CHAPTER 2

ASSEMBLY TECHNIQUES

REMOVING PARTS AND TEST FITTING

The general assembly sequences layed out in the kit's instructions are usually very good, but individual sequences and steps are not always in tune with the details and modifications you may want to add and the paint scheme that you have in mind. In addition, there may be fit challenges that require you to deviate from the instructions from time to time. Some good examples of odd kit instruction steps are: clear parts being added to the outside areas of the fuselage prior to the completion of construction, landing gear that are attached before painting the exterior and guns and bombs that are installed prior to the wings being attached to the fuselage.

After you have studied the kits assembly instructions and put some thought into how you want to build the kit, what modifications and details you may want to add and what colors and paint scheme you want, the next step is to start removing parts and test fitting. I consider test fitting a very important step because this is where you will find out how well the kit fits together and it will get you thinking about how to deal with any fit challenges that you identify. I have been test fitting every kit I ever built for almost three decades now, and this step has always helped improve my scale modeling experience and the finished model.

I use a fine point black sharpie to write the part numbers on the individual parts that I am going to remove. Never snap parts off their trees as this may leave an indentation in the part where it was connected to the tree. This indentation will almost always occur along a gluing surface. Always cut the tabs which connect the parts to the trees using a pair of plastic cutters and be sure to leave a small amount of the tab on the part. It is much easier to remove the excess tab from the part after the part has been removed from the tree than it is to try to remove the entire tab while the part is attached to the tree.

After all the necessary parts have been removed from the trees, you can finish removing the excess stubs from the parts. Sometimes the stub connection points are round and sometimes they are flat. A lot of the new kits that use slide molding have stub connection points that are round on one side and flat on the other side. Typically the actual point where the tree stub meets the part is very thin

as compared to the rest of the stub. If the stub part is round, place the part on a wood block with the stub hanging over the edge so that the part will sit flat on the block. Using the tip of a number 11 X-Acto blade, cut the stub off. If the stub is flat you can just lay the part on your cutting board and cut it off. Finish cleaning the surface where the stub was by wet sanding it smooth with a sanding stick. On really small or delicate parts you can sometimes cut the part clean from the tree stub right at the connection point with despruing tweezer cutters if the stub is small and thin.

After you have cleaned up the area where the stub was located, remove any excess flash from the part. Be careful not to mar the plastic parts or remove any raised detail when removing flash. If the part is complete, such as a landing gear, check the part for a mold line that runs around the perimeter. Typically, these mold lines are very tiny. Remove them by lightly scraping off the excess plastic with the tip of a number 11 X-Acto blade. On round or curved parts, you need to be careful that you do not flatten out the area you are scraping and ruin its shape. To smooth out curved areas use a Flex-I-File with 400-600 grit sandpaper and wet sand the plastic smooth.

As you finish with parts place them in plastic bin organizers so that you do not misplace them. The next step in parts preparation is to check the gluing surfaces of the parts. There are sometimes tiny raised bumps, uneven surfaces or remnants of the tree stubs on these surfaces. Carefully and slowly scrape or sand them off so that the gluing surface is flat.

When all the parts are cleaned up, the next step is to assemble the kit with masking tape. I use small strips to assemble the cockpit area and the engines and larger strips for the fuselage, wings and tail area. When taping sub-assemblies that will fit inside the fuselage, be sure to locate the tape in areas that will not interfere with the placement of the assembly inside the fuselage or cowling.

As you assemble the parts make notes on the kit's instructions on the fit, where there are gaps and voids or where parts need some work to get them to fit better. If you find parts that just do not fit go ahead and work with them to trim, cut or sand as necessary. Its better to identify problems at the start of a project than to get to a point where its time to mate the fuselage halves together and then find that you have a major fit problem. If there is a misalignment problem caused by a locating pin, remove it and use the tape to properly align the part. Warps in the fuselage and the wings are rare, however, they do occur and can sometimes be corrected by taping the parts together. If you have this problem, see if large sections of masking tape will correct the warp. Sometimes small assemblies, such as drop tanks and bombs, have uneven gluing surfaces or locating pins that just do not line up with their respective holes. In these cases, remove the alignment pins and run the parts across a stationary piece of sandpaper to flatten out the surfaces. The part halves can then be taped together and glued.

When you are done assembling the kit with masking tape you should pretty much have the entire kit put together. At this point, I place the kit on my workbench and I start making assembly and painting notes on the kit's instructions. I also note where I plan to deviate on the suggested construction sequence of the kits instructions. Typically, the kit's instructions do not take into account painting steps, modifications or detailing that you want to add.

The width of the gluing surface usually reflects the thickness of the plastic and on older kits the plastic was thick so that the resulting assembly, such as a wing or fuselage was strong. On newer kits I have noted that the gluing surfaces are pretty narrow which means the plastic is thinner. This presents two problems. The first one is that without a wide gluing surface, there is a good chance that the seam area may crack after you have glued it because the bonding surface is narrow. The second problem is that on large models, the thin plastic can flex along the center points of the wings and fuselages causing the seams to fracture.

To fix these problems, laminate strips of plastic to the inside areas of the wings and fuselage to add strength and prevent flexing. I usually use .020 or .040 inch thick plastic strips for laminating interior areas and I always use super glue. You do not need to butt them up against one another. If I am adding strength to wings I usually glue strips from the leading edge to the trailing edge although placing strips from the tip to the centerline will also work. For fuselages, you can place them from top to bottom or from front to back. If you want to increase the width of a gluing surface, position small sections of .020 or .030 inch thick strips along the underside of the parts gluing edge. Super glue the strips in place and then trim and sand them so that the strips are flush with the glue edge.

FILLING SEAMS, VOIDS AND GAPS

For almost all of your gluing and for the majority of your seam work I recommend that you use super glue. The glue doubles as seam filler, it can be sanded and scraped like plastic and you cannot detect the difference between the glue and plastic once it has been painted. There is a specific technique that works best for using super glue that takes advantage of the glues capillary action. When you are ready to glue two part halves together tape the part using strips of masking tape. As you tape, check specific contours and details that are formed when the parts are glued. Panel lines and hatches that cross seam lines need to be lined up correctly. Corners and edges also require extra care to ensure that they are aligned properly; otherwise, you will be doing a lot of scraping and sanding. Tape the halves securely and use as much tape as necessary to hold the parts just the way you want them.

For gluing parts together, use a length of stiff wire with about a .015 - .019 inch diameter as a glue applicator. You can also use thicker diameters if you want to apply more glue to a given area. Generally, the thinner the wire the smaller the quantity of glue that will be applied. Make a small puddle of super glue on a piece of paper. When you put the super glue on the paper for the first time, the paper will absorb the majority of the glue so let the first puddle dry and then place more glue on top of the first puddle. Dip the tip of the wire into the puddle and then run the tip along the seam line and between the masking tape locations. The super glue will seep into the seam area and along the seam line for a short distance. Typically, you will have to repeat the application process several times, as the capillary action of the glue will pull it down along the width of the gluing contact surface.

Start applying the glue in the middle of masking tape locations so that you can see how far the glue moves along the seam line. Do not let the masking tape get glued to the plastic, so keep the wire applicator about 1/8 of an inch away from the edges of the masking tape. Work in small areas at a time and check the positioning of the part as you work along the seam line. If you added extra plastic to the underside of the gluing surface, the super glue will seep into these areas too.

After the super glue has dried, which takes only a few minutes, you can remove the tape and glue those areas where the tape was located. After the entire part is glued along the seam line, carefully check the seam to see if more glue is needed. What you want is to have the glue be level with the surrounding surface plastic. Sometimes this can be hard to judge, so the rule of thumb is less is better, as you do not want excess glue running along the surface of the model.

If you have gaps or voids along the fuselage or where the wings and fuselage meet, I recommend that you fill them with sections of plastic strip. You could use gap filling super glue, which is very thick, but I have found that using strips of plastic works better as it adds additional strength to the seam area and it is easier to sand and shape than a big glob of super glue. Cut strips and form fit them into place along the void. It's okay for the strips to protrude above the surface of the plastic as they can be trimmed later. You may have to use different thickness along a gap, as the center areas tend to be wider. Do not force the plastic into the void, just use thinner widths. Run a bead of super glue along both sides of the plastic strips. When the glue is dried, cut the excess plastic with plastic cutters or an X-Acto blade and scrape and sand smooth.

To remove excessive glue and to contour and smooth the glued surfaces, carefully scrape the glue with a sharp number 11 X-Acto blade held at about a 45 degree angle and then wet sand the seam with a sanding stick. If it is a wing to fuselage seam, wet sand it with sandpaper wrapped around a length of balsa wood. You can protect surrounding surface detail by applying masking tape along the edges of the seam. When you have completed your initial scraping and sanding, clean off the seam area and apply Testors silver paint to the seam line. The silver color will highlight any, cracks, scratches and flaws. Apply additional coats of super glue over the silver paint in needed areas. The glue will mix with the paint creating a dark silver color. As you scrape and sand the areas where additional super glue was added, the silver color of the glue will help you determine when the excess glue has been removed. Repeat the process of checking the seam area with silver paint, applying super glue and scraping and wet sanding until the silver paint shows no flaws. Typically two to three iterations will do the trick.

To remove sanding marks, smooth and polish the plastic and the super glue and to remove any excess silver paint, wet sand with 500-600 grit sandpaper and then rub the surface with fine or super fine steel wool pads. The steel wool fibers will also deposit onto the model and your work bench as very fine metal dust, so I always lay lengths of paper towels on the work bench to collect this steel wool dust. I clean the surface of the model with alcohol damped tissues to remove the dust from the plastic. You can also blow off the dust from the model, but I recommend that you do it someplace other then where you build and paint your scale models.

DIMPLES AND INJECTION MARKS

Injection marks can either be indented or raised, they are almost always round and they are usually located in places that are very hard to get to and correct. The first step in dealing with injection marks is to determine if you need to do any work at all, so check to see if they will be noticeable when the part is positioned along with any other parts that may be attached to it. If the marks are not noticeable, don't waste your time correcting them.

You can fill indented injection marks using a Waldron's punch set to make disks that are close to the diameter of the indentation. The thickness should be slightly higher than the indentation. Place a drop of super glue into the indentation, position the disk and press it down with a toothpick. When the glue is dried sand the area smooth, check for flaws with silver paint and add more glue where needed. If you are working in tight areas that have surrounding surface detail such as the inside areas of landing gear doors, wrap a small length of sandpaper around a piece of balsa wood and carefully wet sand the surface smooth.

If the injection marks have a small diameter and they are located in areas where a lot of sanding and scraping is difficult, pick a plastic rod diameter that is slightly larger that the injection mark diameter, drill a shallow hole through the injection mark and super glue the rod into the hole. Cut the rod and sand the surface smooth.

Raised injection marks are usually easier to deal with because you are removing plastic instead of filling in an area. The easiest way to deal with raised injection marks is to either scrape the plastic flat with a stencil knife or the tip of a number 11 X-Acto blade and then sand the surface smooth or just sand the injection mark, which may take more time then scraping and sanding. If you decide to sand them off use small strips of 400 grit sandpaper wrapped around a length of balsa wood and wet sand the raised injection mark.

Dimples are typically caused by the incomplete flow of hot plastic into the mold. Depending on where they are located will help determine how best to deal with them. If the dimples are on large, flat surfaces, punch out a disk size with your Waldron punch that will cover the dimple. Apply enough super glue to fill the dimple and a small area surrounding the dimple and press the disk over it. When the glue is dry, wet sand the surface smooth.

Another approach that causes less damage to the surrounding surface detail is to drill out the dimple and plug the hole with plastic rod. The drill size should be just slightly larger than the diameter of the plastic rod so that the plastic will sit tightly in place. Insert the rod and apply super glue to both sides of the rod and all the way around the rods diameter. After the glue has dried, cut the rod and sand it smooth. You can also use putty to fill dimples in areas where drilling a hole and using plastic rod to fill it just will not work. In all cases, use masking tape to protect surrounding detail.

