

## Photo-Etch Demonstration Notes

Presented at the AMPS Central SC August 11, 2011 Meeting

The basic steps in using PE up-date sets:

1. Plan Use
2. Cut Part from Fret / Clean up Burrs
3. Bend / Form Part (as needed)
4. Join PE Parts to Each other to form Sub-Assemblies (as needed)
5. Attach PE Parts / Sub-Assemblies to Model
6. Texture Welds / Fill Seams (as needed or desired)

### 1. Plan Use of PE Parts

- Is the PE Part **Better** or **Necessary** ?
  - ✓ Review Kit Instructions / Make Notes as Needed
  - ✓ Review PE Instructions
  - ✓ Review References
- What is the best sequence of Construction?
  - ✓ Will Subsequent Bends Interfere with each other?
  - ✓ Can joins be soldered without unsoldering previous joints? (Use varied melting temp solders or wet paper masks)
  - ✓ Can details be embossed without deforming the part?
  - ✓ Does the part need to be annealed for forming or embossing?

### 2. Cut Part from Fret / Clean up Burrs

- Hard cutting surface (glass or ceramic tile)
- Cutting tool (knife or scissors)
- Control cut-off part from flying away (Anti-Carpet Monster Techniques)
- Sanding / Filing Burrs (Flexi-File, Sanding Block, Needle Files, Sanding Sticks)
- Hold small parts with tweezers close to burr to keep control and prevent deformation.

### 3. Bend / Form Part (as needed – some parts don't need to be formed)

- Tools"
  - ✓ Tweezers
  - ✓ Flat-tip Pliers
  - ✓ Hemostats
  - ✓ Bending Tools – Etch Mate, Hold 'n Fold
  - ✓ Soft / flexible surface for bending curves
- Annealing – Gas flame (stove, torch, candle)
- Correct Use of Bending Lines (bend INTO the line – usually!)
- Bending Sequence
- Embossing details
- Bending Curves
  - ✓ Use soft surface
  - ✓ Rollers

### 4. Join PE Parts to Each Other

- Glues (weak but easy to use)
  - ✓ CA
  - ✓ Two-Part Epoxy
- Soldering (hard to use but strong)
  - ✓ Irons – Electric or Gas Torch
  - ✓ Solder Types – High / Low Temp, 60:40, Rosin Core
  - ✓ Cut Solder to useful size
  - ✓ Flux – Tinning Flux: Paste, Acid Flux: Liquid
  - ✓ Apply and melt Flux
  - ✓ How to Hold Parts?
  - ✓ Apply heat and melt solder – Solder will not flow until underlying metal is also at solder melting point.
  - ✓ Tinning Technique

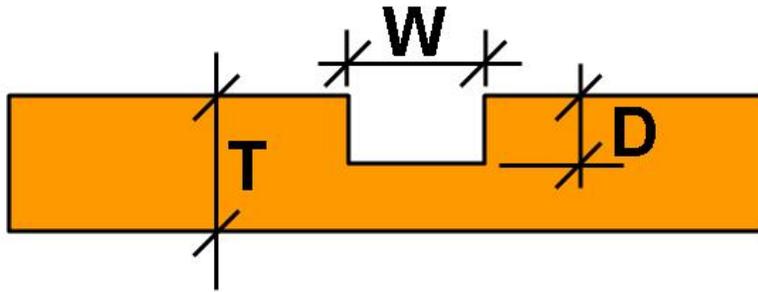
- ✓ Use Brass / Copper Wire Filler for Large gaps in Joints and Seams
- ✓ Use Wet Paper Towel to Protect other Joints from Heat
- ✓ Reinforce / Hold with wire to protect other joints
- ✓ Clean up excess solder, Smooth Joints, Putty and Filler as Needed

**5. Glue PE Parts / Sub-Assemblies to Model**

- Glues
  - ✓ CA – Use rubber cement on tooth pick to position small parts
  - ✓ Epoxy – Use "puddle-dip" technique
- Layout / Positioning – Use other parts to ensure correct spacing / positioning

