TheWILDCAT

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"How-To" Build Alliance Model-Works WWII German Vehicle Tool Clamps

The Alliance Model-Works (AM-Works) German WWII vehicle tool clamps have been reviewed and discussed in *The Wildcat: Volume 2, No. 8, Sep-Aug 2011.* These clamps represent the latest in photo-etch (PE) after-market (AM) parts design and engineering and are delivered on a "connectionless" PE fret. This method of manufacture and delivery greatly simplifies the assembly since there is no clean-up required for these fragile parts. Furthermore, these tool clamps can be assembled to "work" in scale just like their prototypes. For more general information about the AM-Works tool clamps, please see the aforementioned newsletter. Additional information on the suggested construction procedures for these tool clamps and other "working with PE" tips can be found on AM-Works' website: http://www.am-works.com/store/tips-hints-c-7.html?osCsid=c8gb4jif4ueob44md1ip6othm3.

There are many tools that are useful for working with PE parts, some are the more general ones that you probably have on your workbench right now and others are more specialized and used specifically for PE. Additionally, for most of us, our "tool boxes" have grown over the years that we've been building models, so we each have our own favorites and preferences for performing certain building tasks that suit our own building styles and approaches. What I will show here are the tools and techniques that work for me. I think they're pretty good because I've had much success on the workbench using them. However, you might have something just as good and effective in your own tool kit, so by all means, if you have a preference to something that I'm showing here, use it.

Finally, before sharing some of my methods and techniques with you, let me say something about my building "style:" I am a very slow and methodical builder. Compared to many other model builders, some might even characterize me as "plodding." I tend to build in many sub-assemblies (of which many might be only single parts, such as wheels or tools) because I like to paint and weather the various parts of my models separately. I feel that this gives me the best control and precision over the final results. This method, however, means that much of my final assembly is done during the finishing process rather than the construction process. It also means that I build with this as a desired goal, so I often leave some things only partially constructed sot that I can fit other parts later. (This is one reason why I like to build the AM-Works tool clamps so that they are "workable." There's no easier way to install tools later than the way they were added to the prototype!)

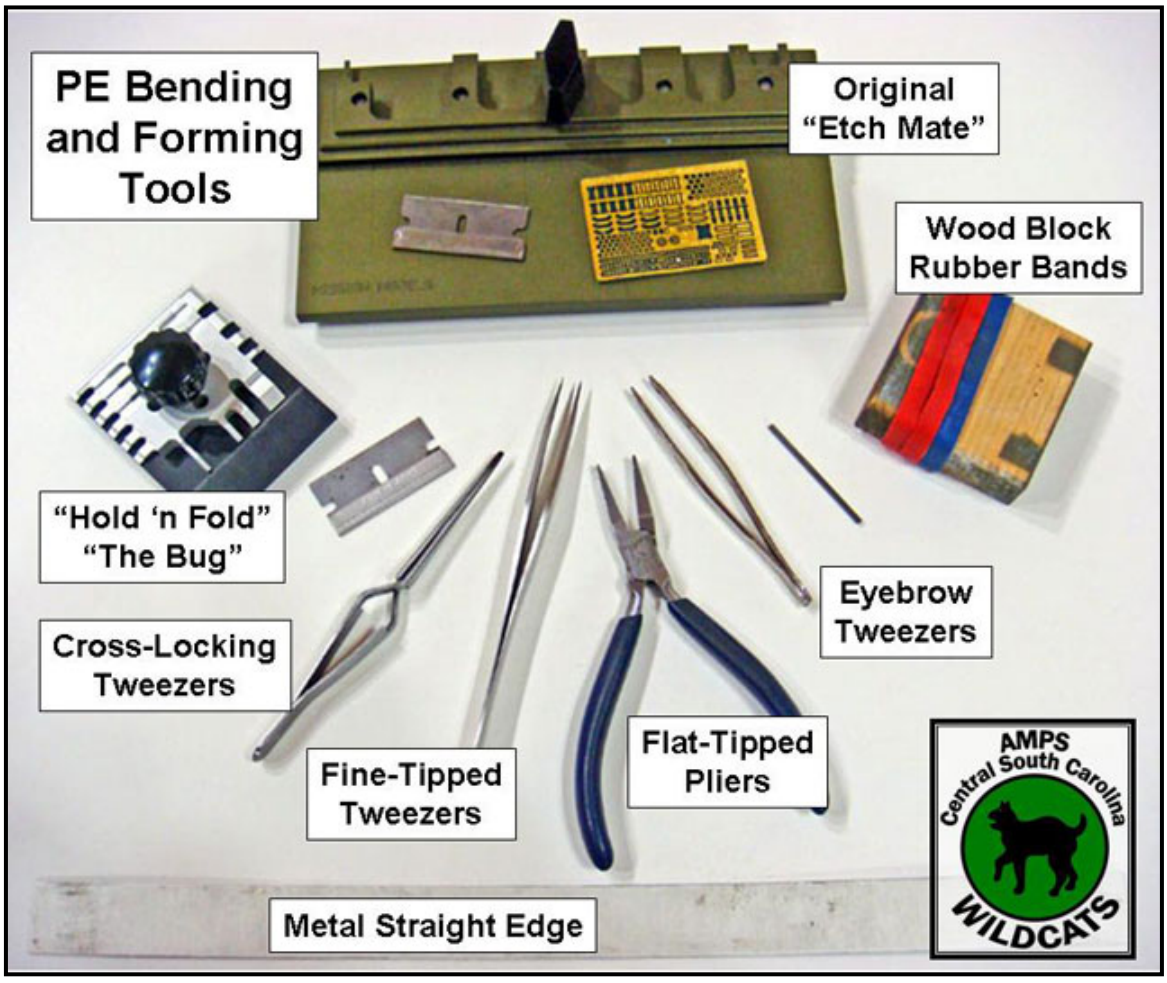
Many of my peers find this overly complicated, tedious, and too slow. But, these methods work for me, so again, as with the tools, if my methods don't seem to fit your "style," don't obsess over it. Build to suit yourself first. If something I'm showing here can be helpful: Excellent! For other things, maybe my methods will suggest some way to you to adjust your own methods to get better results for yourself: Even better!

A question that has come up from some of my AMPS club mates is "how to assemble PE parts without the use of specialized bending tools?" I've been using armor PE since it first became

commonly available in the late 1980's. Twenty-plus years ago, no one dreamed of having special PE bending tools, and those of us using PE simply found ways to bend our parts using the tools already on our work benches. Metal rulers and other straight edges, plate glass cutting surfaces, bending forms and jigs filed from K&S Engineering brass stock, tweezers, flat-tip pliers, etc. were the common tools used. We learned to anneal (heat the brass PE and allow it to cool to remove the "temper" or hardness from the metal) to make the PE softer and easier to bend. We learned to glue PE using CA and two-part epoxy without making a mess, and we learned to solder PE parts together for strength and appearance.

You know what? All of these "old school" techniques and tools still work today! The only "new" tool that's been added to mix is the design-purpose bending (or folding) tool. I believe that Mission Models was the first with their "Etch Mate." However, it was soon followed by the Ausfwerks Design "Fenderbender" (now out of production) and most lately by the Small Shop's (KPM Tools) "Hold 'n Fold" series of tools. The original "Etch Mate" has sadly been converted into a plastic tool which lacks the durability needed for metal smithing. Luckily the "Hold 'n Fold" tools are finely machined in hard anodized aluminum, and their design has been refined and improved, so that at this time, the "Hold 'n Fold" tools represent the absolute best option for the modeler.

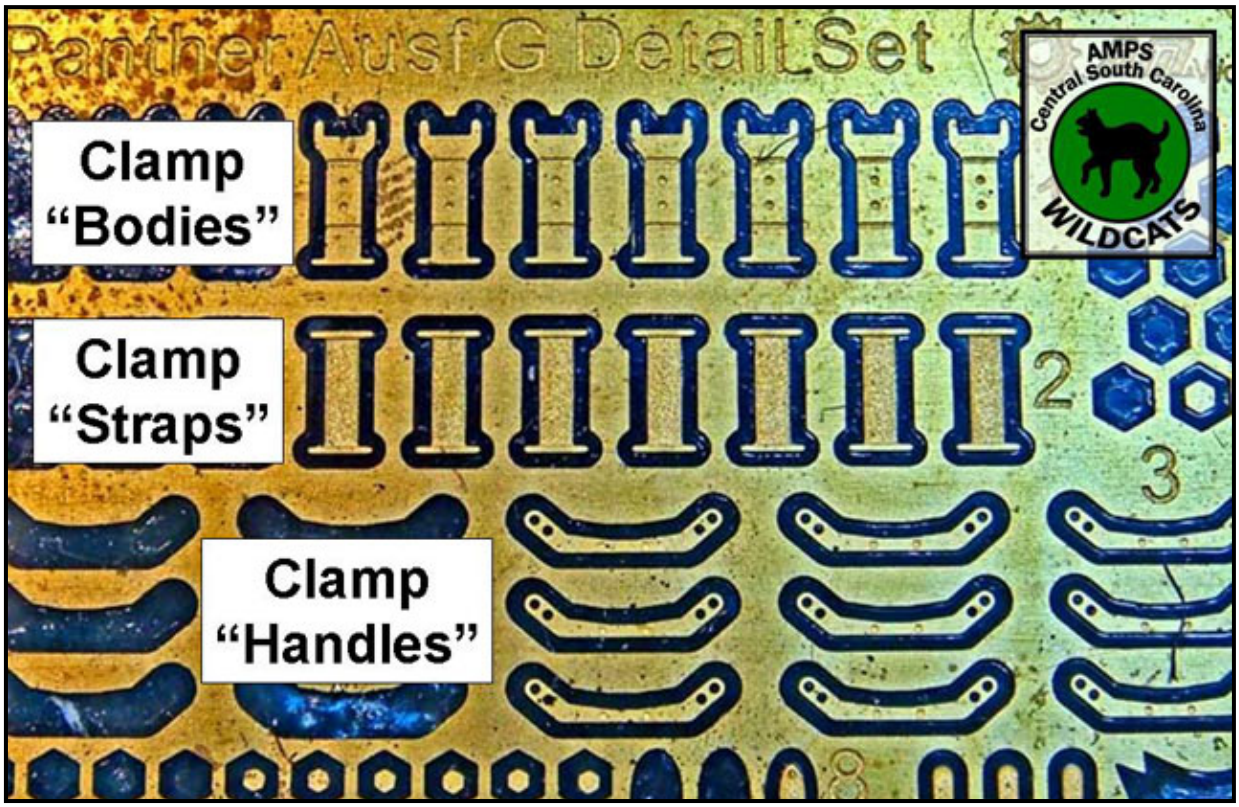
So, what does a bending tool do for you? It allows a degree of precision in your PE folds and bends along with a simplicity in setting up the bends both of which save considerable time over the "old school" techniques. If you use or build a lot with PE, one of these tools is great to have. On the down side, they are expensive when compared to many other model building supplies (about the retail cost of many newer single kits). For me, though, the degree of precision that the bending tools enable me to achieve is worth the cost. This is, of course, a personal choice.