USING WHITE GLUE

Sometimes there are voids between parts that you just cannot fill, sand and shape. While these situations are not common, they do occur. In these instances you can use white glue as a filler, but be sure there is no flexing of the plastic at the seam location. The trick to getting white glue to stick properly is to prime the areas where the white glue will be applied so that the glue will have a good contact surface to stick too. I apply small amounts of the white glue at a time using my trusty thin wire applicator and then I wipe the excess glue with a damp Q-Tip.

You can apply as many coats of white glue as required to build up the area between the parts, but be sure to let each coat dry and always swipe the glue to remove any excess. Usually three coats will do the trick. If the distance between the parts is tiny the white glue will fill the void without any noticeable contours in the surface of the glue. The wider the spacing that needs to be filled the more contoured the surface of the glue will appear. Give the dried glue a coat of primer to check for tiny air pockets and for places that you may have missed.

USING PUTTY & TESTORS TUBE GLUE.

I very rarely use putty for seam work, but if you do here are some tips. To apply putty first squeeze a small amount on to a piece of paper. Allow the putty to flow from the tube's opening while retaining its round shape and squeeze out a line of about 1/4 to 1/2 inch in length. For most putty applications, use either a number 18 flat ended X-Acto blade or a number 16 angled X-Acto blade and slice off small amounts of putty with the edge of the blade. Doing this will give you greater control of both application and location of the putty.

Mask the areas surrounding the location that will get the putty prior to applying it, so that when the tape is removed, the only putty that remains is along the seam line. Using the masking tape guarantees that the only place the putty will touch the plastic is where you want it to touch. Tape along both sides of the seam and get the tape as close to the seam as possible. This will result in a very thin putty line, which will greatly reduce your workload and also reduce the amount of detail that will be removed during sanding.

Use very small quantities of putty for your work and try to use the minimum amount to accomplish what you are trying to achieve. Piles of putty greatly increase your sanding work, and also increase your chances of marring surrounding surface detail when you start sanding. When applying putty, be sure that the plastic halves are well secured with glue. Any flexing of the halves during the curing process or during the sanding and scraping process will cause the putty to crack.

When you apply the putty do not worry about getting it on the masking tape and work in sections that are no more than one inch long. Quickly apply the putty and after you have finished, remove the tape by pulling it back over itself and away from the putty. It is important to remove the tape while the putty is still moist. While this is a slow process, the resulting thin putty line is well worth the effort and time expended. Prior to any sanding, again mask those areas around the putty line so that any surrounding detail will be saved.

If you are using Testors tube glue be sure that you use the red colored tubes as the blue tube glue is a nontoxic glue and can not be sanded. If you use a tube frequently, the top layers inside the tube can get stringy, so squeeze out the glue until you get to glue that is fresh. I use Testors glue to attach small parts or where I need to position or adjust a part. I squeeze a small puddle onto a piece of paper and apply the glue quickly with a toothpick. It only takes 15 seconds or so for the surface of the glue to start to get stringy or gel so use new glue each time you glue a part. I also wipe the old glue off the paper before it dries to reduce the odor problem.

RESTORING SURFACE DETAIL

Every scale model builder is faced with the dilemma of what to do about panel lines and rivet detail that is lost during scraping and sanding. Typically, this occurs along the two halves of the wings and fuselage and at the connection points of the wings and elevators to the fuselage. The first step is always to minimize the damaged areas with masking tape.

If the surface has engraved panel lines you can easily replace them in the areas that you sanded by simply re-scribing them. Be sure to scribe the new line to the same depth and thickness as the indented panel lines that you are going to connect to. If the surface has raised panel lines, you can play a trick on the human eye by scribing a line that connects the raised panel lines.

To scribe a line, you will need to attach some sort of guide to keep the line straight. I use labeling tape because it has a sticky backing, it is very flexible and it is thick enough to act as an edge guide for the scribers tip. To get the tape to contour around curved areas, cut the tape into thinner strips so that it will be more flexible.

If you are using a plastic scriber usually one or two passes will peel away enough plastic for engraved panel lines. To connect raised panel lines one pass with the scriber should do it. If you are using a needle scriber, how much pressure you apply will determine how deep the needle will penetrate the plastic. Light pressure works best and several passes may be necessary to get a good line. Sometimes the scriber or needle will jump away from the tape edge. In these instances you can repair the damaged area using super glue.

For rivet detail, carefully mark the locations of the lost rivets and punch tiny indentations in the surface of the plastic. If you need to restore an access panels outline, use a photoetch panel template guide and a needle scriber. Once you have restored all the panel lines and rivet detail you will need to polish the surface with fine or super fine steel wool pads. The steel wool pads will flatten out the surface of the plastic in areas where you scribed lines or indented the surface of the plastic for rivets. To remove any residue plastic dust from the scribed lines or rivets, use a toothbrush that has soft bristles.

MASKING, PAINTING AND ATTACHING CLEAR PARTS

A discussion on clear parts in a chapter on assembly techniques may seem out of place; however, the biggest challenge in dealing with clear parts is attaching them to the fuselage. Most manufacturers still provide a separate windscreen and here the challenge has always been to get the part to fit snugly onto the fuselage and to fill any void areas between the windscreen and the fuselage without damaging the clear plastic. Traditionally, clear plastic has also been very brittle and it cracks and fractures easily.

To solve this problem, some newer companies are making clear parts that are a section of the fuselage with the windscreen attached to it. In these instances, a different approach is necessary to deal with the seam areas created by a small, clear separate fuselage part. Luckily, the plastic is not as brittle as traditional clear plastic. However the draw back is that the parts are not as transparent.

For kits that have separate windscreens test fit the part into place with strips of masking tape. If there are gaps between the base of the windscreen and the fuselage, determine the size of the gap by sliding various sizes of plastic strips into the gap. Next, remove the windscreen and cover the clear panels with masking tape. Cut the selected plastic strip to a manageable length and then super glue it into place. Form fit the windscreen into place by carefully scraping and sanding the plastic strip to its required shape.

For windows that are undersized for the opening, I recommend that you determine the strip size that you will need and then glue the strip to the window opening. You can then scrape and sand the added plastic to its proper shape by form fitting the window into place. If the clear parts have scratches in them, dip them in “Pledge With Future Shine” which is the new labeling for “Future Floor Finish.” After dipping the parts, set them onto a piece of tissue paper to dry. This liquid acrylic is self leveling and will dry to a hard finish and hide the scratches.

Once you are satisfied with the fit of the clear parts, you can mask them for painting. One of the best ways to mask clear parts is to use 3M painters masking tape to cover the clear panels between the framing and then airbrush the parts. Be careful when using pre-cut and shaped canopy masking. They do not always fit properly and you may have to add masking tape around the edges where the pre-cut masking meets the canopy framing.

There are two basic techniques for using masking tape and the method you choose depends on the framing on the clear part. All framing on clear parts is raised, but some manufacturers design their clear parts so that there is a high relief between the clear panels and the framing. While this sometimes appears unrealistic, when this type of framing is painted it is hard to notice the high relief. This type of framing detail offers a quick and easy approach to masking the clear part. Lay a section of masking tape over an area of the clear part so that the tape covers a clear panel and overlaps the framing. Next, take a sharp, soft lead pencil and follow the framings edge with the tip. This does two things: first, it outlines the location where the framing meets the clear panel, and

second, it provides a visual line for you to follow when you cut the tape. As the pencil tip pushes the tape up against the edge of the framing you will also notice that the tape stretches slightly.

After you have finished outlining a section take a sharp number 11 X-Acto blade and run the tip along the edge of the framing by following the pencil line. Due to the high relief of the framing the edge of the knife will follow the framing very easily. Be sure that you cut through the entire section of the tape so that when you remove the excess tape you will not peel off the tape covering the clear panel. Once you have covered all the clear panels, run the pencil along the edges of the tape one last time to ensure that all the masked edges are seated properly.

The second technique is used for clear parts that have low relief framing. In these instances you will need to cover the clear panels with very small pieces of precut masking tape. To do this lay two layers of masking tape, one on top of the other, and then cut various sizes of small lengths of masking tape using your trusty sewing ruler as a guide. Really small pieces of masking tape can be used to follow the curved surfaces of framing. You can then use the tip of a toothpick to shape the masking tape to the exact curve of the framing. For box shaped areas between framing, start anywhere along the framing edge and work your way around the entire clear panel. As you work along a framing edge overlap the sections of tape and push and position the tape with a toothpick

Once you have completed outlining a frame, you can mask the center area of the clear panel with the larger strips of masking tape. When you are finished masking the entire part, go back over the areas where the tape meets the framing and be sure that the tape is pressed down. When you have finished masking the entire surface of the clear part, check to be sure that you have not overlooked any areas. Also, be sure to mask the inside of the canopy to protect the plastic from over spray.

If you are masking a fighter aircraft windscreen, you will also need to mask the interior of the clear part because you can see both sides of the windscreen when it is installed. Paint the outside framing first, remove the masking tape and use the painted framing as a guide to mask the inside area of the windscreen. When painting the canopies of fighter aircraft, at a minimum, also paint the interior framing on the outside edges of the canopy. If you want to paint the entire interior framing, use the painted exterior framing as a guide for the masking tape placement.

Another method is to mask the exterior framing, paint the interior color first then prime over this color. The primer will restore the framing to a neutral color. Next, apply the exterior colors to the framing. The interior color will show on the inside areas. The only draw back to this method is that the interior color of the framing will appear shiny due to the clear plastic. To reduce this effect, mask the interior framing along the inner edge of the canopy and give it a coat of the interior color.

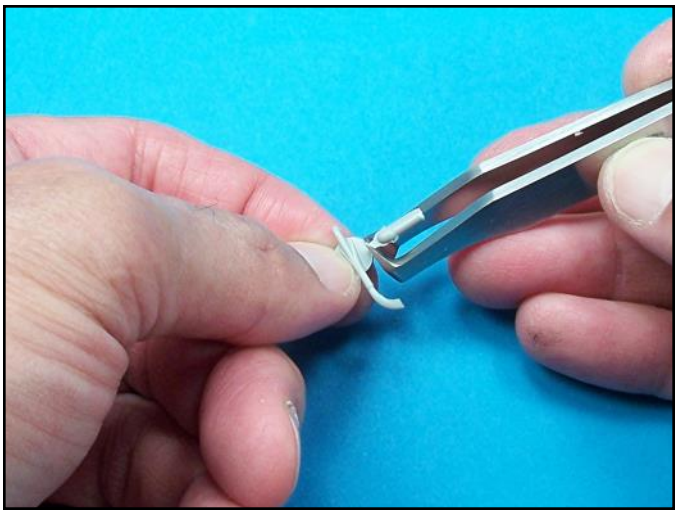
As a general rule you should attach clear parts with white glue because this glue will always dry clear, it will not mare the clear plastic and residual, dried glue can be removed with a damp Q-tip. To get a strong bond between the clear part and the surface it is attaching to, paint the edges with flat colored paint as white glue sticks better to flat paint colors. Position the clear part in its correct location, apply the white glue with a toothpick and then wipe off any excess glue with a damp Q-Tip. For the installation of interior clear parts, such as windows, apply the glue to the perimeter of the opening on the fuselage, install the window and then wipe off any excess glue. If you have masked the part before you installed it you should still wipe off the excess glue from the masking tape so that when you peel off the tape you will not remove any of the dried glue along with the masking tape. After the glue has dried, you can apply more white glue to fill in any gaps between the clear part and the fuselage.

If the windscreen is attached to a fuselage part paint the windscreen first. After the paint has dried mask both sides of the windscreen to protect the clear panels. Position the part onto the fuselage and then glue it in place with super glue applied with a .015 inch diameter wire applicator. Fill in any voids with small pieces of strip plastic. The masking tape covering the clear parts will prevent super glue vapors from fogging up the windscreen. Carefully wet sand the seam area and follow the techniques described above on seam work, except I recommend that you not scrape the clear plastic with an X-Acto blade. The clear plastic will respond well to the wet sanding with a sanding stick.

