hear or even see pics of your work. Here are a few basic tools for leather grips.



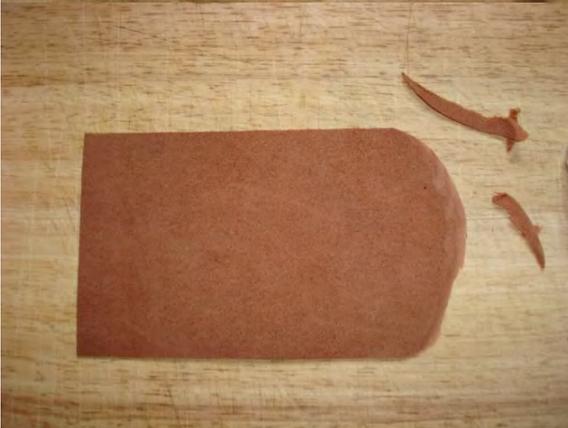


6 X 3 1/2". One thing I need to mention is this grip is for a 1956 Kodiak Special. You will be able to use the straight cut pattern on anything made until 1959. 1959 they went to a pattern kind of shaped like bat wings. I'll cut one of those tomorrow.



I showed some of the tools that could be used. The rotary cutter is the best.

Yes the cutter is the only way to go, Fast and sharp. The rotary cutter and skiveing knife both came from MacPherson Leather Company in Seattle. You can also purchase them from Tandy and can get on line and find a store location near you.



Sorry I missed that one; yes 2-3 oz veggie or veggie-tanned leather. I buy maybe 2-3 hides at a time and get the thinnest ones I can find in the stack. I also scrap as much or more leather than I use. I only use the cleanest parts

with no cuts or scrapes in the leather. A little discolored leather won't matter to much as I'll dye the leather if the color is not somewhat correct.

Dampen the leather before skiveing and dyeing.



Then you got to let that dry completely.

I did wet the leather to skive it and then redampen it a little before applying the dye. I really screwed up, as I wanted to do one pic and then talk a little about each operation. But I loaded to many pics and cannot add the info. I'm going to try and fix it again.

All nice and dry from overnight and the color matches much better if you let it dry naturally at room temp rather than around heat. Another thing worth mentioning is not all grips are the same size. They range from around 4" wide on some early Kodiaks to 3 1/4", which was the size of the original grip on the Special I am working on. I left the new grip 3 1/2" rather than to trim it down. One reason I do that is I am only replacing the leather grip on the 1956 KS and wanted to leave the new leather a little larger so it will just overlap the old lines left behind from the original grip.



And then.



Please note I'm only showing you how I do these and am I in no way a pro leather worker. This is just how I do them.

You can see I kind of try and avoid getting the barge cement onto the stained side of the leather because it will discolor the leather and a pain in the butt to get off. Now you got to let that barge dry and I mean so dry it will not hardly stick to your fingers maybe 1/2-1 hr.



And through the magic of the Internet my glue is dry already. OK I used the burner on the stove to get the glue warm enough to dry only to speed up the process, now back into the warm water for about 10 minutes or so. Remember the glue was almost dry but not quite. Just a bit tacky.



Soak out a little excess water.



Line up the front edge.



Flip the bow over to the throat of the grip and start working the wet leather around toward the back of the bow.



Now you have to let everything dry for a few minutes. You will see the color change as the leather dries.



Once everything is dry. You can reapply some more barge cement. It will take about 5 minutes for the barge to dampen and soften the leather again. Once that it's softened up, finish your wrap and with your hand try and work out all the wrinkles and stretch the leather.



OK you kind of get the idea and like I said I sure am not no pro. But you should end up with something looking like this. Well not like this but somewhat. You can see from the pics I screwed up and measured the wrong Kodiak Special and rather than it being 3 1/4" it was more like 3 3/4". Chit happens and I will peel it off later. But you get the idea on those bow built before 1959. Tomorrow, I got to do the leather on the 1959 maple sight window.