In this "how to" edition, I will show bending techniques that use both "old school" and "new tool" methods. The point of this is that your choice to use or not use PE parts shouldn't be based solely on a lack of a dedicated bending tool. You can achieve the same final results (albeit slower and with more work) using tools and materials that you probably already have on your work bench. It's not that I advocate this approach (I've achieved national award winning results in both IPMS and AMPS national contests with models built using only

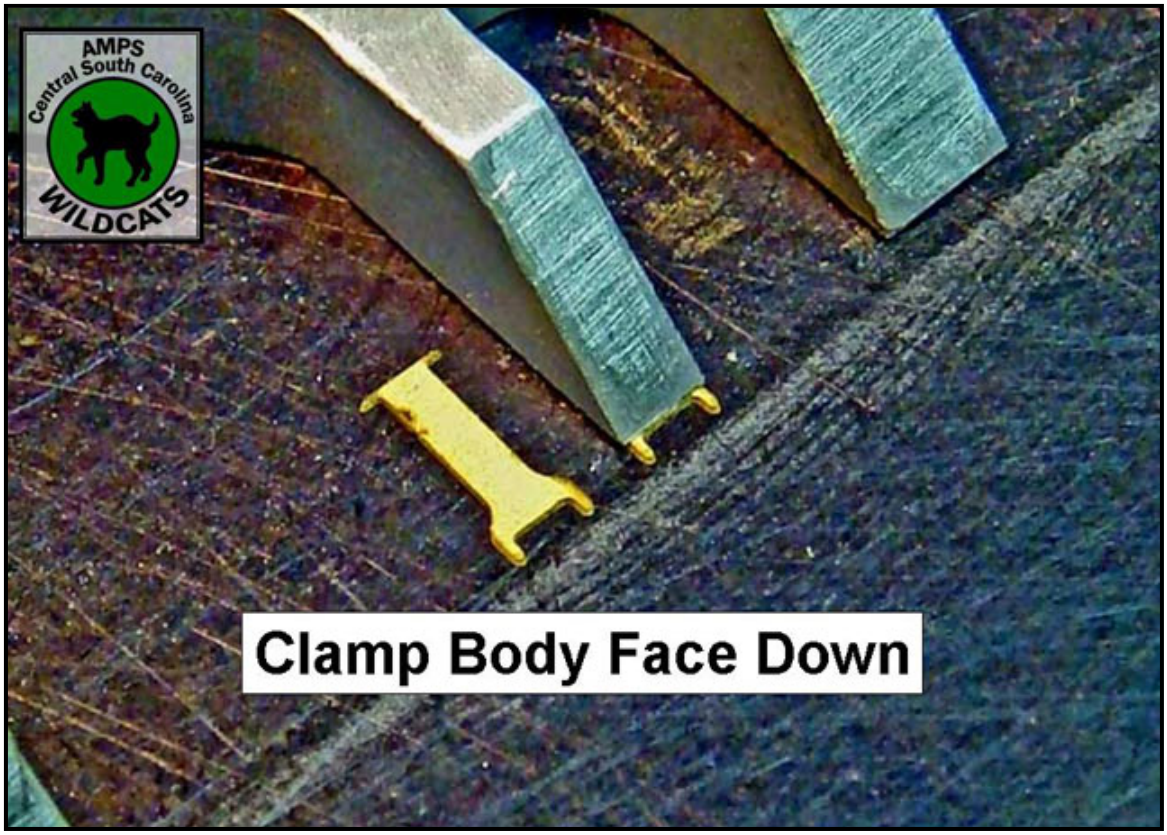
"old school" PE assembly techniques). It's just that PE adds so much in the way of detail and scale appearance to many models that I think it would be a shame to limit yourself simply because you don't have the latest-greatest toys!

The AM-Works tool clamps come as a separate set (LW3506) or as additions to their other vehicle detail sets. Shown here are some of the clamps included with the LW35054 Panther G detail set. Except for size (small, medium, or large) the designs for all of these clamps is the same. The clamps that I'm showing here are designated "Type 1" (Tc1) by AM-Works. There is a "Type 2" (Tc2) clamp that differs in that it has interlocking "lips" across one end of the "strap" and "body." Assembly of the Tc2 clamp is the same except that these "lips" must be bent (instead of bending the Tc1 locking "tabs"). (See *The Wildcat: V2 N8* issue for some photos of finished Tc2 clamps.)



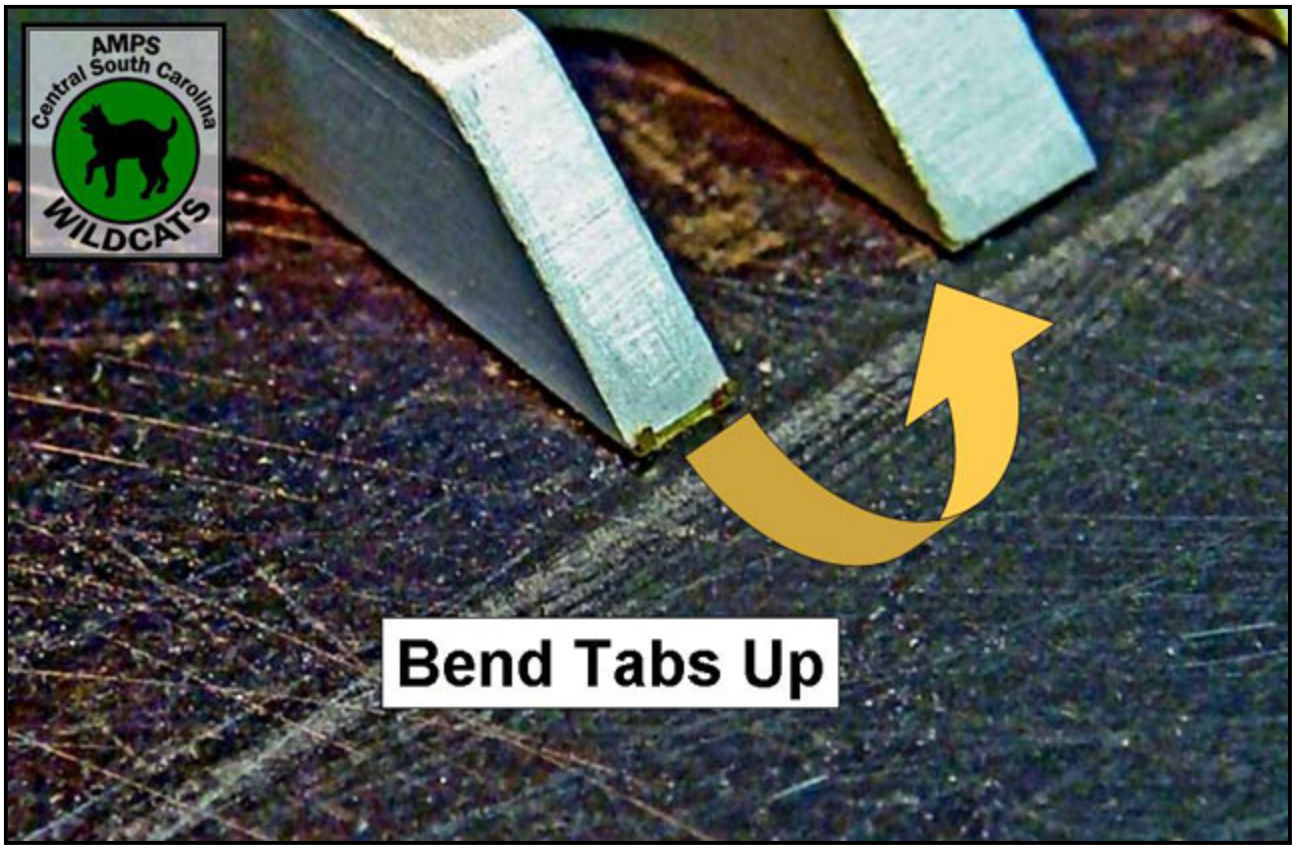
For convenience sake, I've labeled the clamp parts "strap," "body," and "handle." I have no idea if these are the actual German names for these parts, but I had to call them something in order to write a description of how I build them.

The first step in building these clamps is to bend the two small locking "tabs" on the end of the clamp "body." These must be bent in the opposite direction from the next two bends, so the "body" must be



held "face down" (i.e. with the bending lines and details facing down). Bend the "tabs" up to about 90 degrees.

The next step is to flip the "body" over (now face up) and clamp it in its center with one bending line to either side of the bending tool "finger." Now make two consecutive up-bends, one on either end of the body. Note that these bends should be a bit less than 90 degrees. The opening in the "body" should be wider than its base. The exact amount of this extra width depends on how much curve you bend in the "strap."



To do this "old school," hold the clamp "body" in a pair of sharp eyebrow tweezers or flat-tip pliers so that the "tabs" are just sticking past the tool's edge. Pay attention to how the part is oriented in the tool and then bend the "tabs" away from the "body's" detailed side.

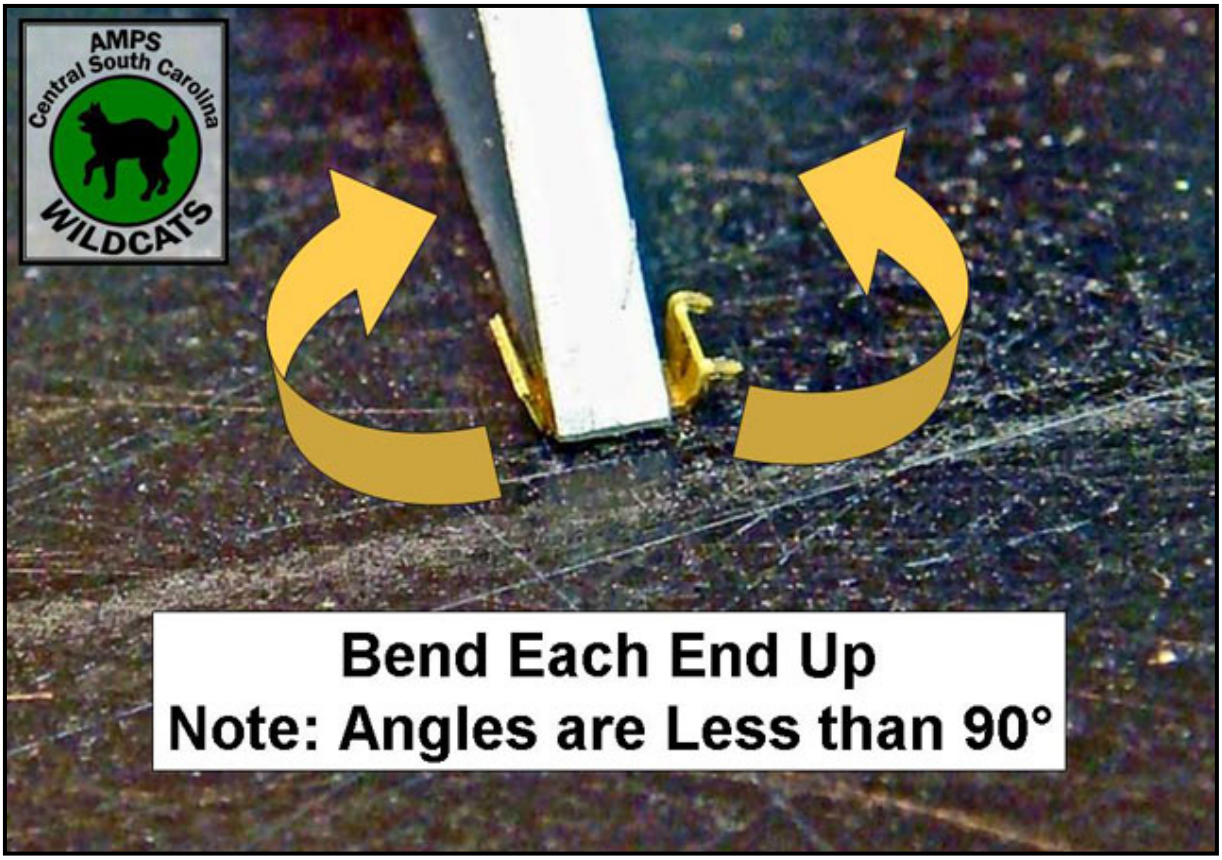
Now, place the clamp "body" face up (bent "tabs" down) on a piece of glass. The glass provides a hard precisely flat work surface. Clamp the "body" to the glass using the edge of a metal ruler or