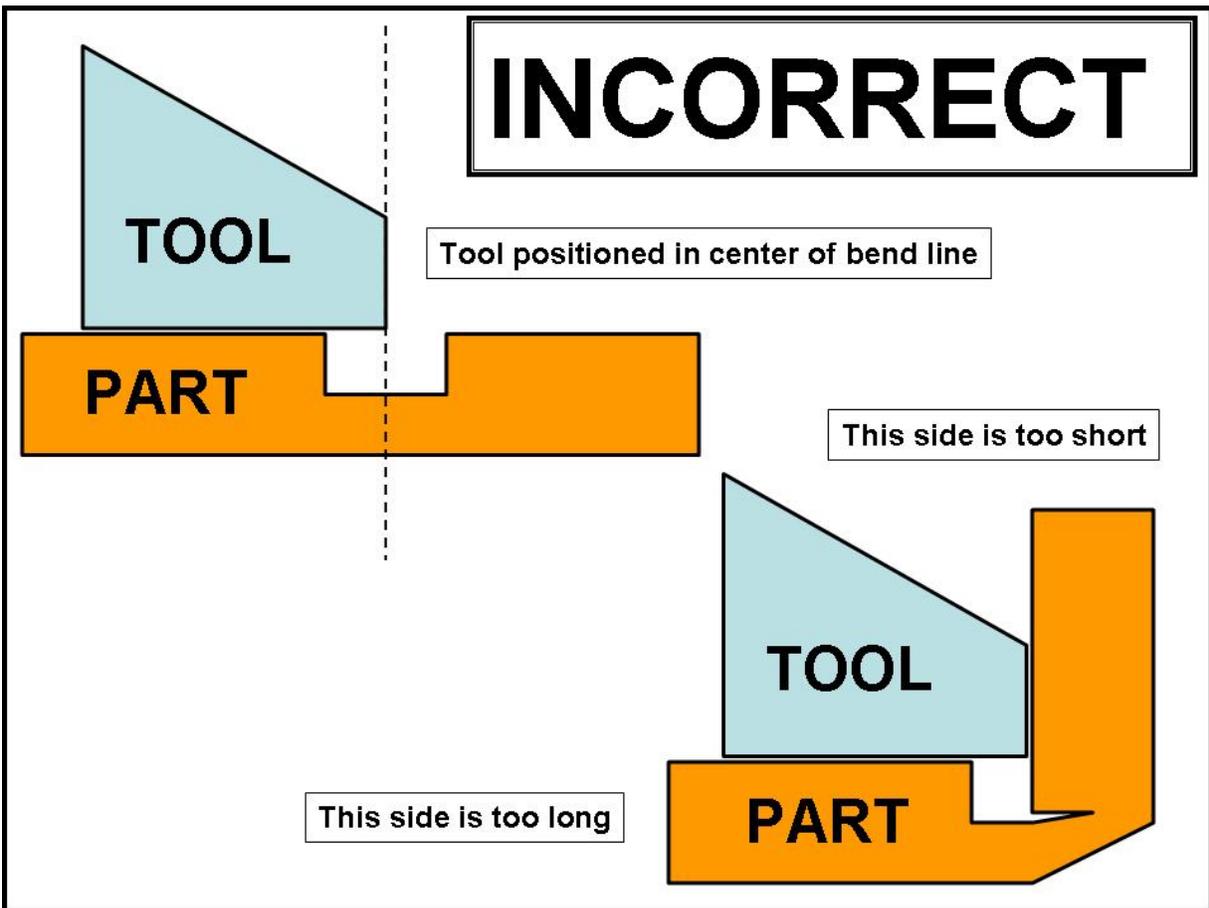
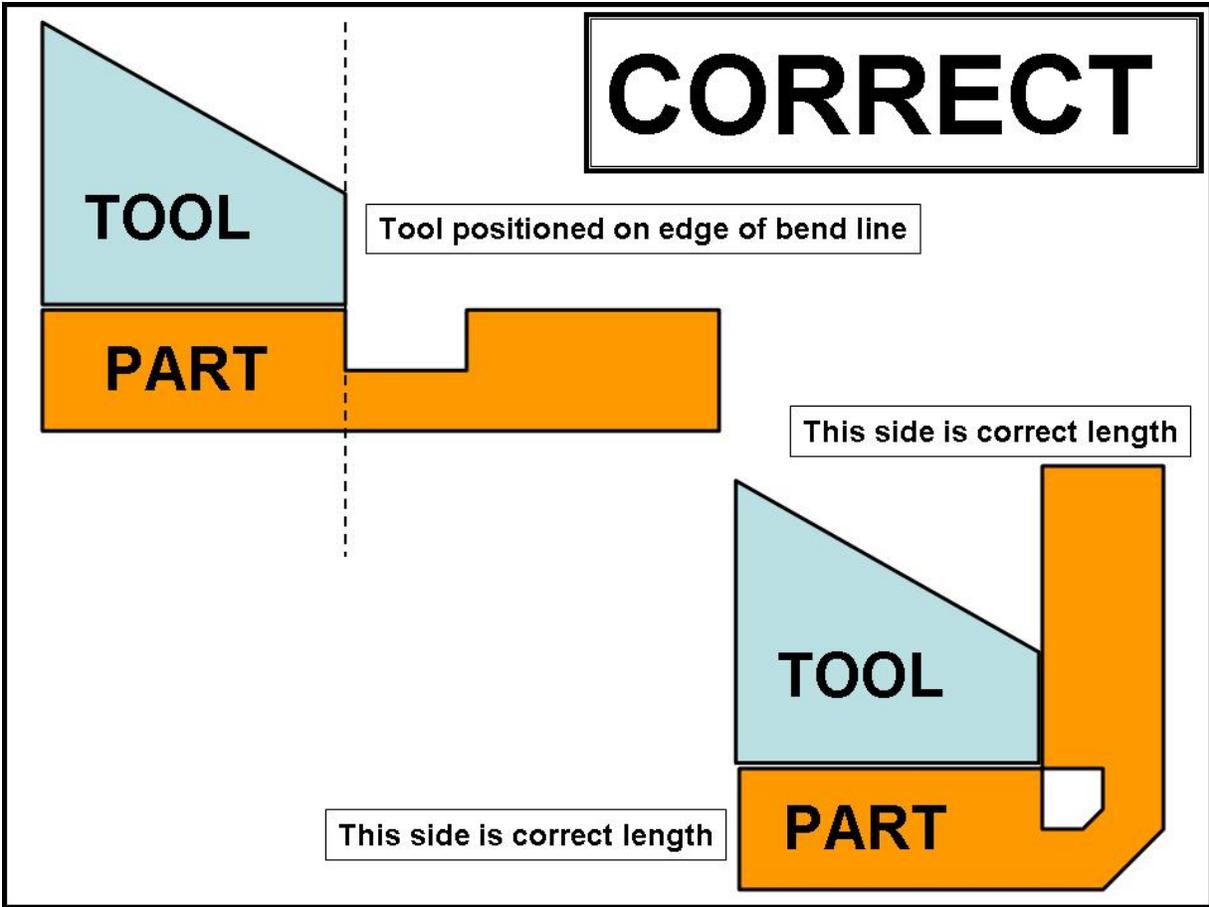
**6. Texture Welds / Fill Seams (as desired)** – Epoxy putty "welds" add strength to PE-model joints.