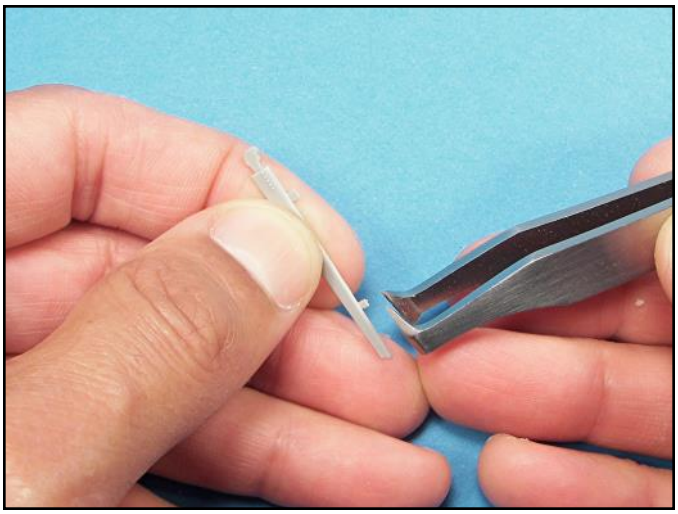
When you have completed your seam work, carefully peel off the masking tape from the interior area of the windscreen. Peel the tape from the outside edge with the tip of a number 11 X-Acto blade and then grab the tape with tweezers and carefully peel it away from the windscreen. You may have to re-position the tweezers several times to work around the cockpit interior parts, so go slow.

Cut the parts from their trees, but leave some of the stub on the part. For large sturdy parts, like fuselage halves you can use your cutters to remove the remaining stub and then wet sand the surface smooth.

Flat stubs can be carefully trimmed off the part by slicing them with a number 11 X-Acto blade with the blades edge held against the side of the part so that you completely remove the stub.

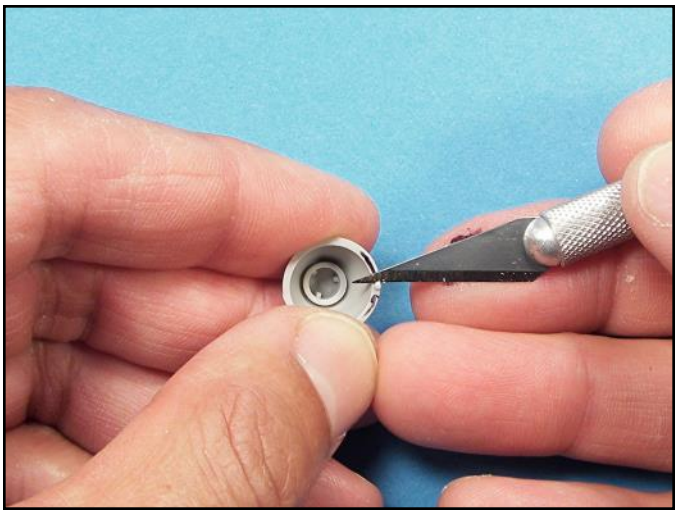


A despruing tweezer cutter is a great tool for cutting stubs off the edges of round parts.

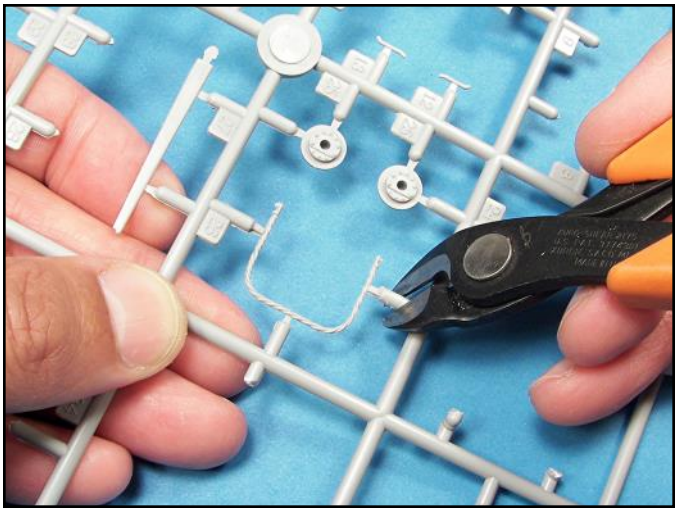


For flat stubs on thin parts, hold the despruing tweezer cutter against the edge of the part and snip off the stub.

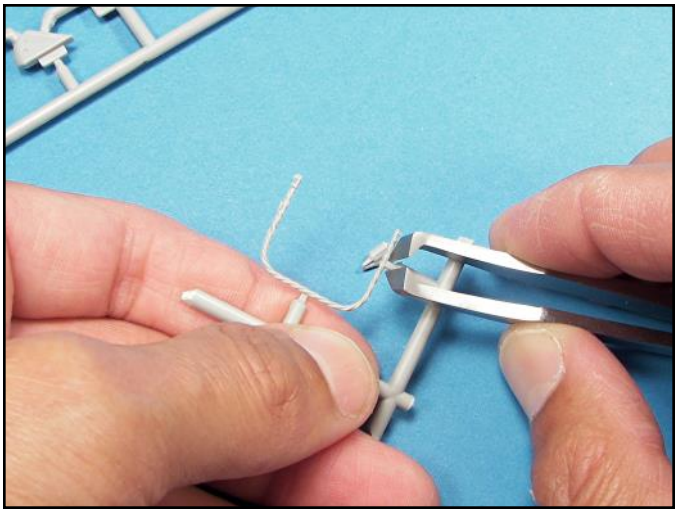
Removing the stubs from contoured round surfaces usually leaves an indentation that has to be repaired. By using the despruing tweezer cutter and cutting the stub along its narrow side, you can minimize the damage.



Stubs on flat surfaces can be sliced off using the tip of a number 11 X-Acto blade, but be careful not to gouge the surface.

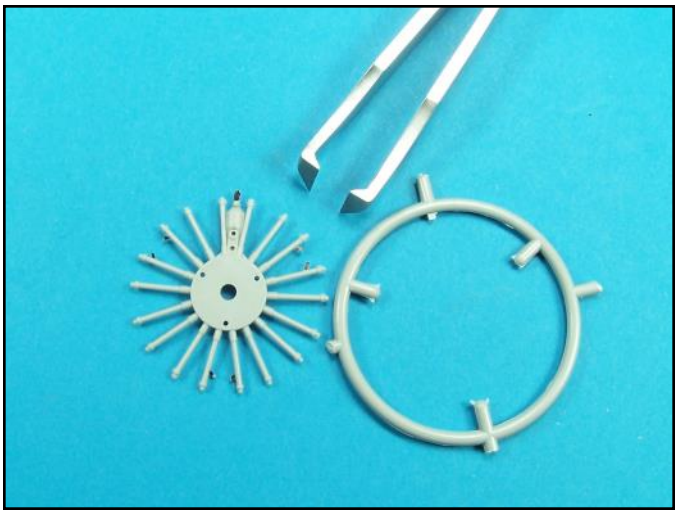


Snipers work great for removing fragile and delicate parts from their trees. Where possible, cut the trees around the part to remove it so that the part is not damaged.

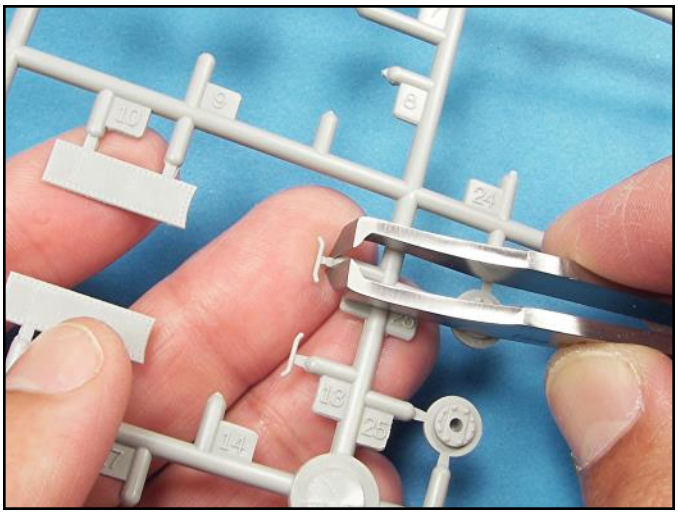


After the fragile part is removed, you can continue to trim off the excess stubs with a despruing tweezer cutter. Also, be careful how you position the cutter, as you can easily damage or cut through the part.

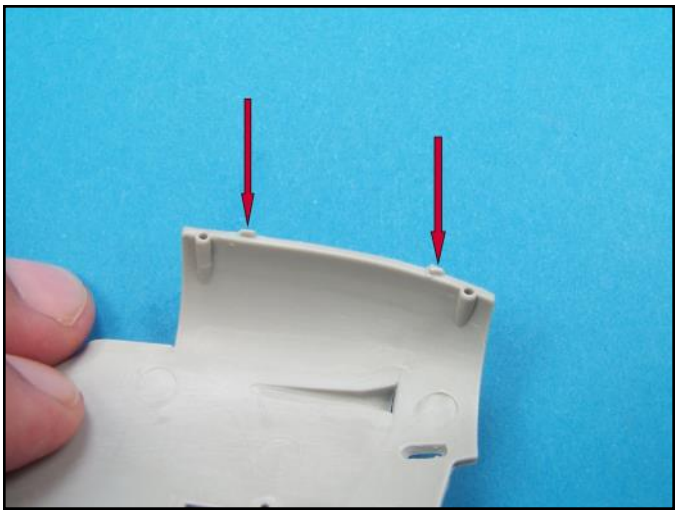
To do fine trimming of any remaining excess stub on delicate parts, elevate the part on a hard wood block and use a number 11 X-Acto blade to remove any excess plastic.



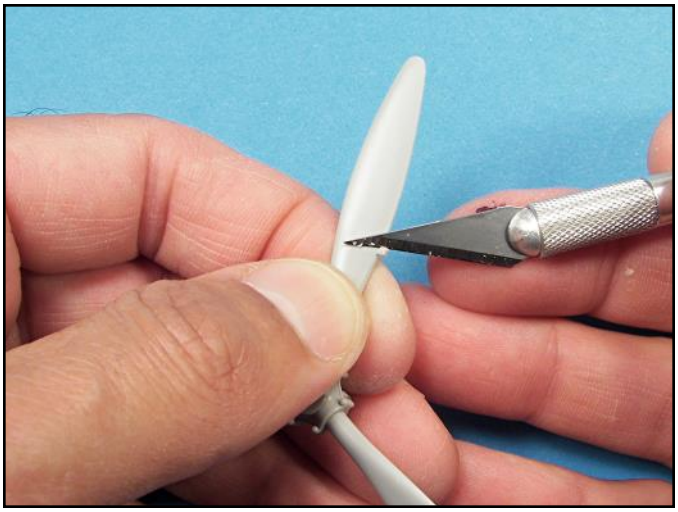
Some parts are very delicate and damaging them would be hard to repair. In these cases, use the despruing tweezer cutter to remove the part from multiple tree location connection points.



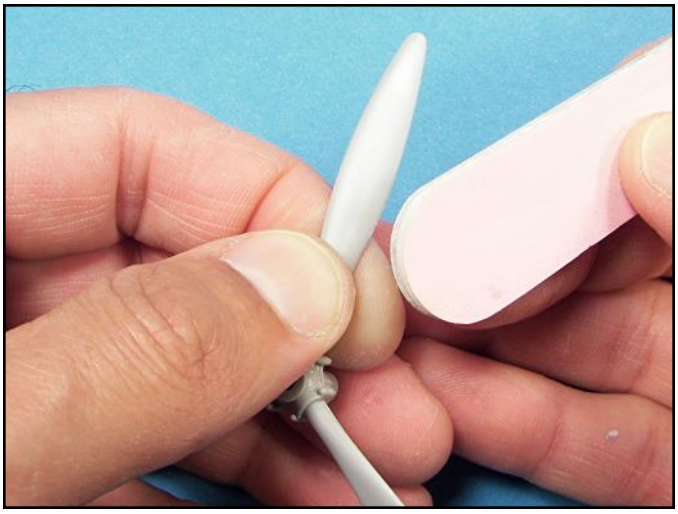
These tiny parts have flat stubs attaching them to the tree. Cutting the stub at its base to remove the part ensures that it will not get damaged. The cutter can then be used to remove the remaining stub.