straight edge. You need a ruler with sharp edges and corners, and if you can't find one, a piece of thick K&S Engineering flat brass stock will also work. The point is that the surface and form that you're bending against must be hard and sharp to impart precise corners to your work.

Now, make two consecutive up-bends, again, leave these a bit less than 90 degrees.

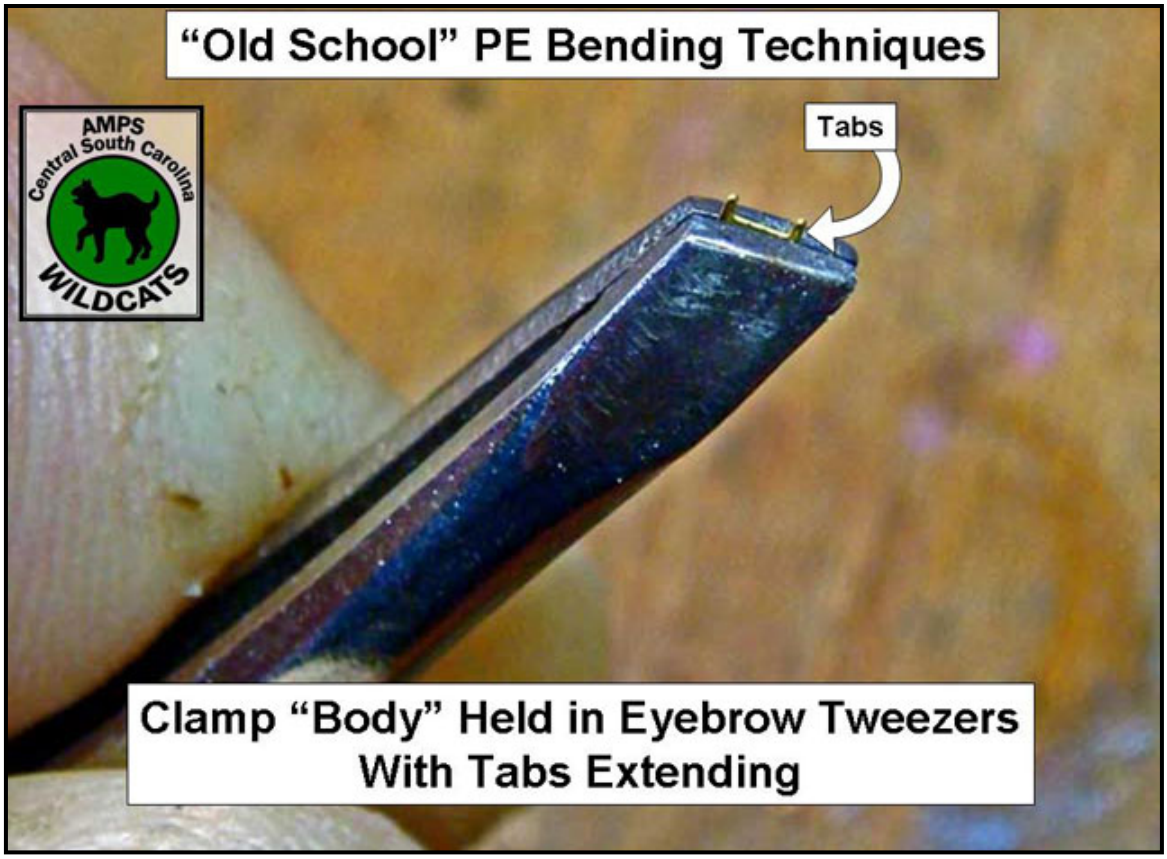
You can see that if you're careful, there is little or no difference in the final results between using the bending tool and the "old school" methods here.

The next step is to bend the handles. Look at the handles closely and you'll see two small etched dimples on one side. These are the bending marks or points. I have found that the tool clamps assemble more securely and work better if, after bending the handles, the short end of the handle is no wider than the width of the "strap" part. To get this width, I've also found that the diameter of the bending mark must be included in the long sides of the handles. This requires a bit of finesse when positioning the handle for its bends.

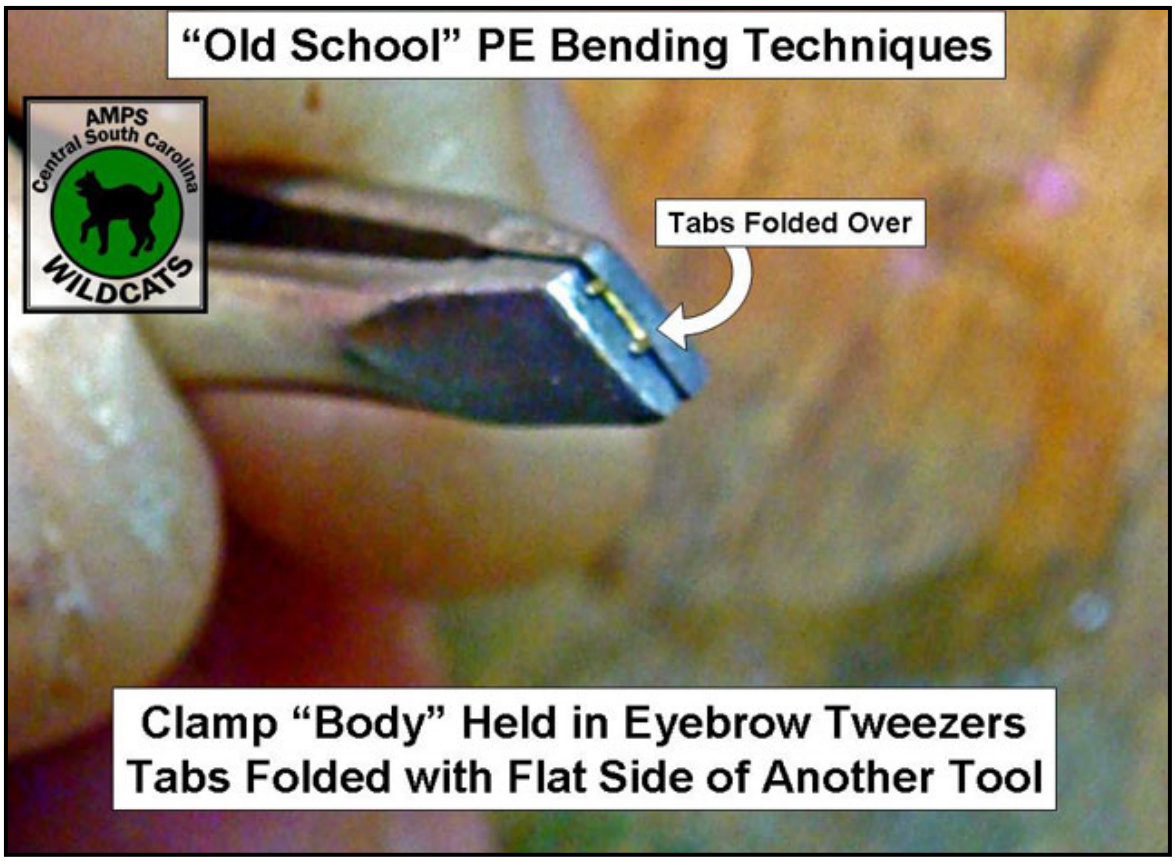


On my tool, even the narrowest finger is too

wide to fit between the two handle bends, so I position the handle for the first bend, make it, then slide the handle over to make the second bend.



The "old school" technique is similar to bending the clamp "body." Position the "handle" face-up, clamp down on it at the bending mark with the metal straight edge, and make the first bend. Slide the clamp over to position the second bend and make it. The ruler is narrow enough that both bends are up. Keep your "lever" tool (the razor blade or X-acto knife blade) tight against the bottom edge of the clamping ruler and lever up pressing hard against the side of the ruler to get a nice sharp bend.