Notice I do not put any glue on the bow at all. If I put glue on the bow and the leather it seems to make the glue kind of thick and it does not dry evenly.

Here's another little something worth mentioning. Bear's original factory leather grips were finished off with an oil base leather protector kind of like mink oil or neets foot type product and 90% of them had no leather dye but were natural veggie colored leather with the oil base sealer which darkened the leather a little. That type leather dressing only lasted about one season (you know how you got to grease your hunting boots often). That's why most of the leather grips on bows that were carried in the field very much are wasted, the leather protector did not last long then rain and the acid from our hands got onto the leather as well.

If you want your grip to look somewhat worn out do not put any dye finish or sealers on the leather just use it as is when your done with installation. It'll get stained up pretty fast. For a medium tone color use an oil base product like mink oil. If you want your grip to stay fairly clean and new for a couple years use this stuff. It is a sealer and protector topcoat all in one. I will be happy to supply their phone number to anyone wanting to try it.



And then.



If you give the leather a good wetting with the sealer and then put it over the heater vent that will help shrink the leather a little and tighten it right up. Please note the wrinkles are gone from the throat of the grip now.

Thank you guy's good eye Tom the twice measuring will prevent early removal of your new grip like mine. Simon both the 1959 Grizzly and Kodiak have a little pattern cut into them. I have a template for them.

OK the maple sight window has had its final wet sanding with 2000 grit wet/dry sandpaper. Next step will be to hand polish it. If your wondering why I sprayed the final coat and then wet sanded was because the finish I use is just a bit to shiny right out of the spray gun so I do my final polish by hand of which I also think it makes a much nicer looking job.



Ok here's the maple sight window after being wet sanded with 2000 grit wet/dry and then hand polished. You can use some types automotive rubbing compound to achieve the shine you want. Just test a small spot and make sure the rubbing compound does not rub off your new finish. I use my own formulated and time tested proven product to polish clean shine and protect all of my own bows and all of my customers bows and nope I don't sell it on TG because I'm not a sponsor and I would rather NOT get my post pulled for trying to make a few bucks off you guy's or for someone to think I was trying to get some free advertisement. Please remember I'm only telling everyone how I do restorations. Again thank you all for your support.

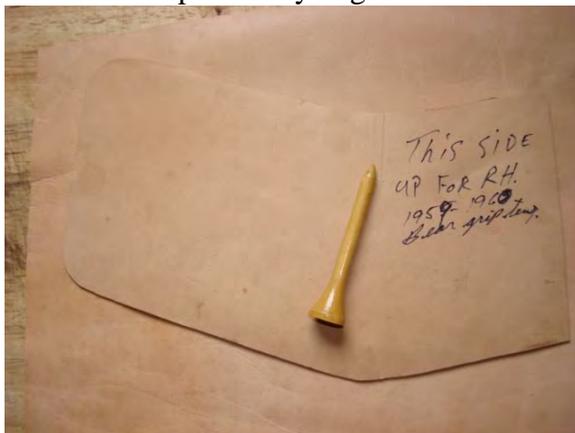


And then.



I did not mention that yes the bushing does sticks out a little. If you do not remove it and get finish into the threads of said bushing you will have one heck of a time getting the screw in. I remove the original bushing and have an old one with finish stuck to it I use to plug the hole. If any finish gets into the bushing hole you may have a problem getting the bushing back into your bow and in the worse case of all if to much finish gets in there you may end up splitting your riser screwing the bushing back in. The coins I install before spraying.

Lets see a 1959 Kodiak grip pattern some leather and a golf tee. You will have to cut this one out by hand so you will need to mark the pattern on the leather with something that is smooth on the point like a new golf tee. If you can save as much of your original grip as possible even if you have to kind of skin it off the bow to save it. It will serve as a pattern or most of your pattern anyhow. I take the old grip off and soak it in some warm water not hot just warm for about 5 minutes. Then I pass it out flat with whatever I got handy like 5 phone books a vise between two pieces of wood under a brick however I can flatten the original grip. You should let it dry over night. Then make a complete pattern off the old grip. You may have to fill in the blanks so to speak but you get the idea.