Be sure to check all the gluing surfaces to be sure that they are flat. Sometimes parts have bumps, tiny clumps of plastic or residual plastic from the tree connections.



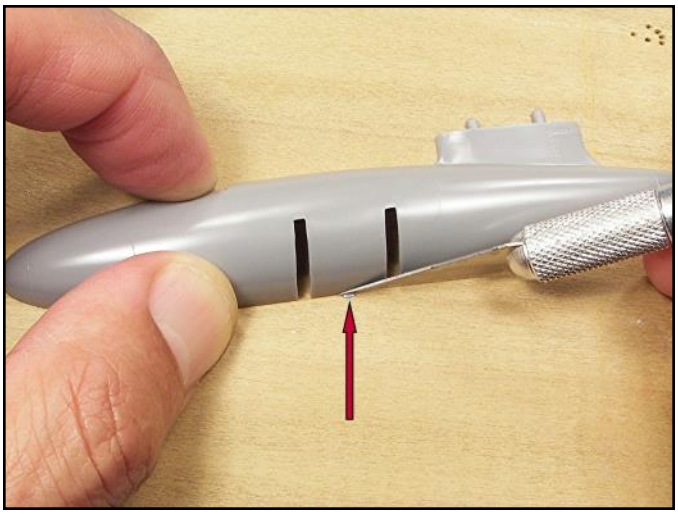
Propellers can be difficult to repair if damaged during removal from their trees. I like to slice off the excess with a number 11 X-Acto blade.



Once the excess stub is removed wet sand the surface smooth with a fine grade sanding stick.

After small parts with thick flat stubs have been removed from their trees, cut off as much excess as possible without damaging the part.

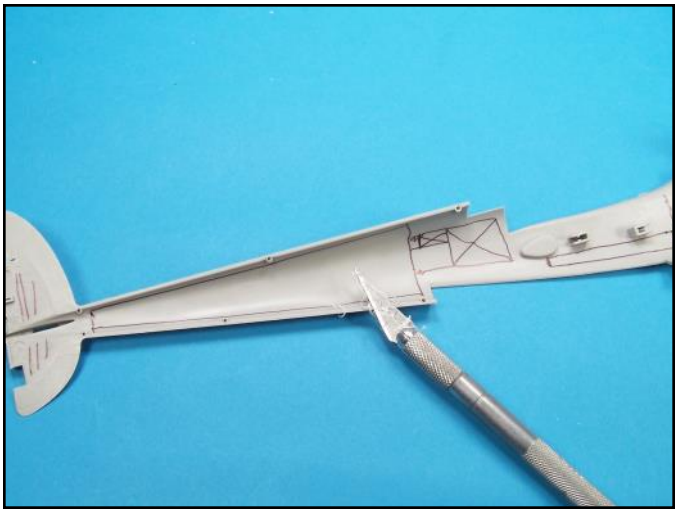
Lay the part flat on a wood block and then cut the remaining stub with a number 11 X-Acto blade.



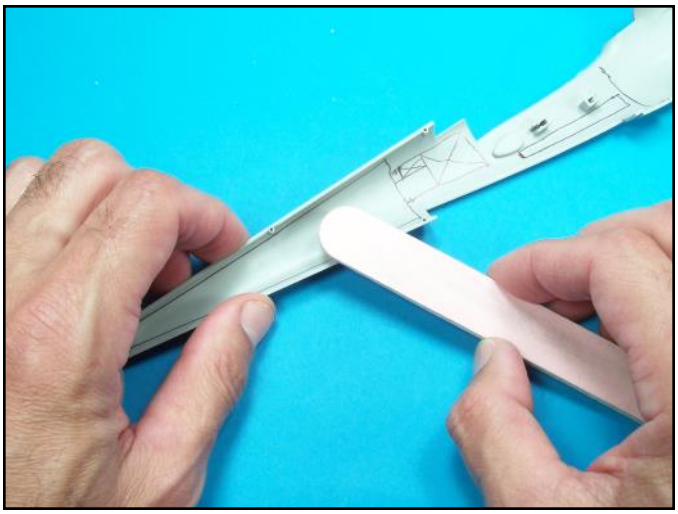
Be careful when cutting a stub off a thin flexible part. Sometimes as you are cutting, the part can flex causing the blade tip to damage the surface of the part.

To sand the surfaces of parts that had stubs cut off, carefully run the part across a stationary piece of sandpaper.

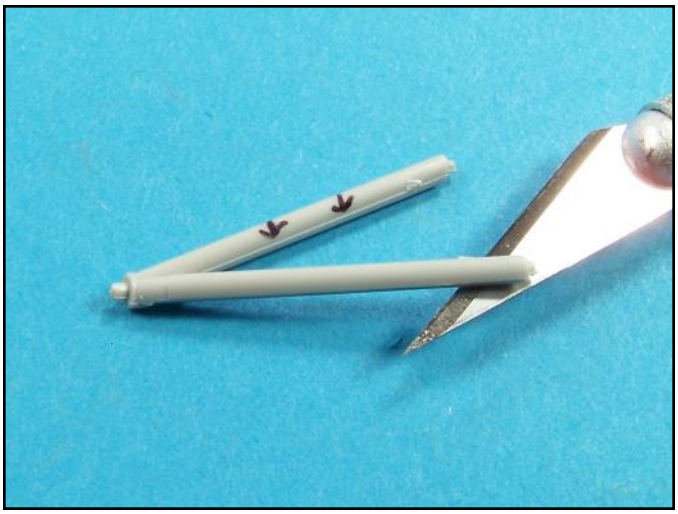
Sometimes the best way to get parts to fit tightly together is to sand the surfaces flat. Light sanding works best and a few passes over the sandpaper will usually flatten out the gluing surfaces.



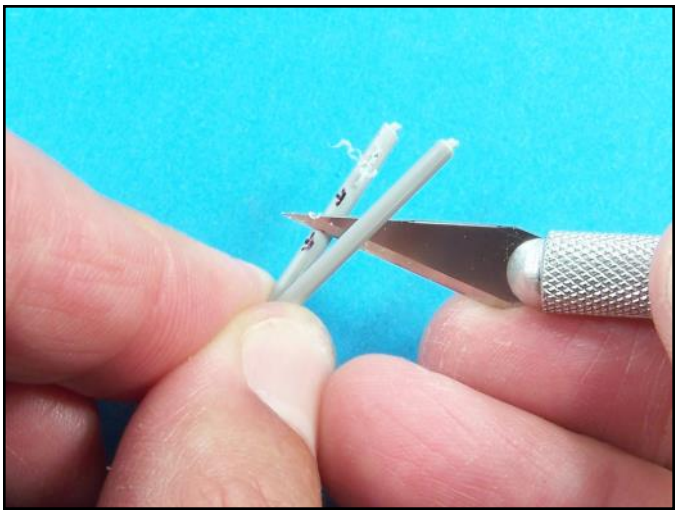
On large parts, I recommend that you lightly scrape the gluing surfaces first to remove any excess plastic.



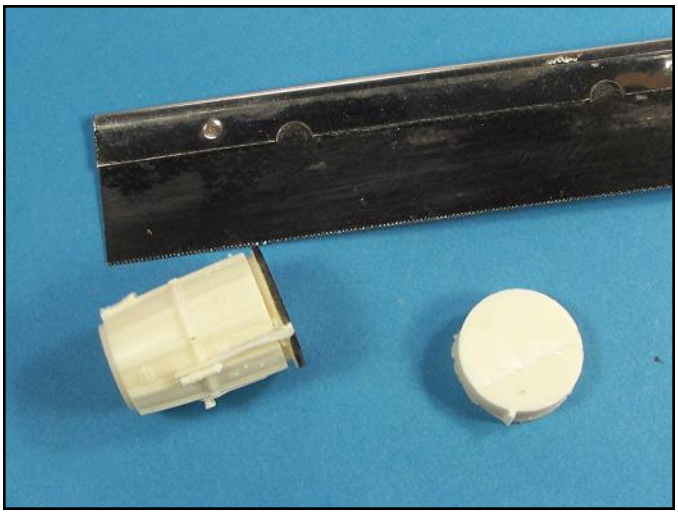
The second step for flattening out the gluing surfaces on large parts is to lightly sand them with a sanding stick.



One piece parts almost always have a tiny mold line of excess plastic that will need to be removed. Carefully check all parts for these types of mold lines.

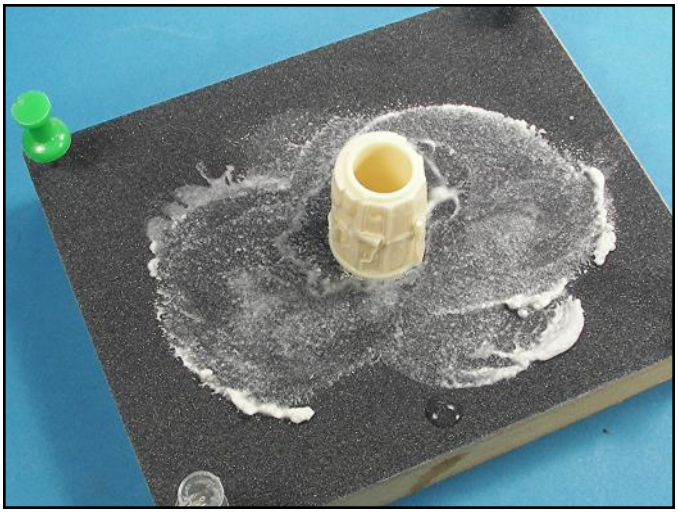


The best way to remove mold lines on one piece parts is to carefully scrape the excess plastic off using a number 11 X-Acto blade held at a 45 degree angle.

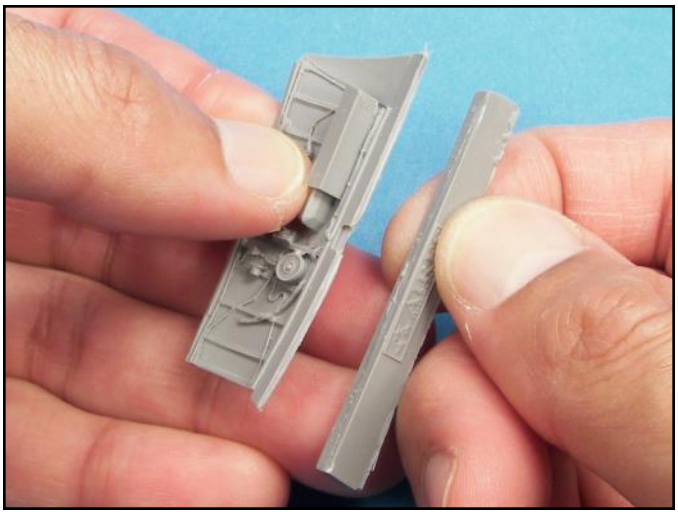


Resin detail sets always have some type of pour plug that needs to be removed. I like to mark the edge of the pour plug first and then cut off as much as possible with a razor saw.