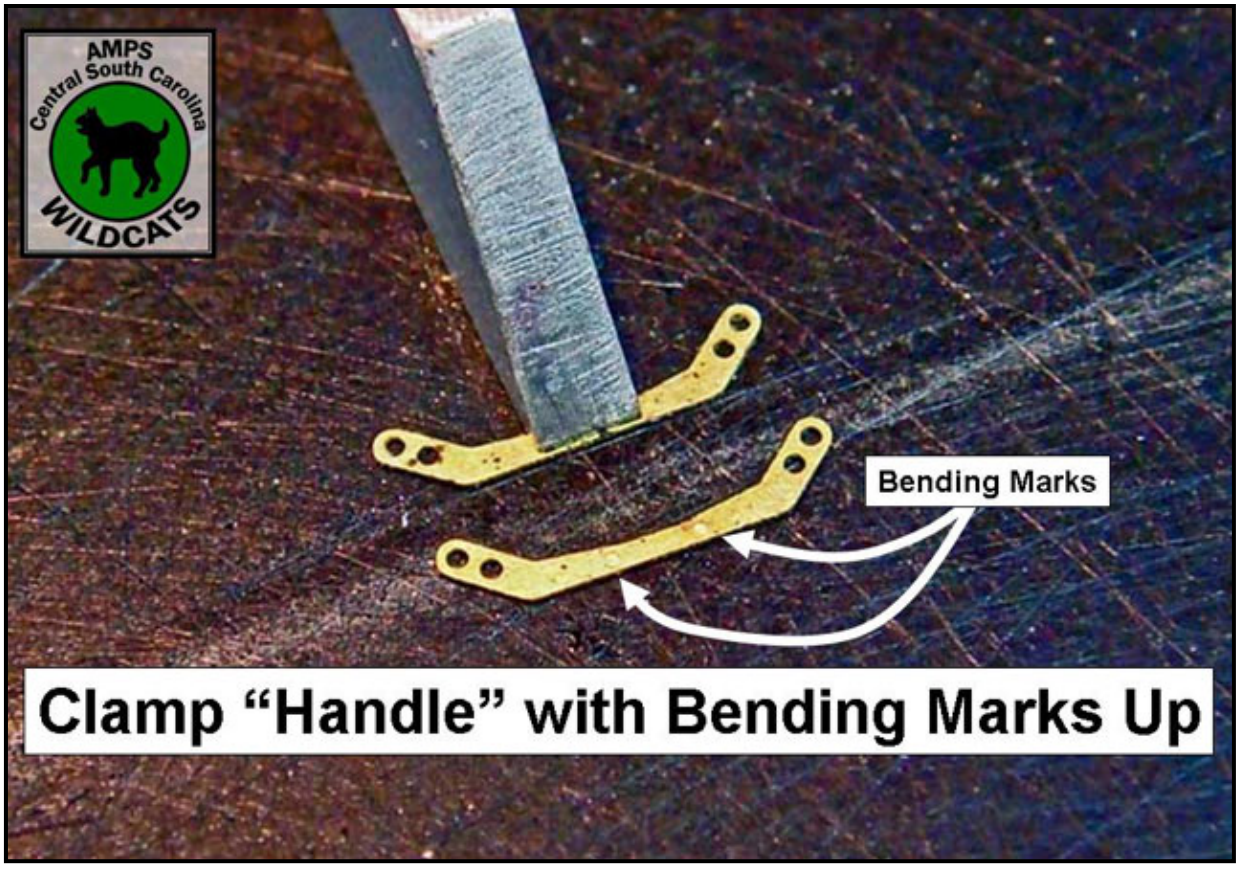


Again, when comparing the clamp parts bent using the PE tool or the "old school" techniques, there are not apparent differences. The only real difference was how much easier and faster it was to do this with the PE bending tool. The end results, though, are the same.

To bend the "strap," it's all "old school." Bending smooth curves in PE parts requires two things, neither of which is available as commercial, design-purpose items.

First up is a roller (well… OK, I think there are a couple of PE rolling tools, but as you'll see, they're more of the "male form and female die" types than true "rolling" tools). I use various sized bits of steel and brass rods and tubes that happen to have crossed my work bench over the years. I keep a small box of these lying around and just grab the size that looks most convenient. The size (diameter) of the roller must be less than the final desired size (diameter or radius) of the curve or bend. This allows for the PE part to "spring" out a bit, but it's also a factor of how metal is shaped or formed (perhaps most correctly "deformed"). When the metal is bent, the outside of the radius stretches and the inside compresses. The roller diameter needs to be smaller than the outside radius of the part so that it can exert the force required at its point of contact needed to compress the inside of the metal to keep

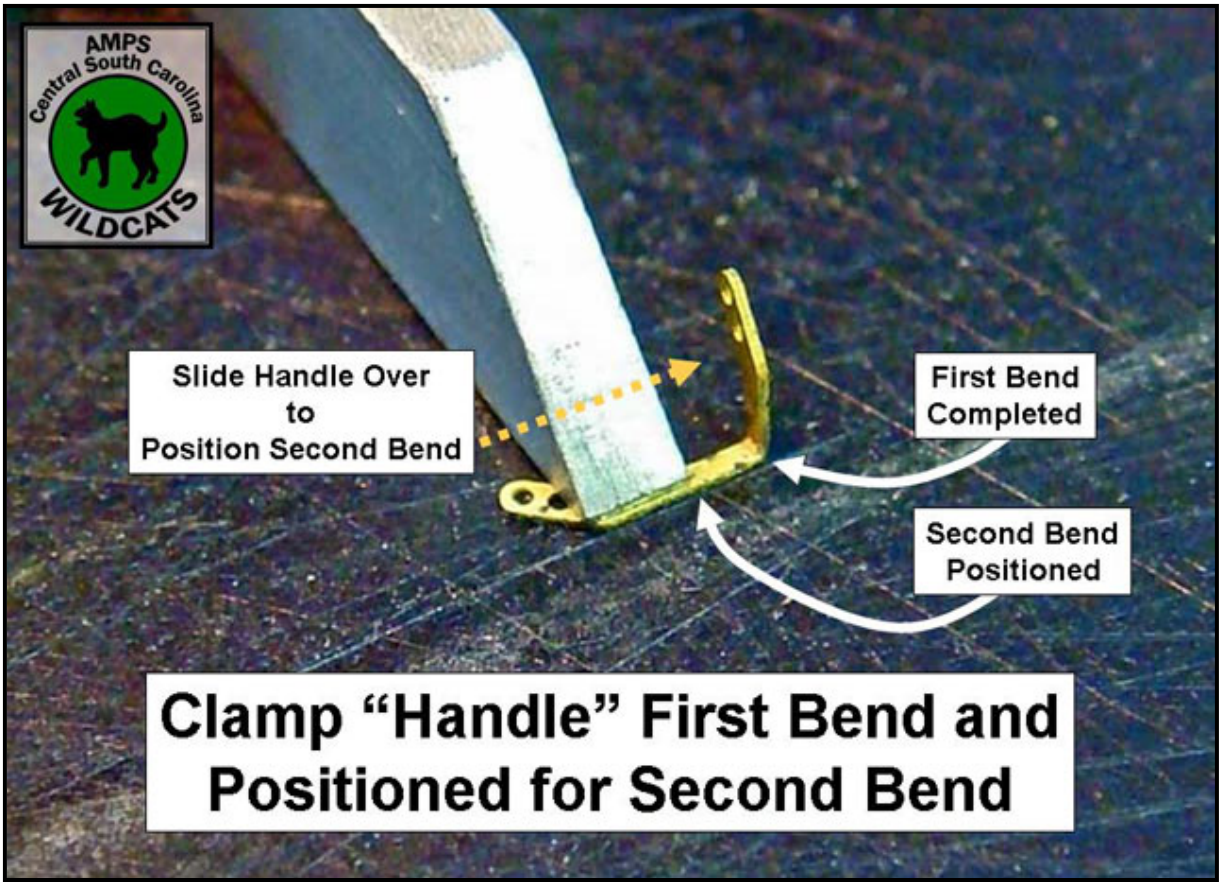
it from stretching on the inside while exerting force through and away from its axis to the outside in order to stretch it.



Also, the roller needs to be rigid along its length to keep from deflecting in the center of the bend giving the outer edges of the bend a greater radius than its center.

For this narrow, small bend, I'm using a piece of stainless steel tubing about 3/32 in diameter. Since the clamp "strap" is so thin, it doesn't need to be annealed.

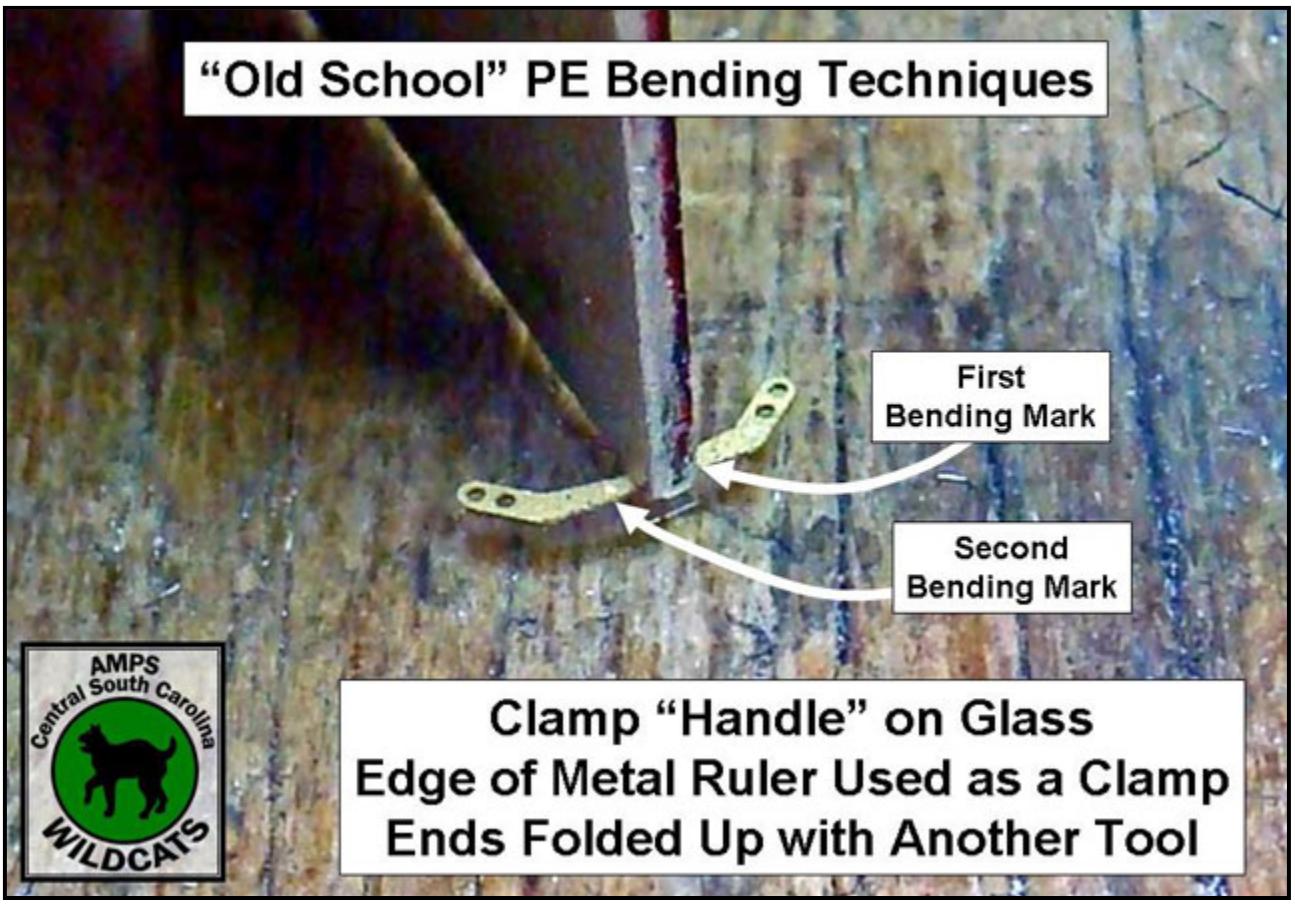
The second thing needed is a soft bending surface to roll against. (This is the opposite of the glass plate requirement needed for sharp bends). I use many different surfaces depending on the size of the final curves needed. A piece of inner tube