Hope you can see this OK.



Kind of scribed it onto the new leather and then cut it out.



Soak the new leather grip in some warm water and skive the edges. You got to let the leather dry over night.



If your going to dye your grip you can do that now while the leather is still damp. Then let it dry overnight.



Wow that was a short night. OK back to the barge cement on the back and let that dry until its just barely tacky.



A good coating of the barge will also help soften the leather.



Holy crap that barge is not as thick as the pic makes it look. It is a good even layer but that pic makes it look like I poured it over the leather.

After your glue dries toss the grip back into some warm water again and repeat the same steps as in the earlier lesson. Line up your straight back edge and then flip the bow over and work from the throat of the grip toward the back of the bow. Keep working until all the wrinkles are out and then overlap the long flap on the back or underlap I should say. Keep working the wet leather smooth. Booya it should come out looking something like this. If you have a few small edge gaps where the glue did not stick along the top or bottom and even in your overlap joint you can put a little barge under it with a tooth pick and let it set for 3-5 minutes. That will soften the leather again. Then smooth that spot over with your thumb. You may see a dark line along your overlap but that's normally from the wet glue. It should clear up when the glue is completely cured. I should have added that front edge of the grip that's not glued down. I do that so I can pull the leather tight from that edge. Then I apply glue there last and finish it off.



OK your leather dried over night. That allowed the glue to cure 100% also. The glue is rock solid and the leather is tight. No finish has been applied as yet only the leather dye. If done correctly the leather finish will tighten it again making a really good fit. I was going to trim those two place in need of trimming before I posted the pics but that would have been kind of cheesy of me to try and hide something I needed to fix wanting to make you guy's think I did the perfect grip every time NOT going to happen. We'll trim our grip this morning and the really tricky part now I forgot the hole for the quiver bushing and you can see the leather tightened up and left and impression. Or did I hummmmm I don't think so. You will want to stick around for this one.



Darn it.



That pic shows the place I need to trim and the impression of the bushing hole.



You better be damn careful with that snap knife too. One bad slip and you've sold the farm. Trust me on this one just take your time and be really, really careful. A nice cut into that new finish will spell disaster for sure at this point.



And then



And that little tiny piece on the back of the bow that did not quite line up, I got rid of that as well.



Now for that pesky little quiver bushing I forgot to punch the hole for or did I. here's 2 pics because I'm not sure which one looks clearest on you pc.



Yeah I know you're all saying, "What's that field tip for?" I would need to point out first to you guys. Yes I do have a leather punch, fact is I have several and a couple are the best one's made. But ya know how it is; sometimes the best can be made better. So I scraped the leather punch idea year ago. I found an 11/32" field tip works better then anything for me anyhow. You can see I put the field tips point on the tool rest of my belt sander. Then I slowly feed the field tip against the sanding belt until I just kind of break into the inside cavity creating a super sharp cutting edge from the inside of the tip. This will also make the perfect bevel to taper the leather for the bushing. Once more this is where you do not want to screw up. This is nearly the final operation on the bow and if you screw up now it can get ugly real fast.



You'll need a few tools something along these lines.



By pressing around the hole with your thumb you should be able to find it pretty easy. If you are having trouble locating the bushing hole you can dampen the leather. You will need to wet the entire leather grip, all the way around or your colors may not match if you just dampen right where the hole is. The bow is all sealed under the leather. So wetting the leather should be fine. Once you located your bushing hole, place your field tip right over the hole and twist the bushing completely around and then completely around again in the other direction. That will help keep the cutter kind of centered. Once you're done it should look something like this. Please note the bit of barge cement showing in the hole. The glue is so thin it shouldn't hurt anything. However there is some of the leather remaining in the hole you will have to use your snap knife and cut the extra leather out. If the leather gets between the bushing and wood making the hole too tight it will splint your riser for sure.