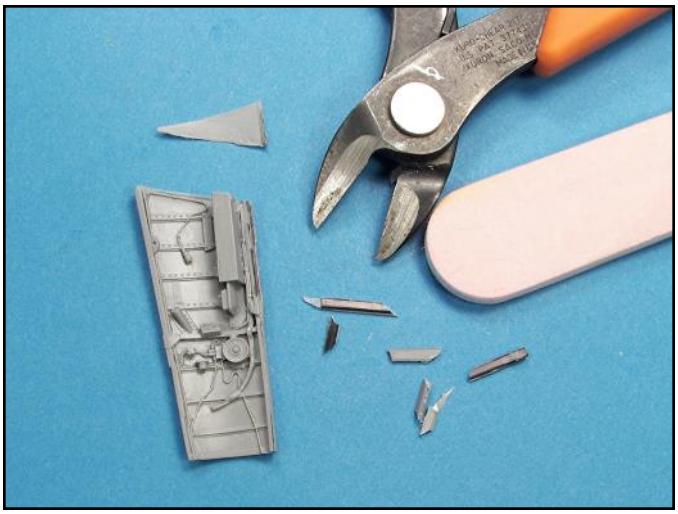
Here is another example of a large resin pour plug that was removed with a razer saw. Always wear a dust mask when cutting resin with a saw, as the dust can irritate your lungs.



The marked location on the remaining pour plug on this part will act as a visual gauge when you sand the remaining excess resin off the part. Wet sanding resin cuts down on the resin dust.

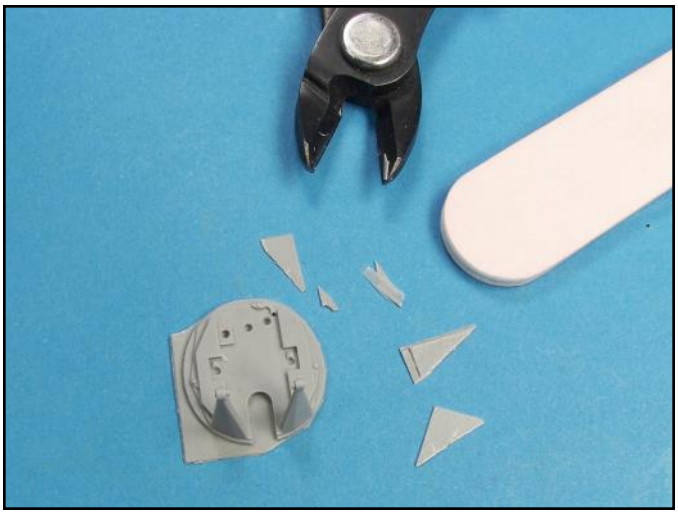


Sometimes resin pour plugs can be scribed with the tip of a number 11 X-Acto blade and then snapped off.

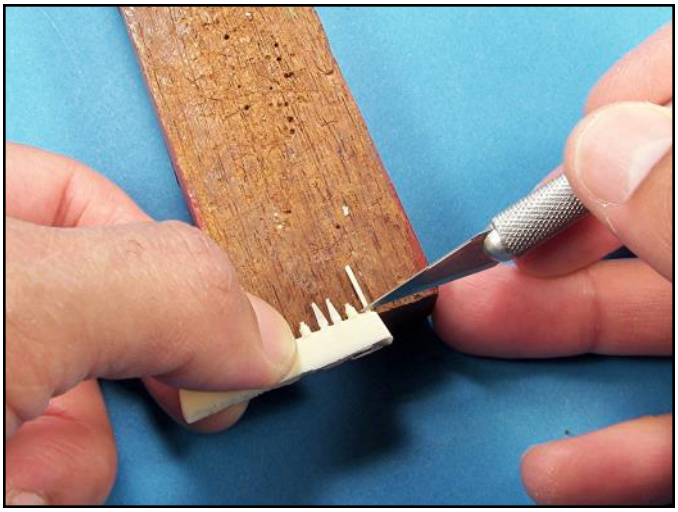


The remaining resin plugs on delicate parts can be removed with snipers and then cleaned up with a sanding stick, if scraping the edge with a number 11 X-Acto blade will damage the part.

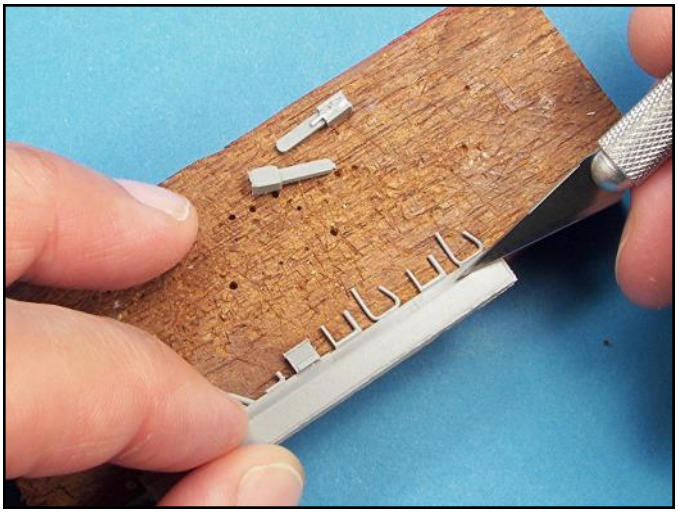
Different resin part shapes require different types of pour plugs. Sometimes you can use a combinations of tools, like cutters and number 11 X-Acto blades to remove the plug and clean up the part.



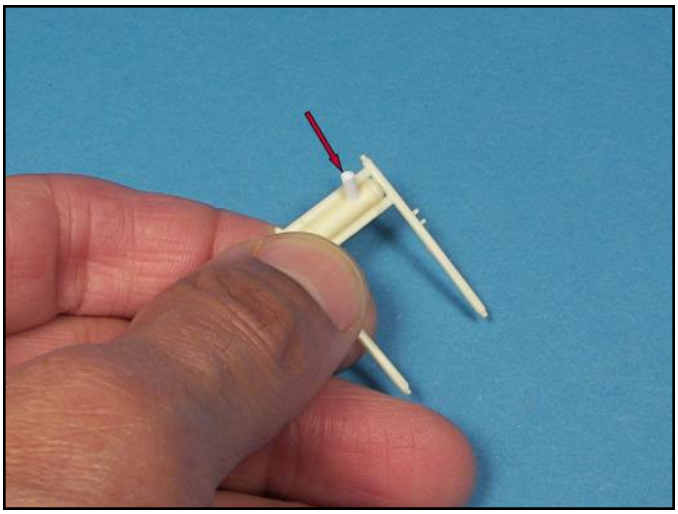
Round parts with a flat plug can be removed by carefully snipping around the perimeter of the part and then lightly sanding off any remaining excess.



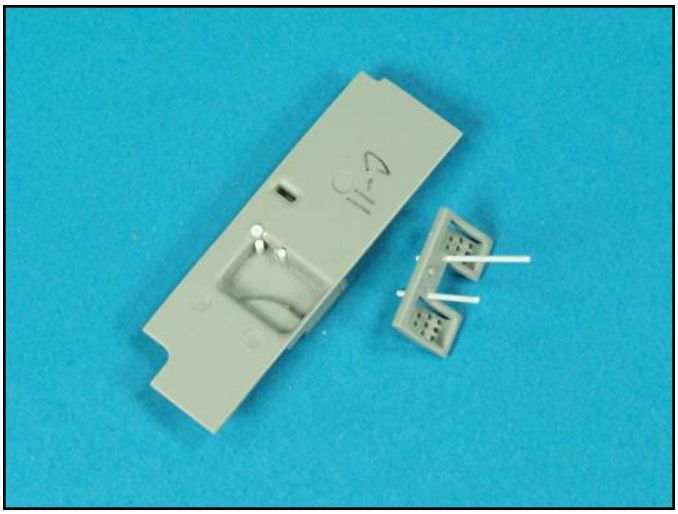
Small resin parts can be attached directly to a pour plug. In these cases, place the parts on the edge of a hardwood block with the pour plug hanging over the edge and cut off the parts.



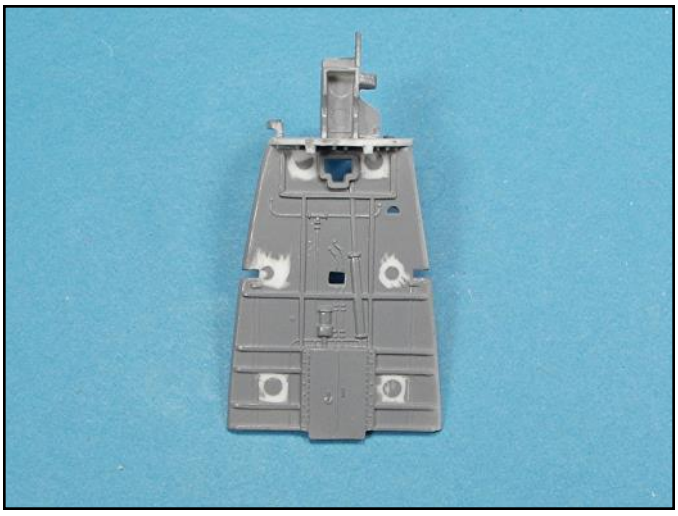
Sometimes small parts are attached to a pour block by a thin layer of resin. In these cases, carefully cut off the parts and then trim and scrape off any excess resin.



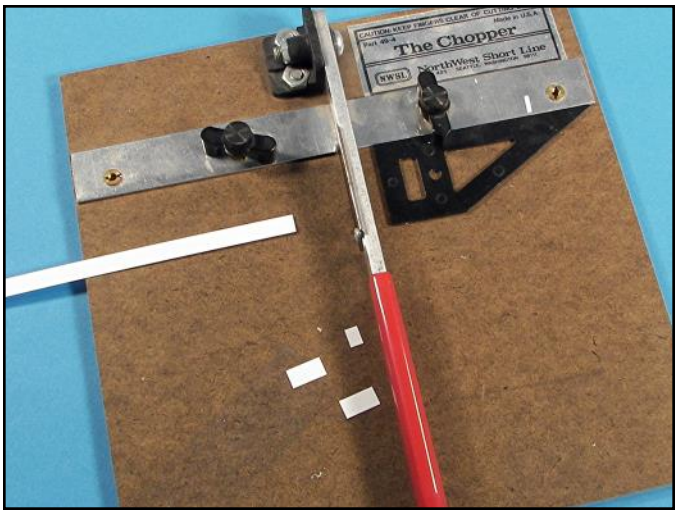
Sometimes resin parts have voids. Carefully drill out a void using a drill bit slightly larger than a plastic rod that you select to fill the void. Super glue the rod into place and then trim the excess and sand it smooth.



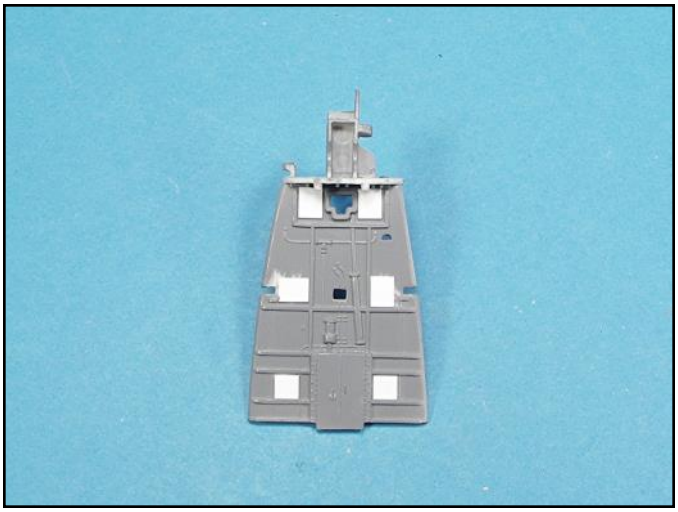
Sometimes plastic parts have surface dimples and tiny voids. I like to correct these by filling them with plastic rod just like on resin parts.