# BEND LINE GEOMETRY



**T - Thickness**  
**W - Width of Bend Line**  
**D - Depth of Bend Line**

**Dimensions**  
**W = T**  
**D = 1/2 T**



## Examples of Sequence of Construction

Note that the instructions simply show the parts already folded / bent to shape and where the parts are joined. However, it is up to the model builder to decide how to actually construct the assemblies, to include how to fold the parts, what sequence to use, and how to join the parts together. Simply changing the sequence of steps can have a significant impact on the final appearance of the finished parts.

This is typical and common in all PE up-date sets and is nothing new here. PE sets require a great deal of thought on the part of the model builder. However, the more of them you do, the easier they become to figure out.

This particular set also assumes that the builder has a certain level of knowledge about the Panther tank or access to references. There are several options available and parts are included for Panther Ausf. G tanks manufactured from the very beginning until the end of the war. This is also common with PE up-date sets: Most assume that the builder is very familiar with the subject.

### Example 1 - PE Detail Set Page 1: Rear Stowage Boxes

This is the approximate process that I used to build my boxes.

Stowage Boxes parts A28 and A29

1. Cut part from fret.
2. Clean-up burrs using Flexi-File.
3. Anneal part using gas torch.

Prepare weather lip part A27B. Note that A27B is shorter than A27A and fits the opening in the box better and the lids parts A23 fit better on lips A27B than on A27A. I don't know how the lids D17 work. If you're going to build the boxes closed, you might not need to install the weather lips A27B and might be able to use lids D17. Test fit to see how this looks first.