The inside and outside pieces both cut somewhat clean.



Remember we will be adding finish to the leather and that will give you a chance to get all the wrinkles out when the leather is dampened from the leather finish.



No lubricant needed it should screw right into the wood no problem its the same bushing that came out of that bow originally and the threads match real good. You can also tighten the bushing up by using the screw. Screw the screw into the bushing and then just tighten the screw and bushing both at the same time. You will want to be super careful using the screw to tighten up the bushing as the screwdriver can slip out of the slot real easy. I'm pretty certain if you can find a small Craftsman flat blade screwdriver it has a 1/4" shank. Just grind the flat blade off and you got yourself a quiver bushing installing tool. I do use the adjustable wrench on the shank to make one 1/4-1/2 turn to seat the bushing. Be careful there because the last 1/4-1/2 turn tightening will wrinkle the leather.

Bear did tap the hole prior to installing the bushing. The reason being if you force the bushing into said hole hoping to cut threads it will normally split the riser. If you do not have the correct tap you can drill the hole almost the size of the bushing so it does not split the wood. Add a little epoxy to the threads and it should be fine once the epoxy is cured. As for the counter sunk type hole in my B riser. The bushing serves to hold the leather down around the edges. So if you counter sink it the leather may come unglued around the edge of the bushing hole.



I think it will be needing a strike plate to match. For today strike plates 101.  
A few strike plate-making tools.



That square is 2 inches wide.



You won't need to cut the leather to long just a little longer then your strike plate.



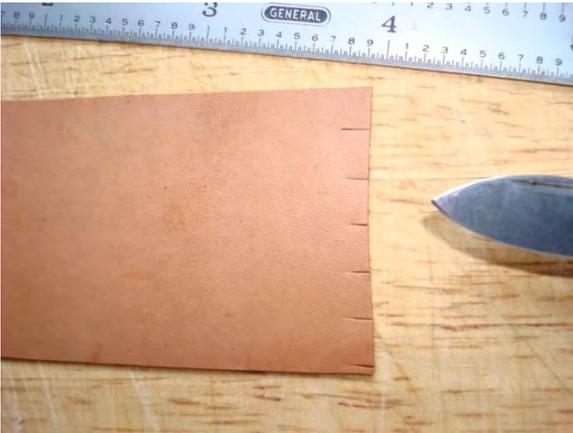
Into the warm water.



1 1/2" wide and as long as you want to make it.



Make marks 1/4 apart on both ends.



A nylon washer screwed to a piece of Purple Heart.



Ya still with me?



Same color leather dye as used on the grip.



Home made leather-cutting die.



And then.



The strike plate is all done and this one time unshootable little gem is headed home for a new life.



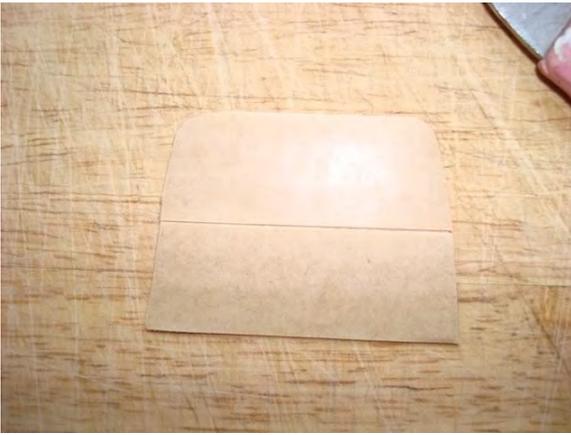
Double backed sticky tape.



Trimmed to fit.



Remove protective backing from tape.



You should end up with something looking somewhat like this.



Transfers ready and separated from the backing. When I say separated from the backing I mean I did peel them apart to make sure they separated clean and then kind of laid them back together to protect the letters from collecting dust.



Make a small 3-4 inch long application of finish. Then let that set for 10-30 minutes pending on your type of finish. It needs to be a bit tacky, but not wet. I myself normally do the upper and lowers at the same time. But if it's your first time setting the dry transfers you may want to stay with one at a time.