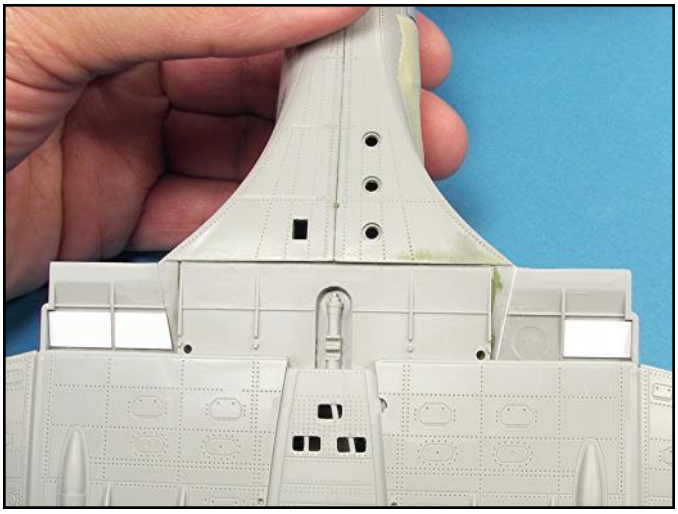
Some parts have mold punch outs which are almost always round. In tight areas where scraping or filling may damage the surrounding detail, hide the punch outs.



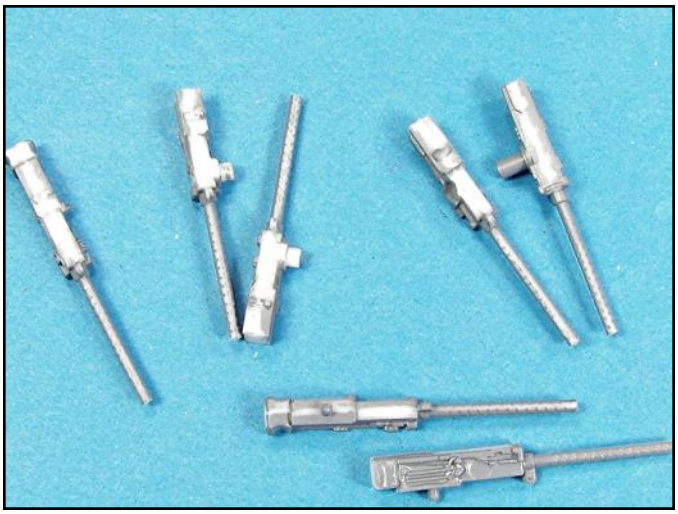
To hide mold punch outs using thin lengths of plastic strip, I prefer .010 or .015 inch thickness and I cut them to the correct lengths with a Northwest Short Line Chopper.



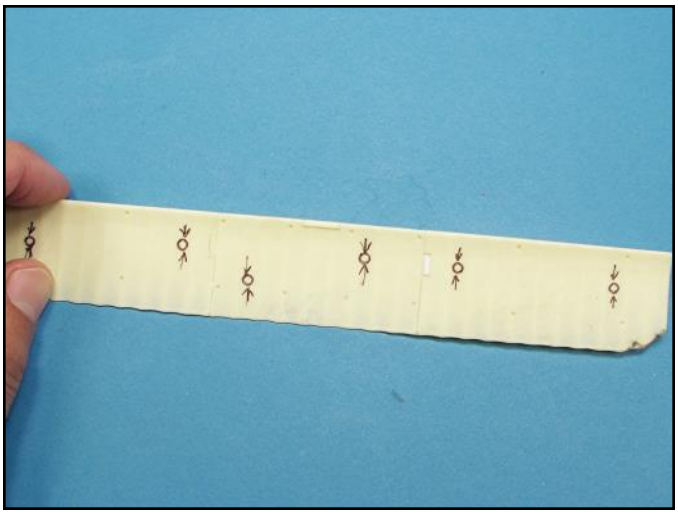
The mold punch outs on this part have been covered and once the part has received its final colors, detecting the added thin plastic sections will be almost impossible.



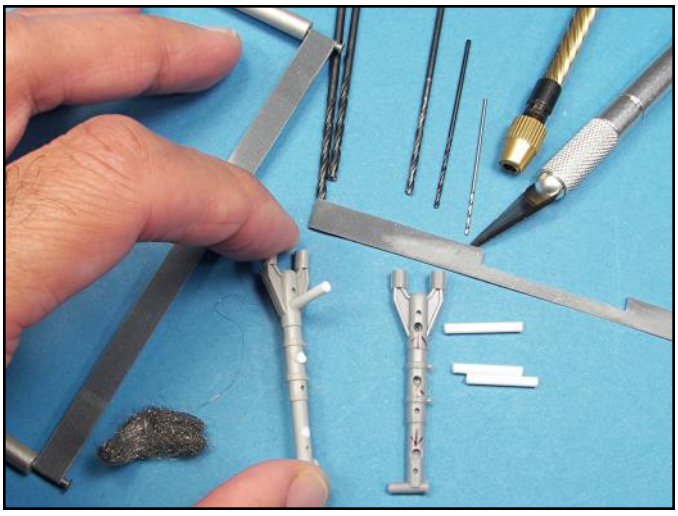
Here is another example of mold punch outs that need to be hidden. Trying to fill them with round disks that will need to be scrapper flat and sanded smooth will damage the surrounding framing detail.



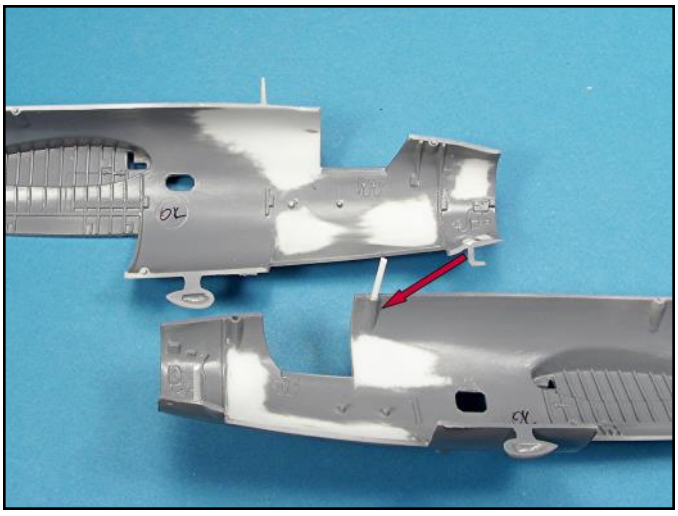
White plastic can be very difficult to work with. The trick is to prime them first so that you can easily see the mold lines and any voids or mold punch outs.



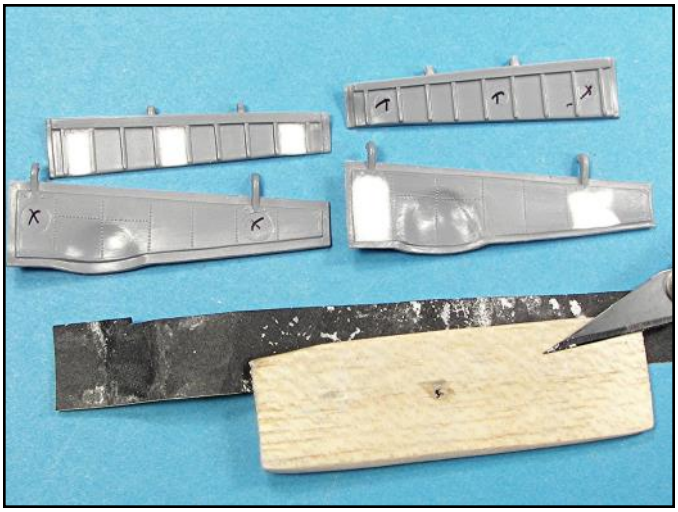
These shallow mold punch outs, were gently wet sanded with a fine grit strip of sandpaper wrapped around a piece of balsa wood.



Indented injection marks can be tricky on round surfaces. Drill out the indentation and then super glue round plastic stock into the hole. Trim of the excess and scrape and sand smooth with a Flex-I-File.

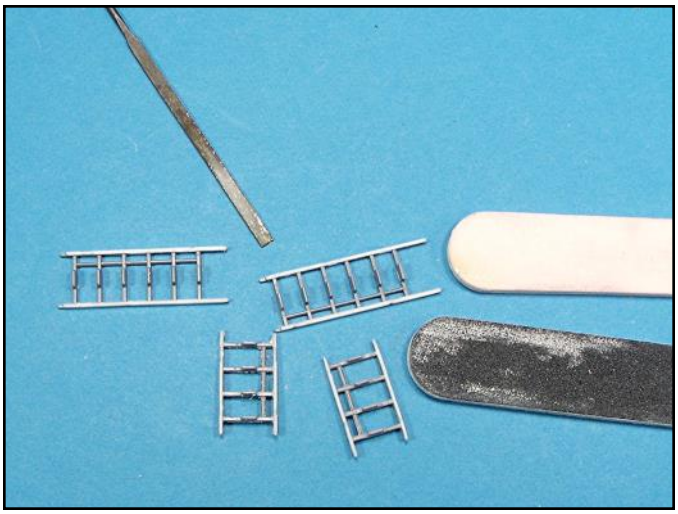


Sometimes kits have positioning tabs in locations that can be seen once the model is assembled. The plastic rod filled the void of this tab and then it was carefully scrapped off and sanded smooth.

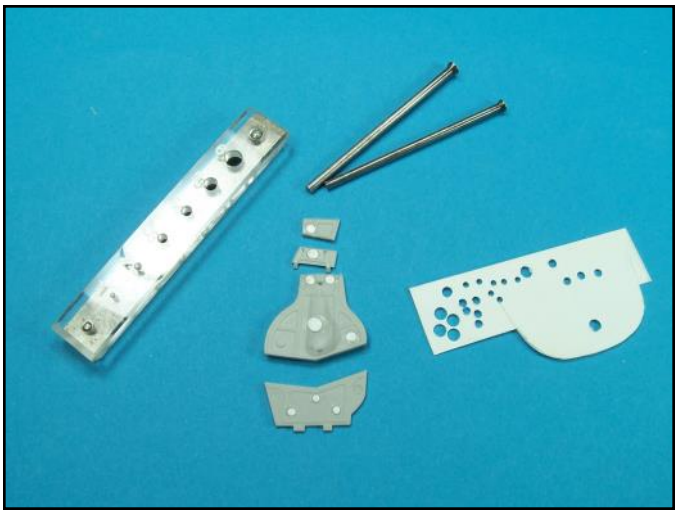


Shallow mold punch outs can sometimes be sanded smooth by wrapping a length of sand paper around a strip of balsa wood and wet sanding the surface smooth.

These landing gear parts are white plastic and once primed, a number 11 X-Acto blade was used to scrape the mold punch outs and the mold lines smooth.

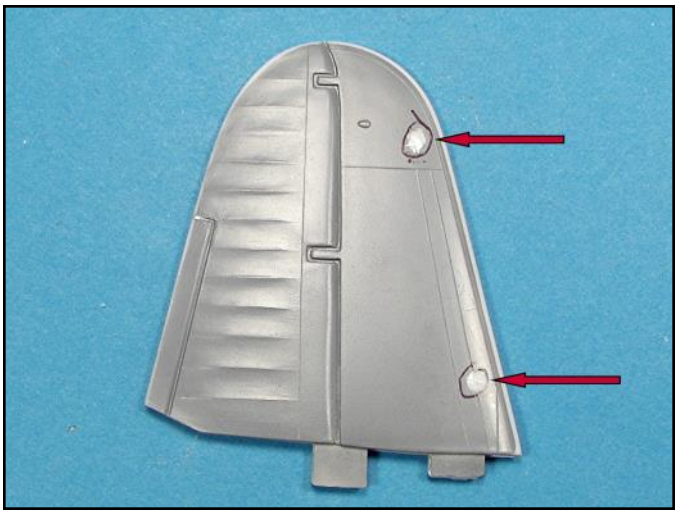


These bomb frames for a B-26 had mold punch outs along the edges that were carefully filed down and then wet sanded smooth with sanding sticks of various grades.