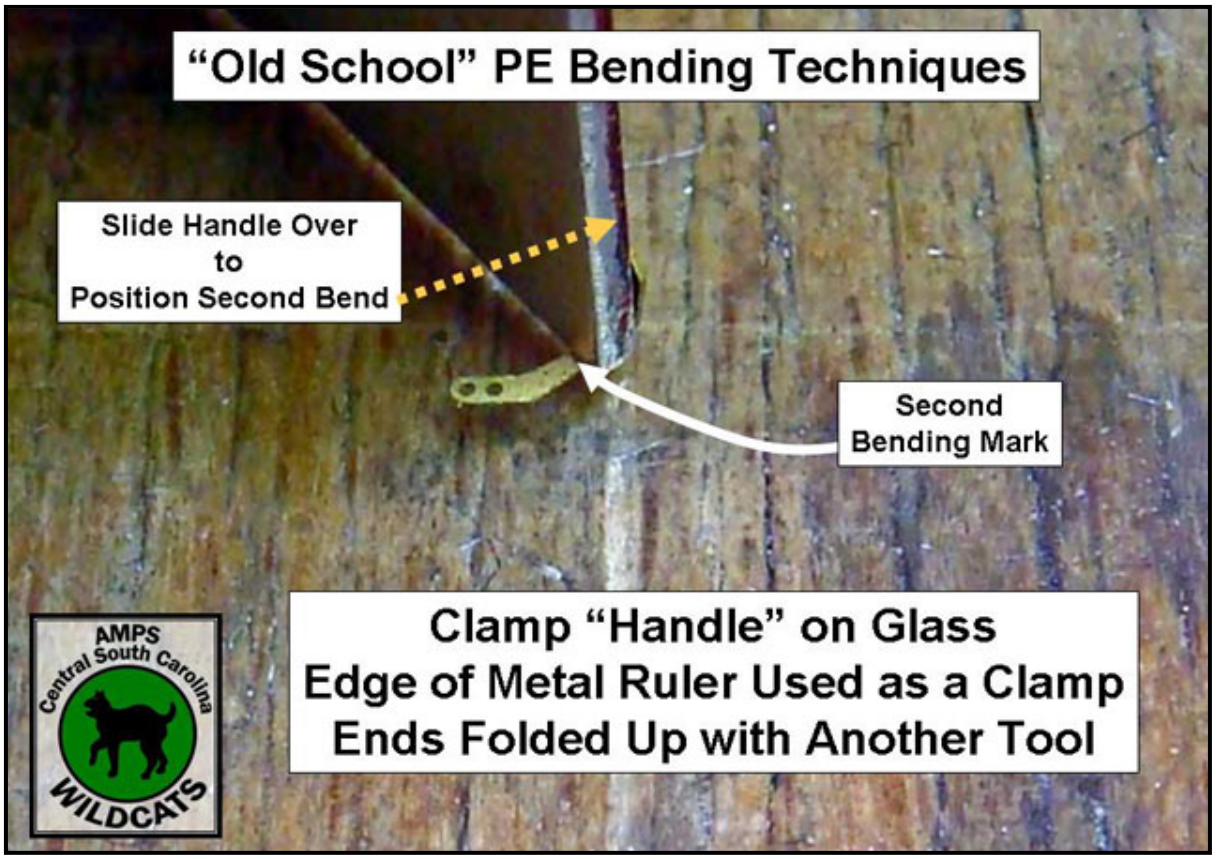
rubber on my wooden work bench works well sometimes. I've also use a piece of foam core poster board when I needed more flexible depth to bend against. However, I've also use a couple sheets of paper when I needed a harder less flexible surface to make small slightly radiused curves.

One of the most useful surfaces that I have is made up of several wide rubber bands wrapped around a small wooden block. This expedient work surface is about 3 inches square and is convenient to keep handy on my work bench. It works well for small curves and radiuses, and in fact, I bent the curved front fenders for my Panther using this surface.

I bend the tool clamp "straps" face down (with their pin detail down). This works for me, but I'd guess it can also be done the other way. We need to impart a

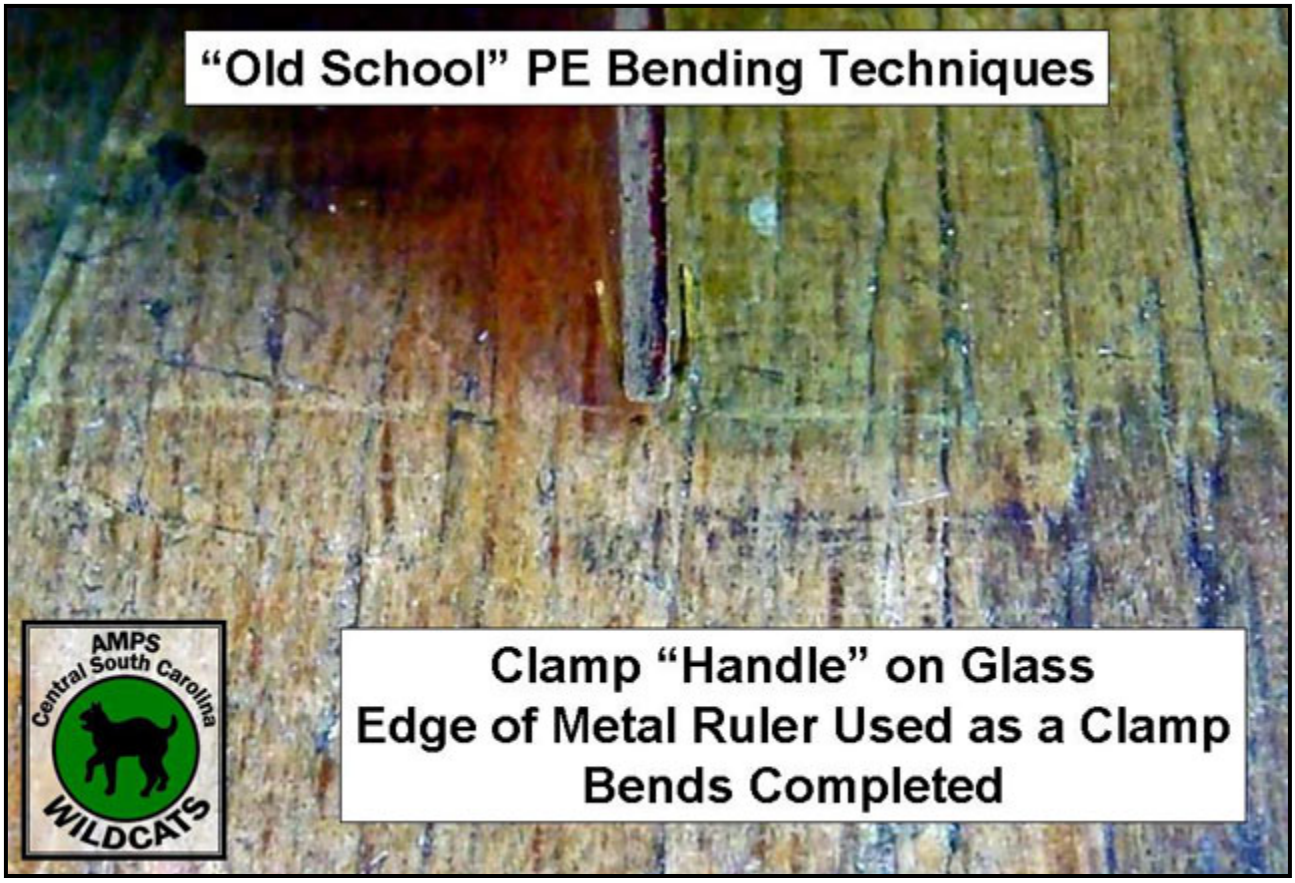


curve to the strap to replicate the prototype's design. However, if we don't curve the straps, they will be too long to close over the top of the clamp "body."

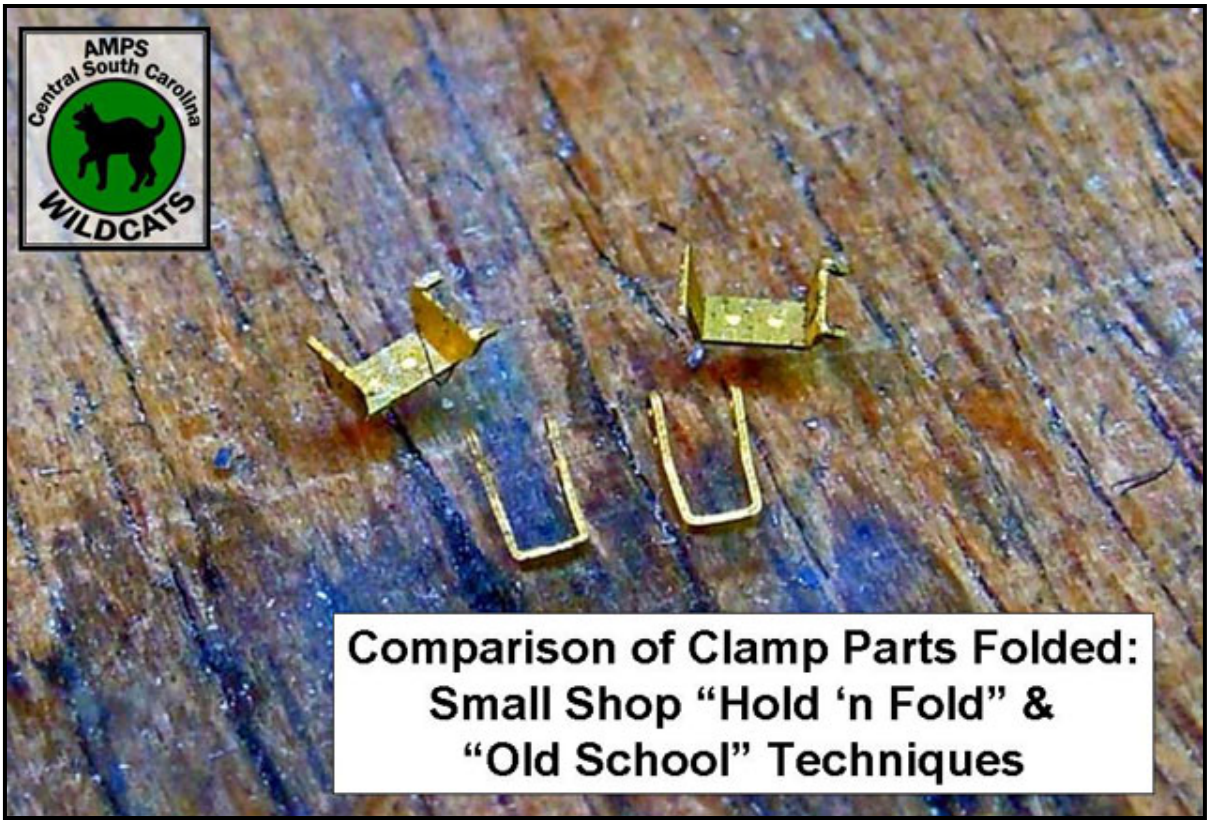


Hold the roller on both ends and rock it across the "strap." The amount of curve is a judgment call and depends on how wide the top of the formed clamp "body" is.

Now, I've learned that the clamp "strap" works best if it has a second, "relief" bend of about 75 degrees about 1/5 of the way from one of its ends. This bend, when once fitted into the "handle," provides clearance for the "strap" to pass over the handle edge of the clamp "body." This will then allow the "handle" to lay flat or flush against the tool clamp's mounting surface. Without this relief bend, the "handles" tend to angle upward too much when the clamp is closed.