Now press the letters into the tacky finish. I use a small plastic tool I bought from Al to press the transfers down however you can use a small piece of wood.



You can see in this pic of where I rubbed the transfers into the tacky finish better. I use a razor blade to pick up the edge of the transfer paper.



The new transfers should end up looking something like these.



Just wanted to share with you guys what can happen. Here is a pic of one of the 1959 Kodiaks. It only needed the limbs to be sprayed and it was ready to send home. However in a few cases where bows have small stress cracks sometimes no matter what you do you will not see them until you put a little finish on the limbs (kind of like you did not see the dent until you painted the car?). Now is not a good time to find stressors. But it's also when you got to decide if your going to just continue on and finish the bow as-is or are you going to take time to re-loc-tite them and then wet sand the LT off along with your two coats of new finish? Myself I got to re-LT and wet sand. It sucks but got to be done. Your bow will come out looking so much better if you take a little extra time right now.



Also wanted to add one more shot of some underlays if you want or need the on your bow. Easy to shape and look pretty good.



When gluing a vertical shelf crack, how long do I have to set my clamps after I start?

I normally have the clamps all set with no pressure hardly at all, just enough to hold them in place. Then inject the LT and give the clamps one turn or until the LT is level with your surface. About 2-4 pounds of pressure will close almost any gap in a bow. Let it dry 24 hrs no matter how fast the surface dries, inside the gap takes a few hrs at least. It's better to use 2-3 small clamps too. That will let you direct the pressure right where you need it. Put some thin scraps of wood or leather between the clamps jaws and your bow. Here's something else I should have added I did not know buying syringes is not legal in some states. So if you don't have access to any, place a very thin wire and it must be wire no string right on top of the crack. Then kind of drizzle the LT down the wire due to LT's wicking formula it will follow the wire right down and into the crack. The syringes are a bit easier to use but if you cannot get one the wire will work fine.

Question: I acquired a Bear Tamerlane that I think could be a beautiful bow, but it currently has issues. I have not done anything to the bow yet, but I would like to finish it. One of the problems is that there are small cracks in the outer glass layer. I know this is common and can be filled and finished over (like bowdoc does). However, because this layer is white, the cracks show up from the darker under-layer and look bad. So, do I just live with it, or is there a way to cover these cracks?



Answer: Well there are a couple different ways to tackle those little beggers. One would be to get yourself a super fine, I mean super fine tip paint brush. And some white paint maybe like testers. You may have to add a super super small drop of a darker color to it. Because that fiberglass is not snow white (like the paint) never was snow white. 99% of the white fiberglasses do have some streaks of off white colors in them. But you may be able to just ever so gently paint over them and kind of cover them. You would want to do really thin coats of finish over the white because most finishes will melt the testers paint and wipe the lines right off.

Another idea is to take a dental pick and pick the cracks as clean as possible. Maybe even picking a little glass out in the process. Then mix white pigment with some epoxy and fill them. Let the epoxy dry over night (do not use 5 minute epoxy) and sand off the excess.

Q- I am cleaning up a 1963 Black Widow for a family member. Grandpa decided black electrical tape would make a good string keeper and it left a black residue when I removed the tape and replaced the string. What would be a good way to remove the tape gunk without messing up the glue joint for the overlays.

Answer - Cover girl 100% acetone finger nail polish remover and green scotch-brite (walmart a total cost of about 4 bucks or less) that will take tape residue right off. Be very careful and scrub gently or you may scrub off some of the original finish.

Q-Some bows had color painted limbs. How do we get the old finish off without damaging the paint? If the limbs need to be repainted, what paint should be used?

A-Yes I forgot about the painted limb bows. One thing is it's very difficult to remove the finish and leave the paint. The paint was one or two thin layers of an automotive type paint. Which would stand up to outdoor use. If you do need to repaint the limbs its best to buy a hi-grade automotive type paint.