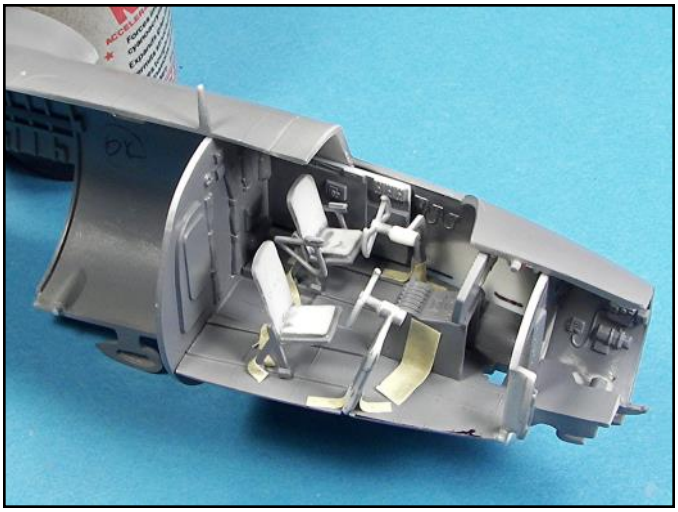


The mold punch outs on these parts are both raised and indented. The indented marks were filled with disks punched out with a Waldron Punch Tool and then super glued into place.

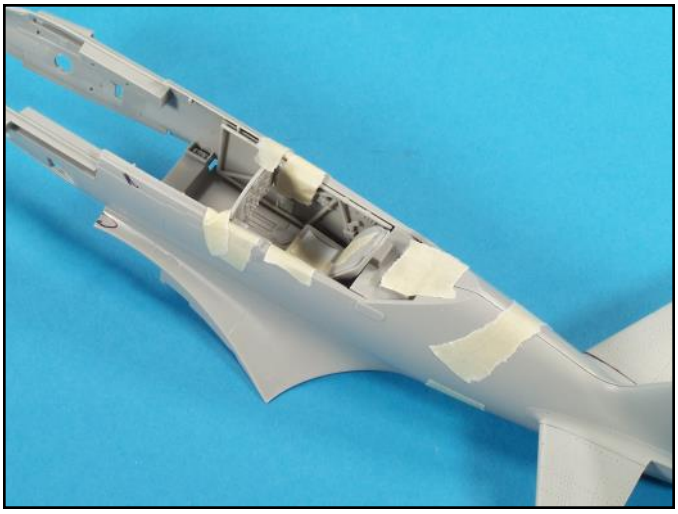
The glued disks were wet sanded smooth with fine grade sandpaper wrapped around lengths of balsa wood. The raised injection marks were carefully scraped with a number 11 X-Acto blade and then sand smooth.



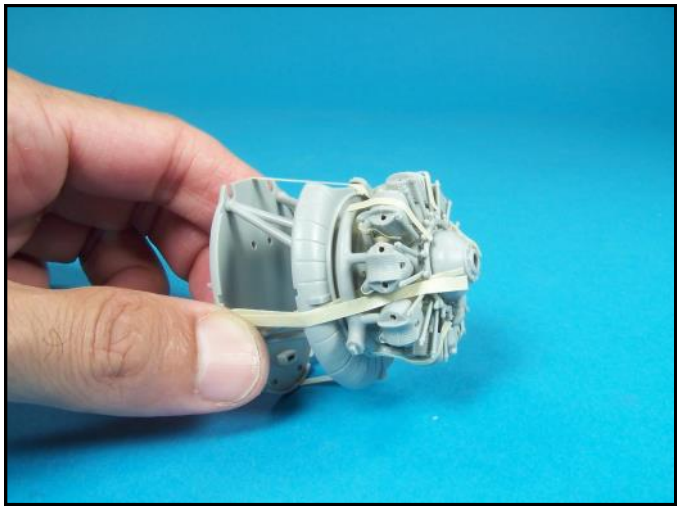
I hardly ever use putty anymore, but the dimples of this part were shallow so I filled them with putty and wet sanded the surface smooth.



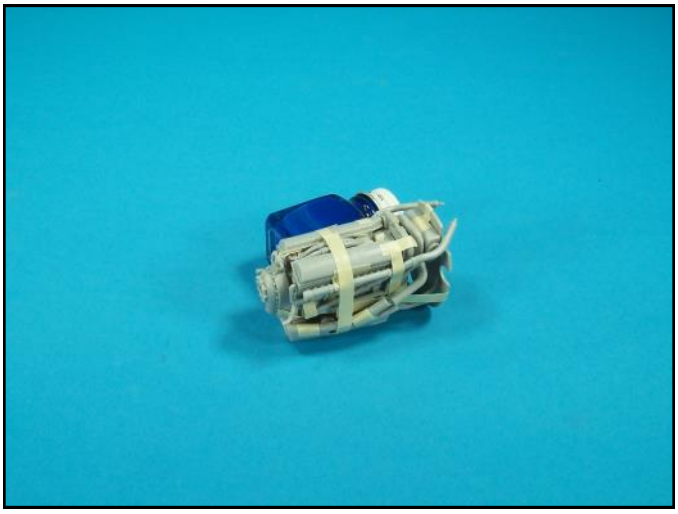
Taping together the interior areas, especially the cockpit helps you identify fit issues and helps you decide what details to add and how you want to add them. It also helped identify where to hide nose weight for this B-26.



Here is another example to taping together a cockpit. This step also allows you to make notes on painting and weathering.

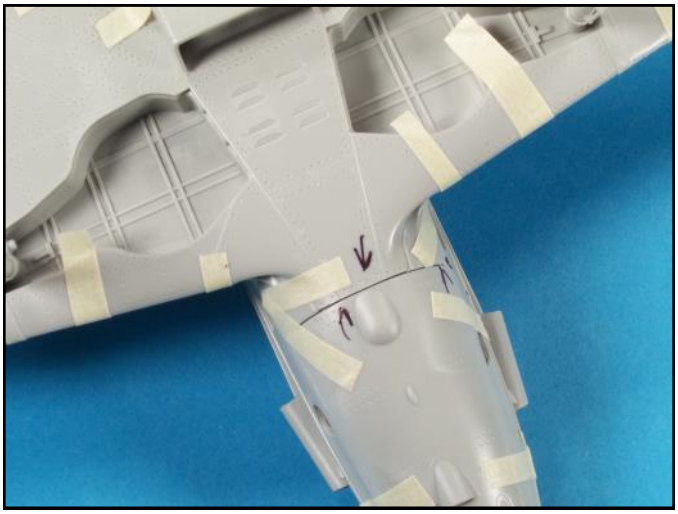


I also tape up the engines to be sure all the parts fit together and that the assembled engine will fit inside the cowling. I make any adjustment note on the instructions.

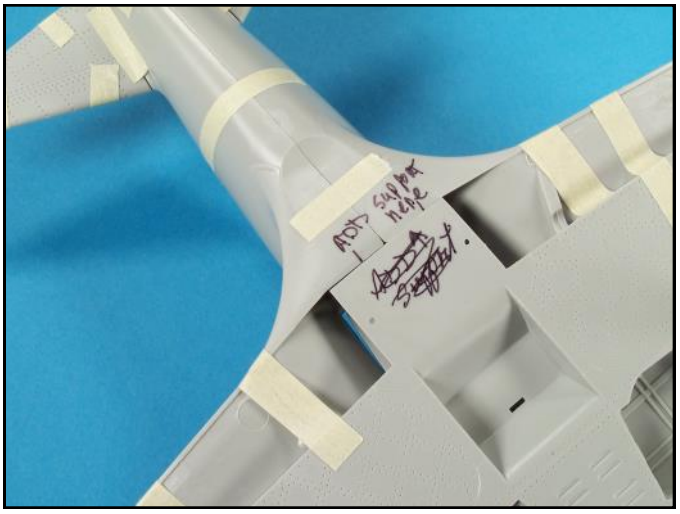


Here is another example of an engine tape up. Some of the parts had to be trimmed and slightly bent to get them to all fit together.

Once you have all the parts cleaned up, tape the entire model together to check the fit of all the major components. This step can be a bit time consuming, but it is well worth the effort.

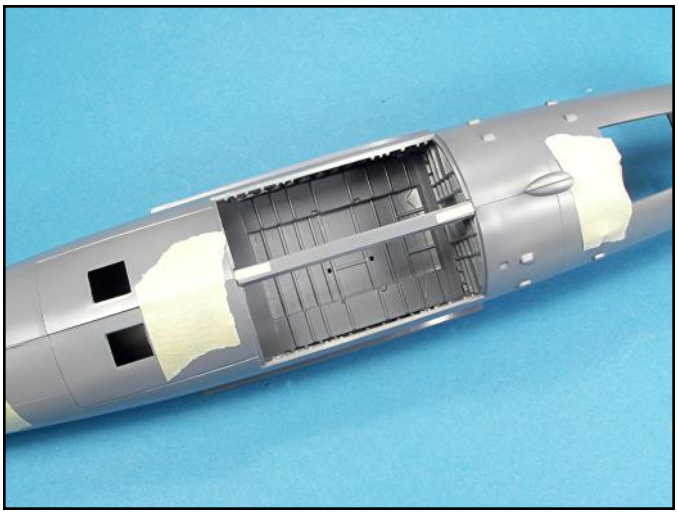


Voids between parts are easily identified during the tape up step and careful checking all the connection points will leave no surprises once you start gluing subassemblies together.

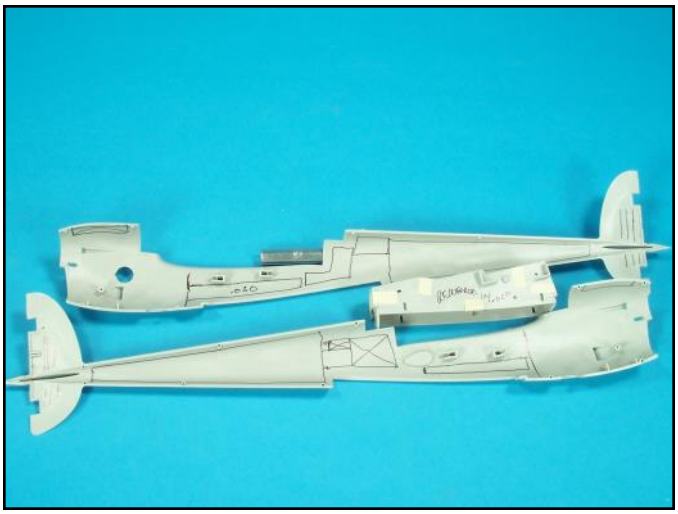


I also make notes on the parts where possible to help speed up the assembly process.

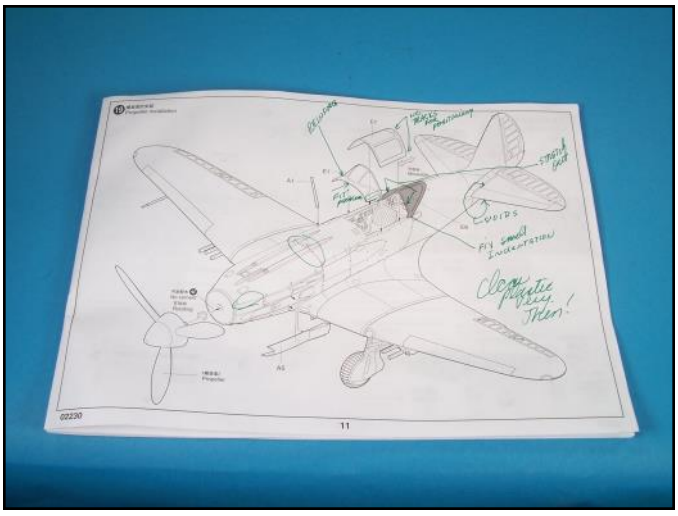
The tape ups on these complex engine and wheel well assemblies for this P-38 kit were well worth the effort, as I was able to identify several fit challenges that were easy to fix during their assembly.