I hold the "strap" in my flat-tip pliers with about 4/5 of the strap sticking out. I then use the flat edge of another tool (side of an X-acto knife blade, tweezers handle, etc) and bend the "strap" down a bit less than 90 degrees.



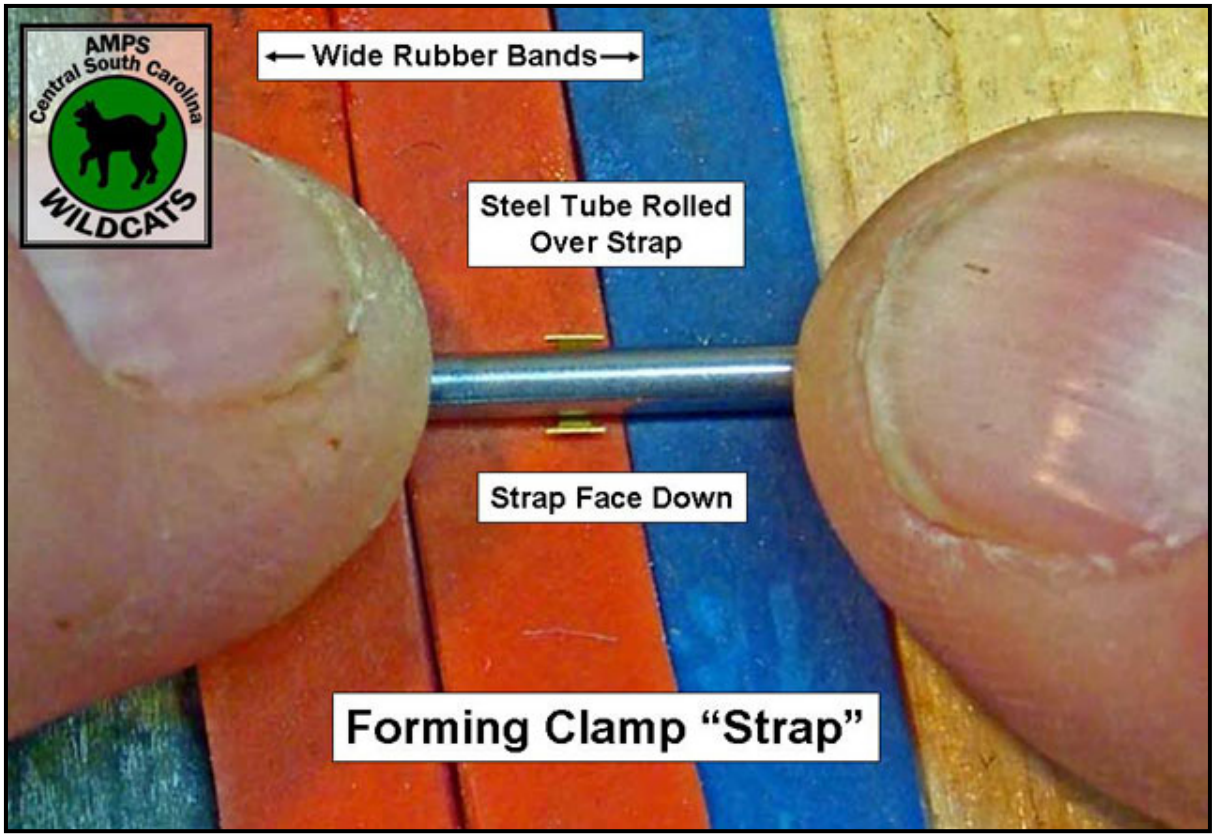
Here you can compare the "strap" with the second "relief" bend (front) to one without the second bend (rear).

Ok, so now we have all these nicely formed and bent PE tool clamp parts: How do we put them all together?

Again, no specialized tools required here. In fact, I only use two tools for to assemble the clamps. I use a pair of cross-locking tweezers with tips small enough to hold the formed handle on its short side, and I use a pair of fine-tipped tweezers to manipulate the "strap" and "body" into the holes on the handle.

Note a couple of important points first: One is the orientation of the handle once assembled. Refer to the pictures and your instructions. It is easy to assemble the clamps with the handles up-side down. I know because I've done it! Nothing is more aggravating than to have to disassemble one of these things because of a *laepus*

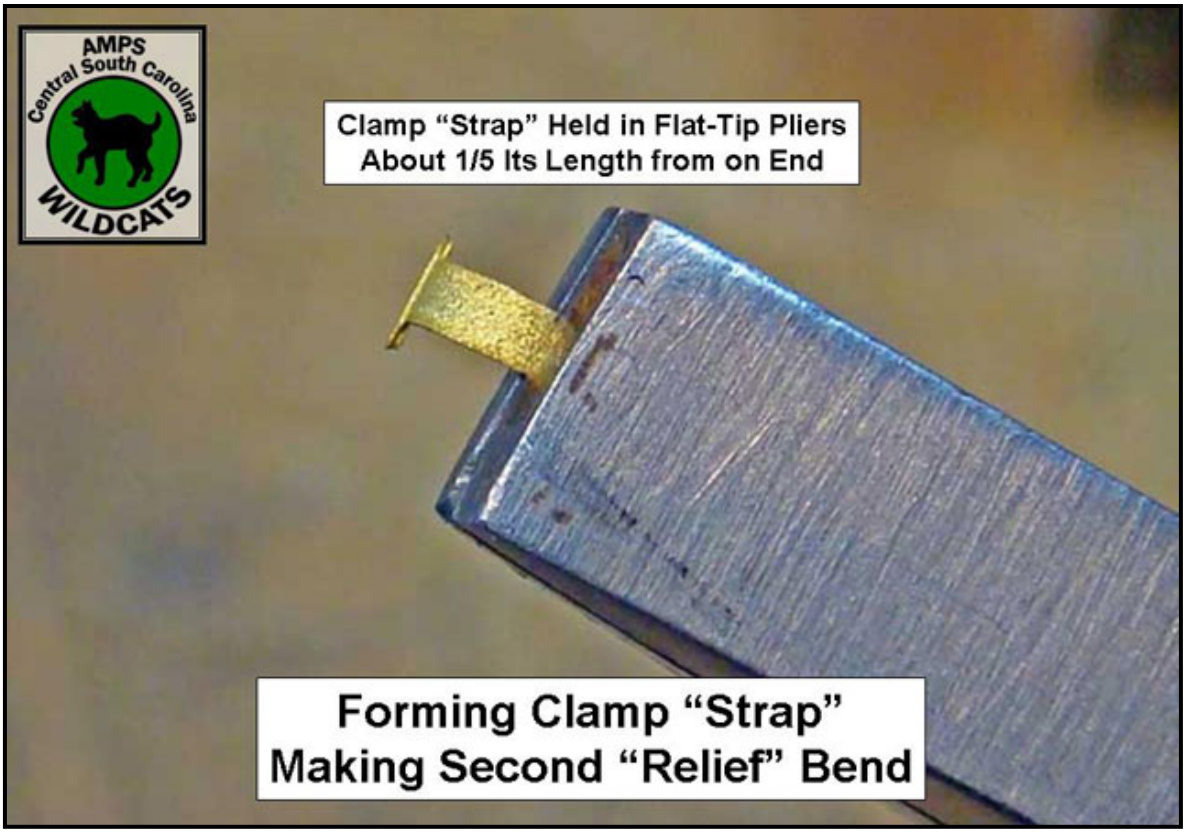
cerebellum! The second this is that the handle has two sets of holes. The set closest the handle's closed end is for the "strap," and the set of holes on the tips of the handle's "arms" are for the clamp "body."



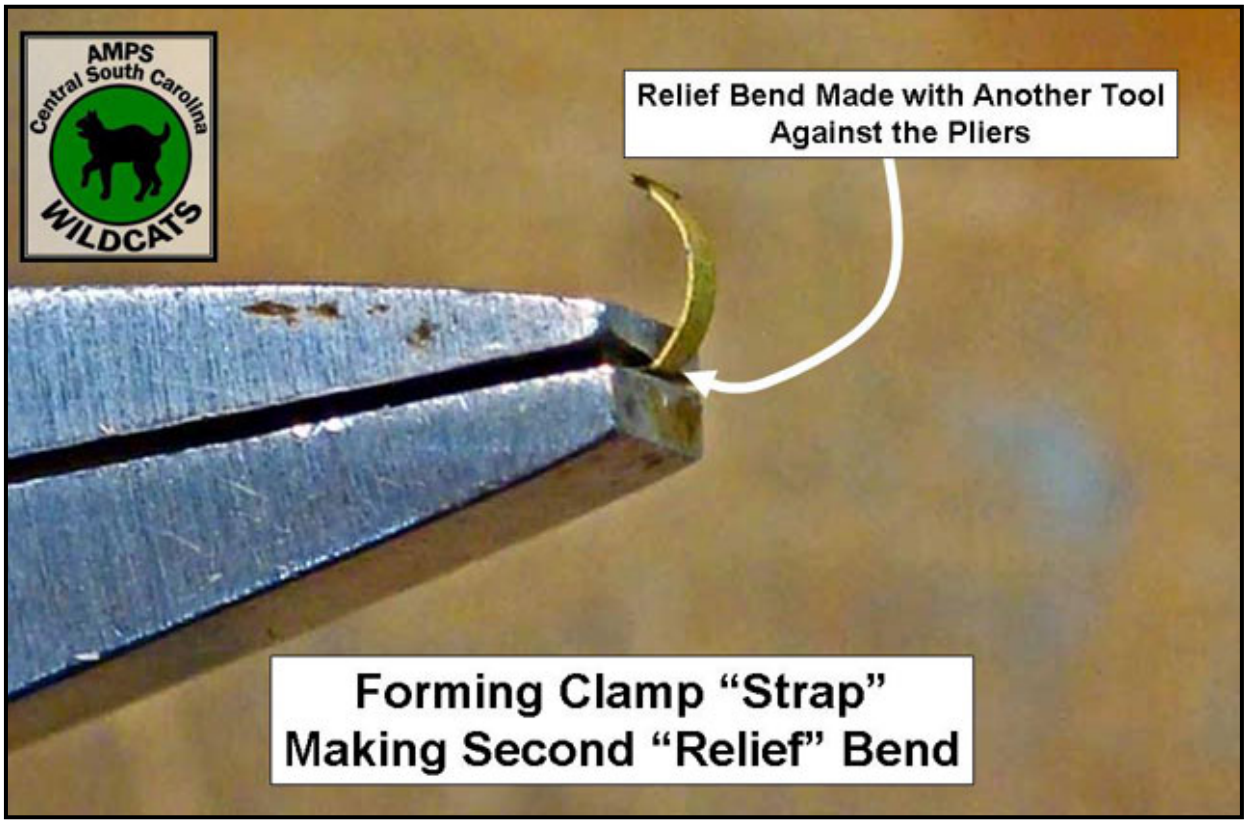
I grab the handle with the cross-locking tweezers and hold it in my left hand between my thumb and forefinger with its open end to my right. My left forefinger applies "counter-pressure" against the backside of the handle to keep it from deforming and to keep it closed against the other parts as I install them. This is very important. Without this counter-pressure, the handle will open up and the pins from the "strap" and "body" will not stay in place.