1. Cut part from fret.
2. Clean-up burrs using Flexi-File (use tweezers to hold part)
3. Fold part into hollow square.

Note that the "lip" should be on the outside of the part after folding, so the bend lines must face down. Pre-bend slightly to mark bends on side opposite of lines, then turn over and bend.

4. Fit this part into the square opening in part A28 (A29). Part A27 B might need to be shortened slightly to fit into A28 (A29).

Note that this part should fit snugly.

Solder part A27B into opening of A28 (A29)

1. Apply flux.
2. Melt flux.
3. Apply solder "chips"
4. Heat

Fold part A28 (A29)

1. Fold the opening that has part A27B soldered into it first.
2. Fold sides.
3. Leave back of box open
4. Adjust sides for best fit at joints

Solder side joints

1. Apply flux.
2. Melt Flux.
3. Apply solder "chips"
4. Heat

Note that there may be some joints that will not fit tightly and remain square. If necessary, apply straight sections of brass wire to inside of any open joint after flux, but before solder "chips"

Emboss the stiffening ribs on box face by burnishing from inside of box with back open.

Fold back of box closing box. Note, may need to use a wrap of wire around the box to hold back tightly to sides.

Solder back of box. Note that the back only needs to be soldered along centers of the edges and not completely around its circumference. However, the top joint behind the square opening will still be visible after the box is finished.

1. Apply flux.
2. Melt flux
3. Apply solder "chips"
4. Heat
5. Clean-up joints around the back edge of the box so that the mounting frame part A30 (A31) will fit cleanly.

Prepare part A30 (A31) mounting frame.

1. Cut part from the fret.
2. Clean-up burrs using Flexi-File (thread the Flexi-File strip into opening to clean inside burrs)
3. Fold / bend three sides. Do not bend the bottom side (with tabs and holes). Slightly "over" bend the three sides.

Fit part A30 (A31) mounting frame to back of box A28 (A29). Note that the folded sides will "clamp" to the box if they are slightly "over" bent, but if bent too far from square, part A30 (A31) will not fit. Like "Goldie Locks," not too little, but not too much.

Solder the mounting frame part A30 (A31) to the box. Note that the solder can be applied to the inside centers of the frame so that the solder will not be visible on the finished box on the model. Also, using a wrap of brass wire to hold the frame onto the box might be helpful.

1. Apply flux.
2. Melt flux.
3. Apply solder "chips"
4. Heat

Complete bend / fold on bottom edge of mounting frame. Consider soldering the center of the bottom edge. Fold the tabs so that they're parallel to the back of the box / frame assembly.

Prepare the mounting hooks A46

1. Cut parts from fret
2. Clean-up burrs. Use tweezers to hold parts.

Fold / bend hooks. Note that the two folds / bends must go in opposite directions. So, make the first bend on the part of the hook with the bolt in the bending break table. Take the part out and now use the back of the bending break to clamp the part along the bending line. Bend up.

Tin the mounting frame at the holes on the top edge of the frame.

1. Apply flux
2. Melt the flux
3. Apply a single "chip" of solder
4. Heat

Tin the attaching points on the mounting hooks A46

1. Apply flux
2. Melt flux
3. Apply a single "chip" of solder
4. Hold in cross-lock tweezers
5. Heat

Solder tinned mounting hooks to frame

1. Hold hooks in position on mounting frame
2. Heat until solder melts
3. Stop heat as soon as solder melts

### **Example 2 – PE Detail Set Page 3: Front Fenders**

Note the instructions suggest embossing the stiffening ribs and rivet details while the fender parts B2 (B3) are still flat. Embossing the details before the fender sides are joined to the fenders allows the deformations imparted during the embossing to affect the final fit and finish. Therefore, I recommend the following sequence.

Fenders parts B2 (B3)

1. Cut the part from the fret
2. Clean-up the burrs using a Flexi-File and sanding block
3. Anneal the part using a gas torch

Bend the curved section of the fender. Note the curve starts along a line where the fender edge bend lines meet the fender side edges. The top of the fender is flat. Use a wooden dowel section and a soft / flexible surface to bend the curve. Match the curve to the radius on the fender edges. This will probably have to be adjusted after the fender edges are folded / bent.

\* Be careful and do not bend the fender edges when you bend the curve into the fender!

Fold / bend the fender edges.