I start by installing the "strap." I angle the "strap" to stick its "nearside" pin into the handle hole closest to me. I then use the "strap" to push the "nearside" of the handle towards me, opening the clamp handle slightly. As the handle opens enough for the "far side" "strap" pin to clear the inside of the handle, I lever the "strap" away from me and slide the far end of its pin into the opposite handle hole.

As the far end of the "strap" pin enters the opposite hole, I squeeze my thumb and forefinger together slightly to re-close the sides of the handle trapping the "strap" pins in their holes.

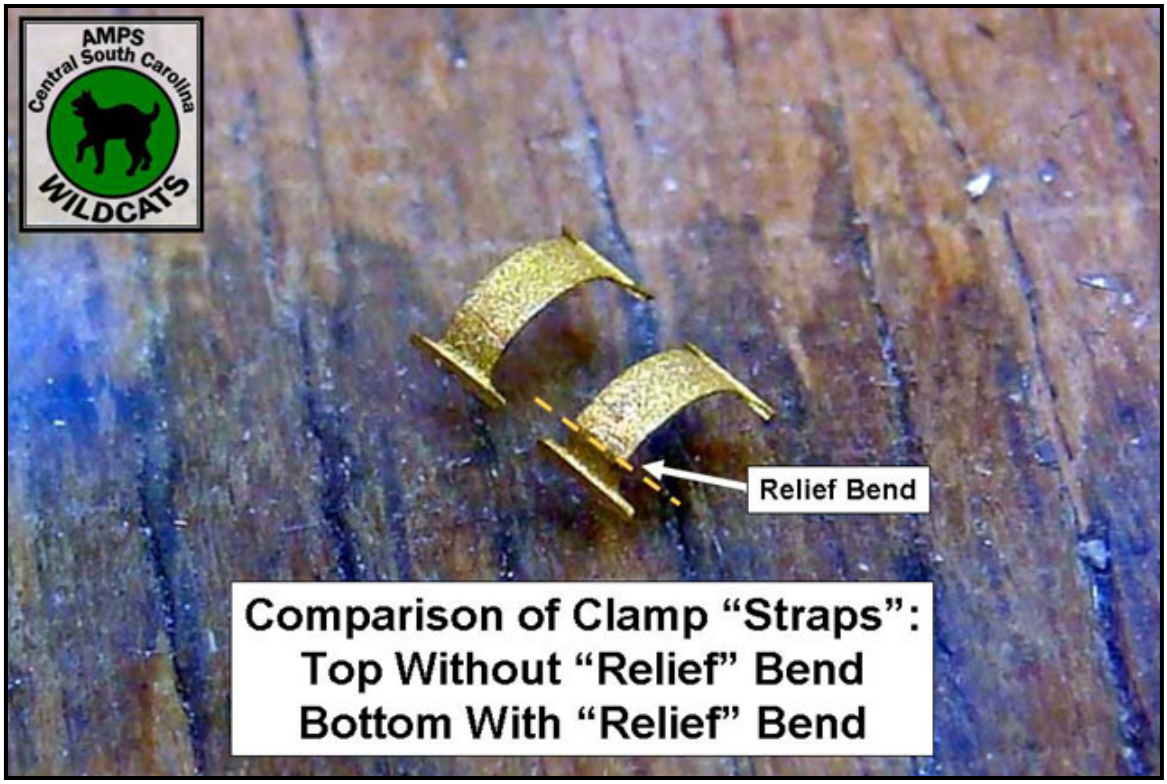


Next, I flip the "strap" up and out of the way. I then use the fine-tip tweezers to slightly (!) bend the very tip of the far side of the handle away from me. This provides just a little bit of extra clearance room for the clamp "body" pins. You don't need to make this little bend too large or the "body" pins will not stay in place long enough to close the handle in the last step.



I then install the clamp "body" using a procedure very similar to that used for the "strap." I begin by angling the "body" towards me to stick its "nearside" pin into its hole. Once its in the hole, I pull the "body" slightly towards me opening the handle a bit

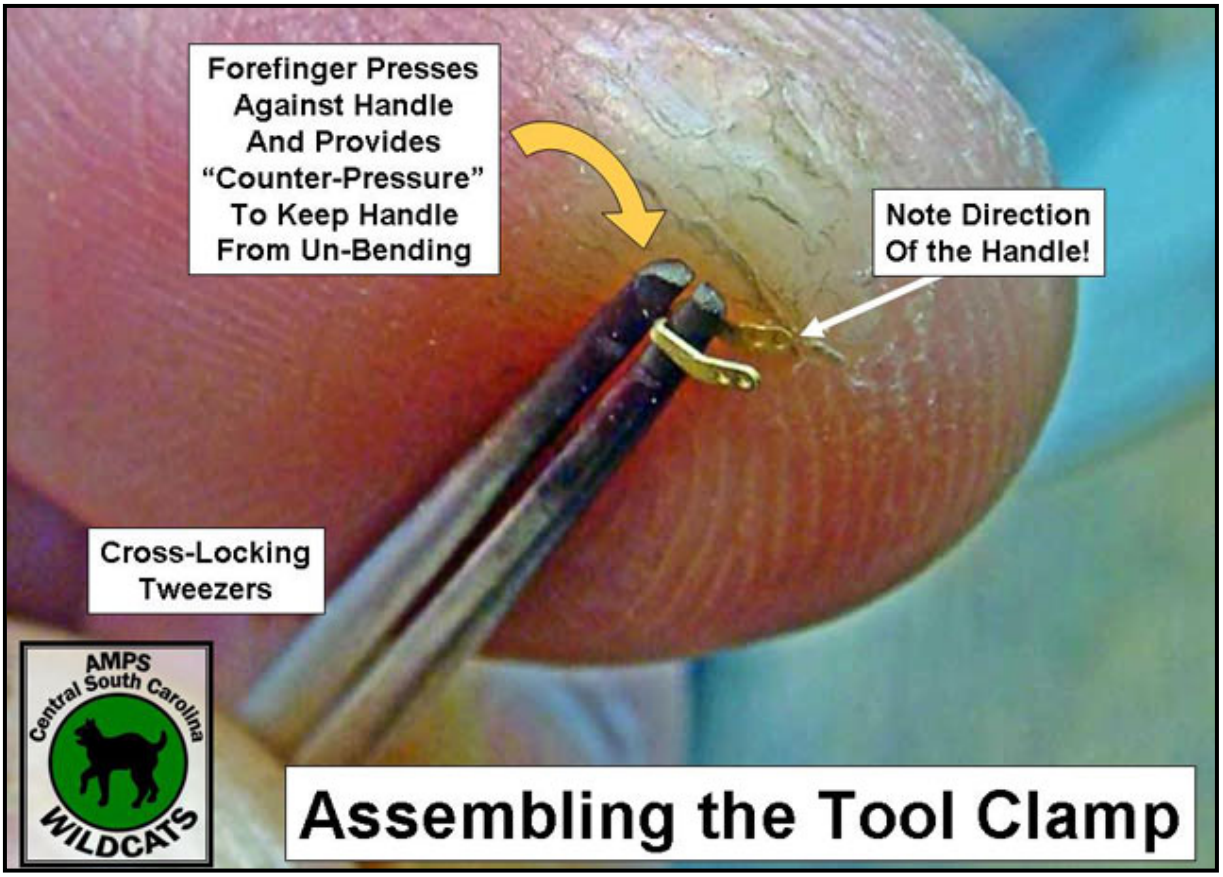
to get enough clearance for the "far side" "body" pin. I then lever the "body" away from me and slide the "far side" pin into its hole.



Note, don't pull the "body" too much and open the handle too wide or your "strap" pins will disengage from their holes, and the strap will fall out. This is why we make the very slight clearance bend in the tip of the handle. Also, keep your thumb and forefinger applying pressure to the sides of the handle.

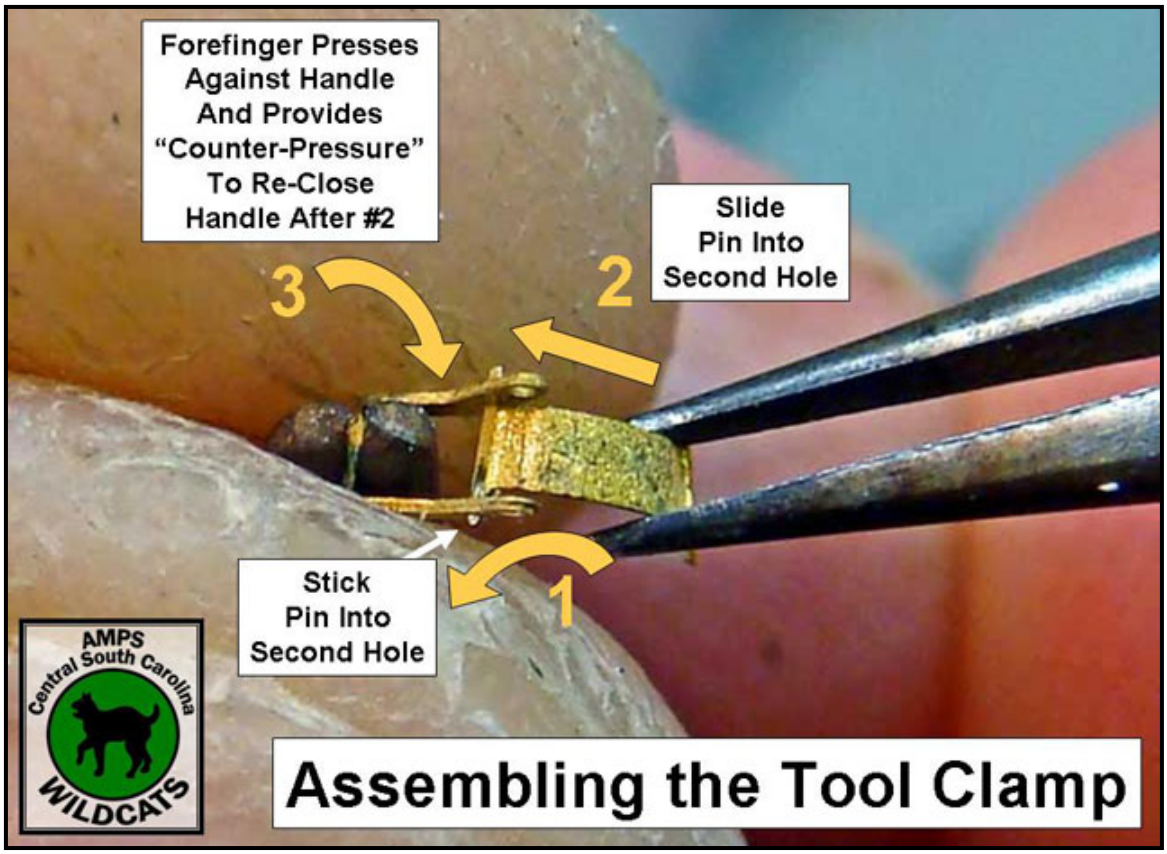
Again, as the "far side" "body" pin enters its hole, I use pressure between my thumb and forefinger to squeeze the handle closed to trap the pins.

Finally, I use the fine-tip tweezers to close the ends and sides of the handle against the "strap" and "body" pins. I also "tidy-up" any parts that need it. Here you can see that the "strap" has been twisted slightly. I simply grabbed its end with the fin-tip tweezers and straightened it.

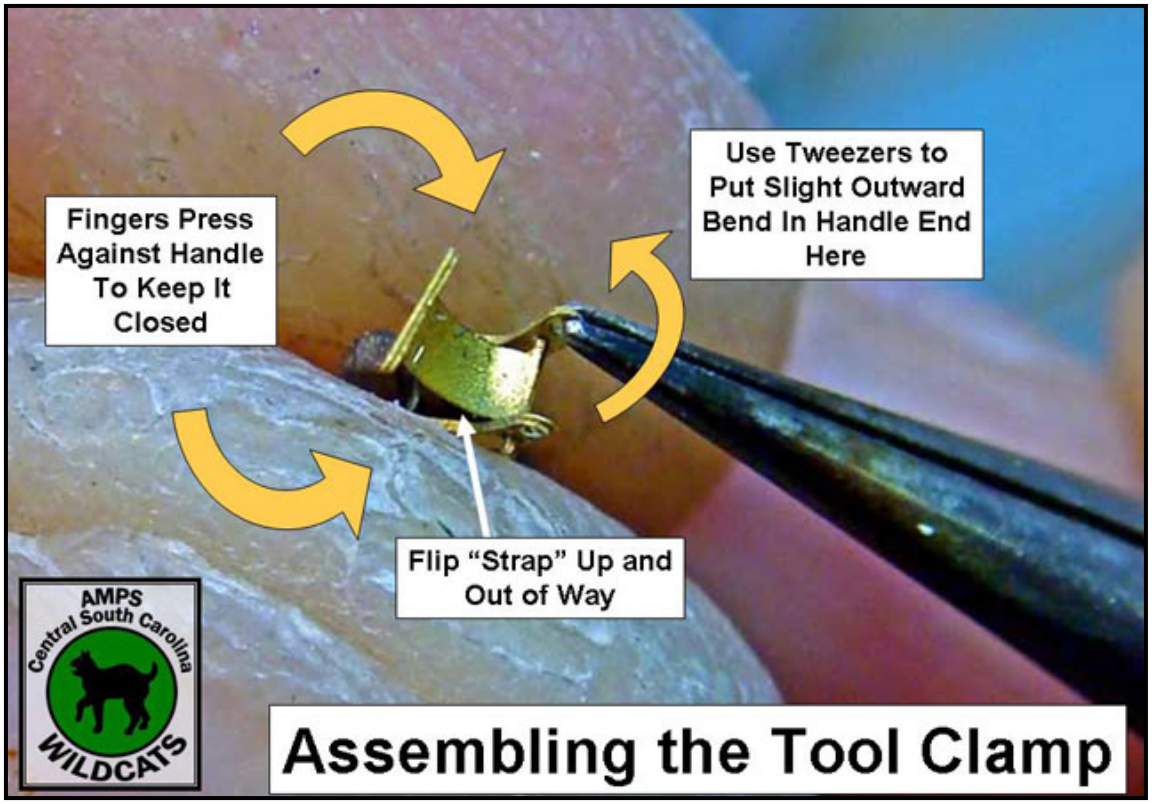


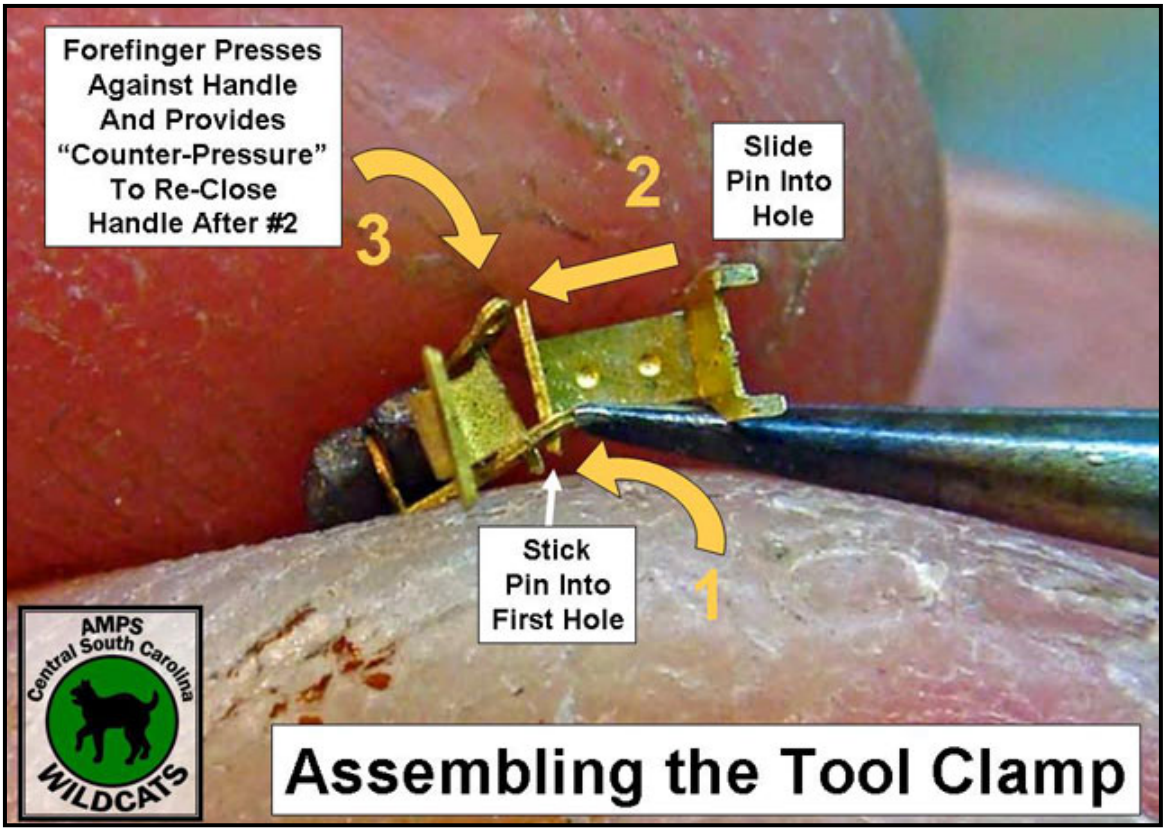
In the final comparison shot of the two clamps, one bent

using the "Hold 'n Fold" and one using the "old school" techniques there are essentially no differences that I can see.



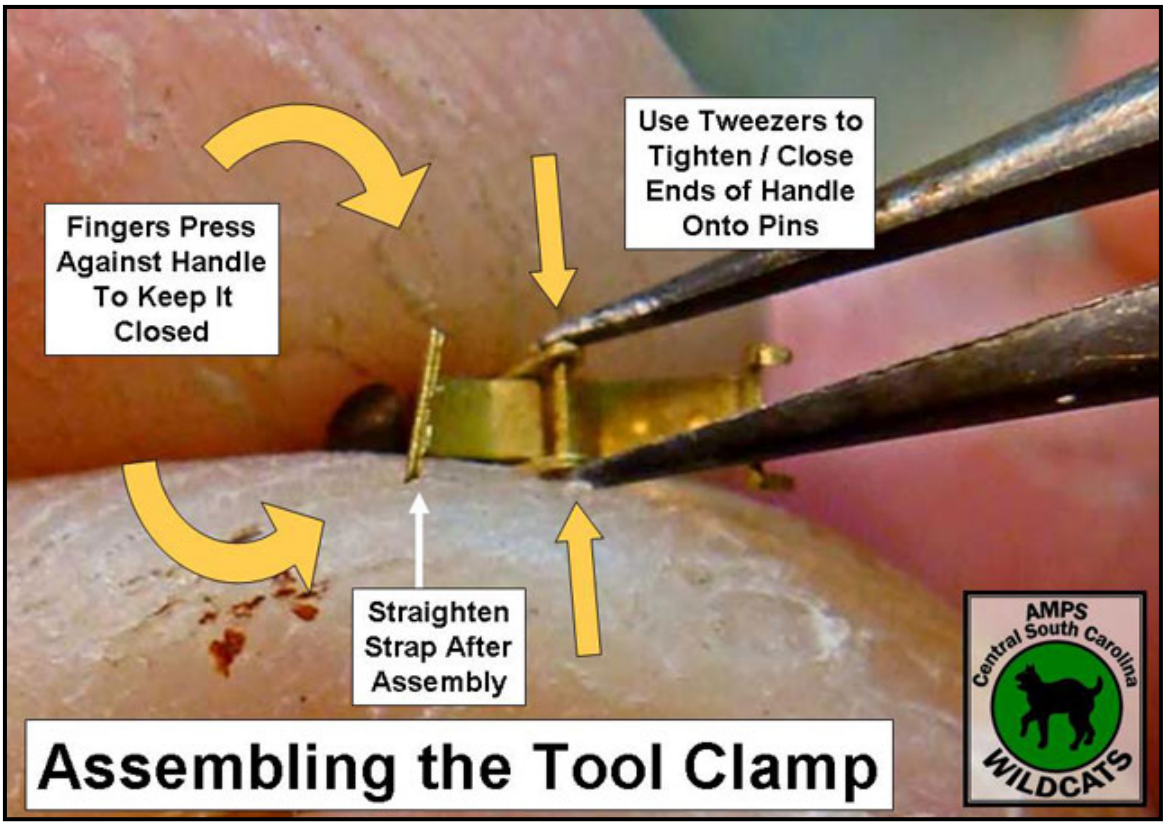
These little tool clamps add a great deal to the "look" of any German vehicle and create a significant amount of extra detail. Also, with careful assembly, the working nature allows for simpler and cleaner final finishing. One thing that you will probably see it that many of the kit tools don't fit tightly into the clamps. There are a couple of reasons for this. One is that these clamps are a "generic" design, and even the three different sizes in the AM-Works set is a compromise. The prototypes were each designed for a specific tool, and although their function was the same, their exact dimensions varied. Also, the prototypes had rubber, leather, or fabric cushions on their inside surfaces to ensure the tools were not damaged and did not vibrate loose. However, once you've added your kit tools to the clamps, a bit of thinned white glue (I use Woodland Scenics "Scenic Cement) or flat clear paint (of your choice) will fix the tools in place and hold them precisely in alignment on your finished model.





If there's enough interest in this little "how to," I'll write up some additional tips and suggestions for other specific PE assemblies and parts.

Happy modeling,
Mike Roof
AMPS #1632

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Finished Tool Clamp Open


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WILDCATS
Finished Tool Clamps Closed