\* Note there is a small tab on the end of the long curved edge that must be bent to a 90 degree before bending the edge. Get this small tab bent as sharp as possible.

Adjust the fender curve to match the curve on the edges. These will fit fairly tightly with some work.

Solder the fender edges.

1. Clamp the fender edge and fender together tightly using cross-locking tweezers.
2. Apply flux
3. Melt flux
4. Apply solder "chips"
5. Heat

Emboss the rib and rivet details. The instructions recommend using a turned brass scale ammunition round. This works well, but I recommend rounding the point of the brass ammunition round so that its tip is about  $\frac{1}{2}$  to  $\frac{3}{4}$  the width of the etched grooves and holes. A super-fine ball point ink pen might work as an embossing / burnishing tool. Make sure that the tip isn't too large, though, or it will not give a "crisp" look to the work.

1. Use a soft surface for embossing the ribs.
2. Emboss the rivets in a small hole used as die
3. Use a small hammer to tap the punch to emboss the rivets. Count the number of "taps" and be consistent in the amount of force used to make the rivets the same size. For the first two or three rivets, check the size after each tap to determine the number of taps needed.
4. When embossing the ribs, count the number of "scribes" used in the same way as described for the rivets.

Adjust the fender so that it is as "flat" across its front and rear edges as possible. Embossing the ribs and rivets will impart a side-to-side curve in the fender that must be bent out using finger pressure.

Do not clean-up the solder joints on the outer edges of the fenders until the reinforcement part B4 (B5) has been soldered in and the clevis flap part B6 (B7) and the hinge part C26 have been soldered on.

Tinning the hinges parts C26 and their mounting locations on the fenders parts B2 (B3) and clevis flaps parts B6 (B7) will make adding them easier than regular soldering.



## Unidentified or Optional Parts Included in this PE Set

Several optional parts are listed on page 5 of the instructions or in the body of the instructions.

Note that early production Panther G models had the Panther A rear stowage box mounts and tail light (mounted on the left rear box) (pg. 1). Note that these Panther A mounts on the Panther G did not include the heat shields (D1 and B74). These were only used on the Panther A.

This kit includes optional parts for all three types of rear exhausts set-ups (pg. 2).

This kit includes the IR equipment stowage box for the right rear. However, the model builder must add the four mounting tabs for this box (pg. 1).

There are two different chains for the gun travel lock. Parts C21 are for the lock around the gun barrel and C23 are for the lock "loose." (pg. 3)

The Schurtzen locks, parts B20 + B19 were only used on the first and last Schurtzen mounting holes even though the kit gives you enough for every hole. (pg 5)

Any number of heater cover parts C10 can be used on either the heater or shown stowed. (pg. 2)

The right side winter intake covers C5 + C2 + C3 can be shown open or closed in combination with using heater covers C10. (pg. 2)

The Anti-aircraft (AA) Machine Gun (MG) mount parts D13 + A38, 39, and 40 is only used on the cupola ring. On some late Panthers, this ring was not installed. (pg. 3)

On page 5, the instructions list a bunch of Fret B parts (47, 48, 57, 59, 33, and 34) for relocating the tools onto the rear deck. You need to check your references for this unit modification. The standard factory set up is shown in the instructions.

### Fret A

A24 + A25	Turret Rear Door Hold-Open Catch
A50	AA MG Ring Sights. These are for the MG when it's mounted on the commander's cupola.
A35 + A36	15 / 20 Ton Jack Body
A37	Jack Block Reinforcing Straps (shown on PE inst. Pg 4)
A3	"Closed" has Bolts in Holes (check references)
A4	"Open" the Bolts are not in the Holes (check references)

### Fret B

B60	Combine with B58 to make a correct / complete shovel head. B60 is the inside and B58 is the outside.
B1	Stern Antenna for Befehls Panther. Requires either scratch-building the mount or a different kit.
Two Un-numbered	Parts on upper Right Corner of Fret B are the Mast Mounts that go on the Right Rear Stowage Box of the Befehls Panther. These parts roll into tubes, one with a closed end (lower mount).

### Fret E

E10	The Lifting Cap for the Jack
E11	Cool Little Cog Shapes
E4 + E5	Type 2 Tool Clamps for Ax and Wire Cutters. These can be substituted by parts E1 + E2 Type 1 Tool Clamps. There are enough Type 1 clamps for the entire vehicle. Vehicle is correct either way depending on references.