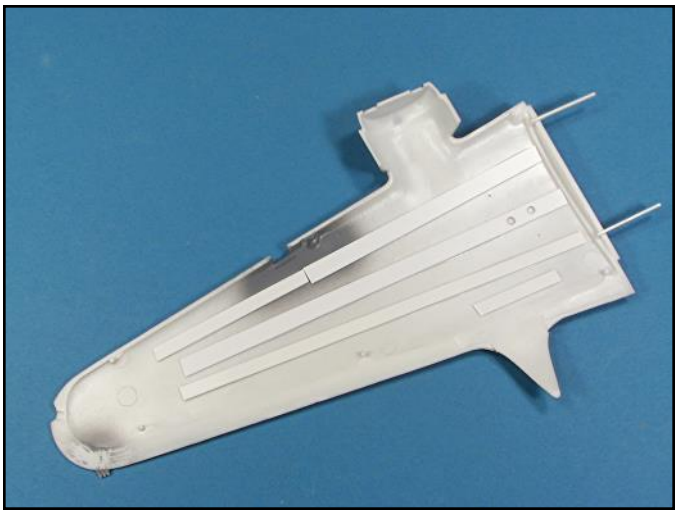
The interior bulkheads on this B-26 had to have some plastic removed to get them to fit correctly inside the fuselage.



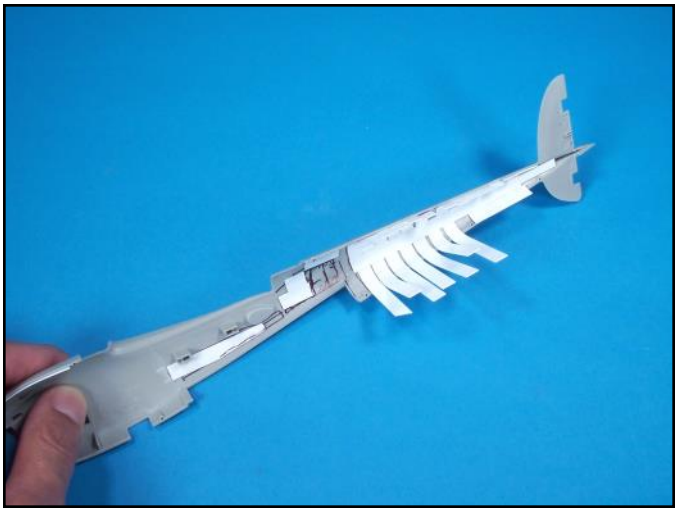
The plastic on the fuselage booms of this P-38 were very thin. I marked locations where plastic sheeting could be laminated to strengthen the plastic and prevent flexing, which can crack seams.



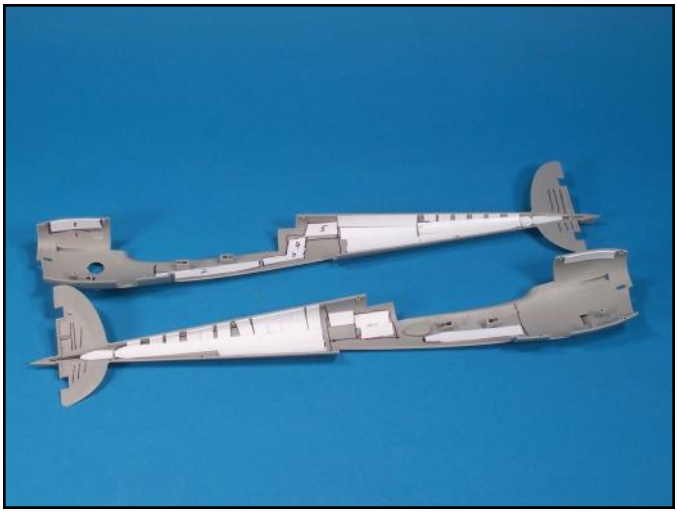
I use the instructions to make notes on all the things I find during the tape up process and I also note how I intend to fix them.



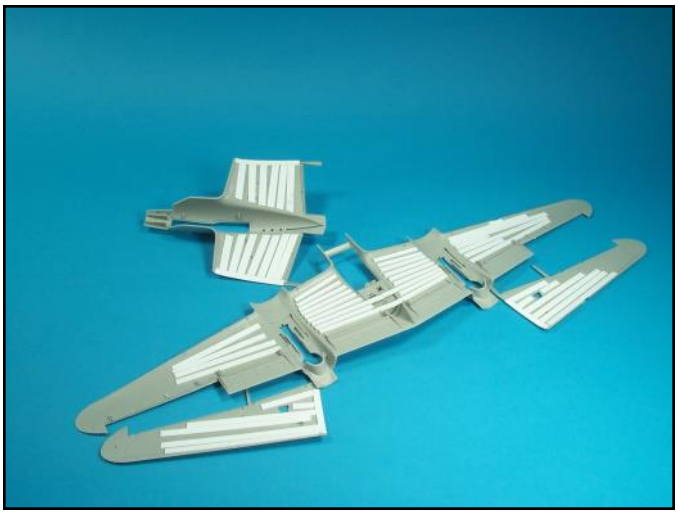
B-26 models require a lot of weight to get them to sit correctly. This puts a lot of stress on the wings and fuselage. Lengths of .030 and .040 inch plastic strips were laminated to the inside areas of the wings to strengthen them.



A lot of plastic was added to the inside areas of these P-38 engine booms. The plastic strips were laminated to the interior with super glue.

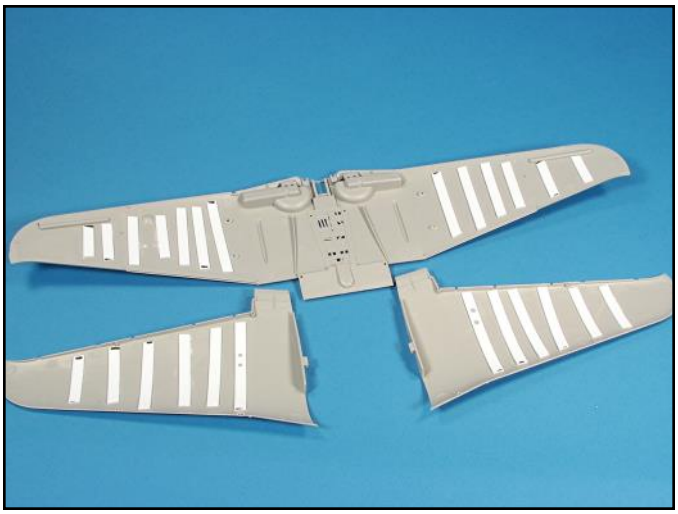


Once the excess plastic strips were trimmed, the part halves were test fitted to be sure the added plastic did not interfere with the gluing surfaces. These parts are now very strong.

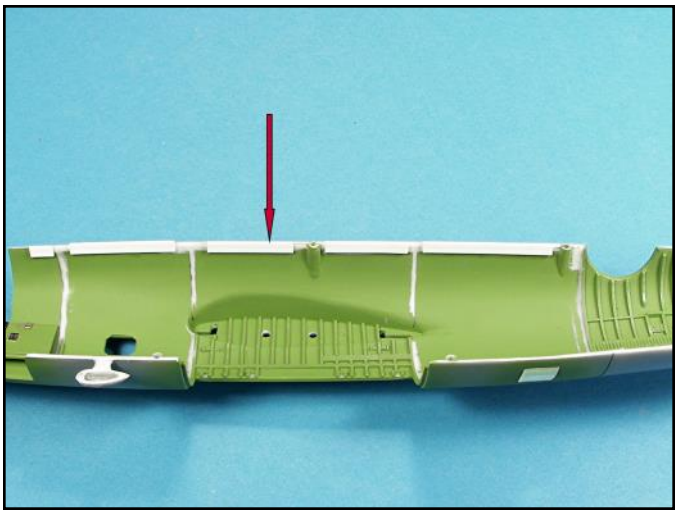


The thickness of the plastic on wings and main fuselage on this 1/32 scale P-38 were thin and a lot of plastic strips of various thicknesses were needed to strengthen the parts.

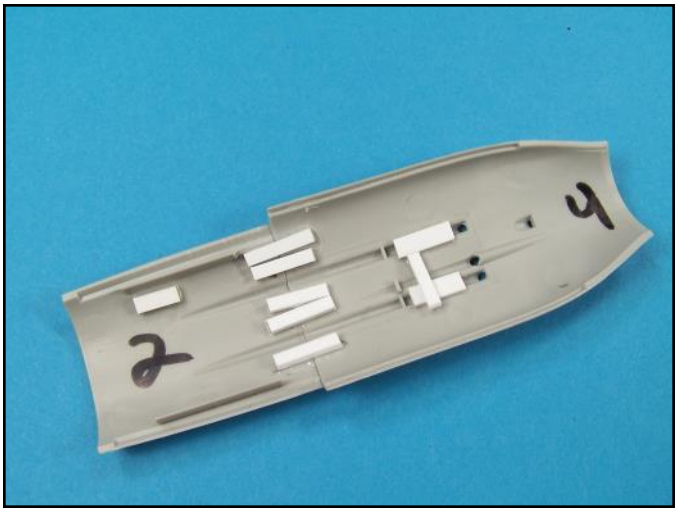
Even small parts can benefit from laminating a few strips of plastic to the inside areas for added strength. Stronger plastic puts less stress on the seams, eliminates cracking and makes the parts easy to handle.



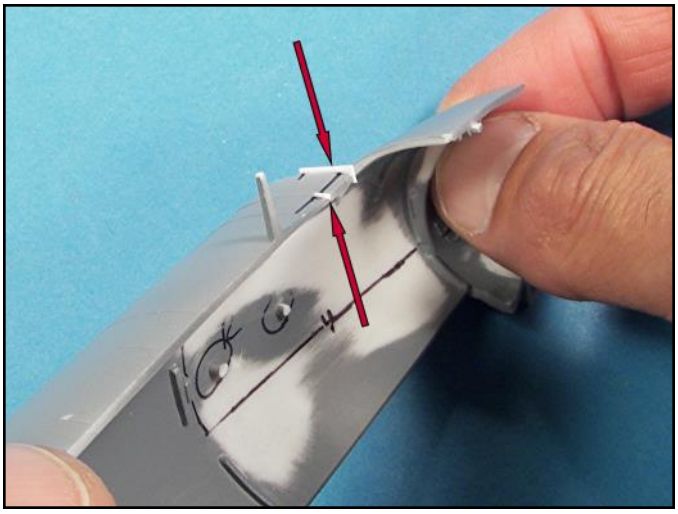
You can position plastic strips in different ways to add strength to an assembled part. Since these wings were very wide, I decided to laminate the strips from front to back.



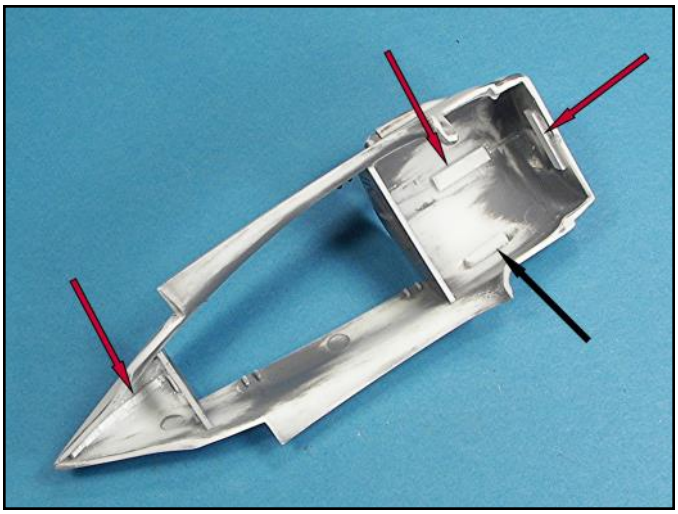
To increase the upper gluing surface on this 1/48 scale B-26, I added strips of plastic along the edge. This made the assembly very strong and helped support all the lead weight that was added to get the model to sit correctly.



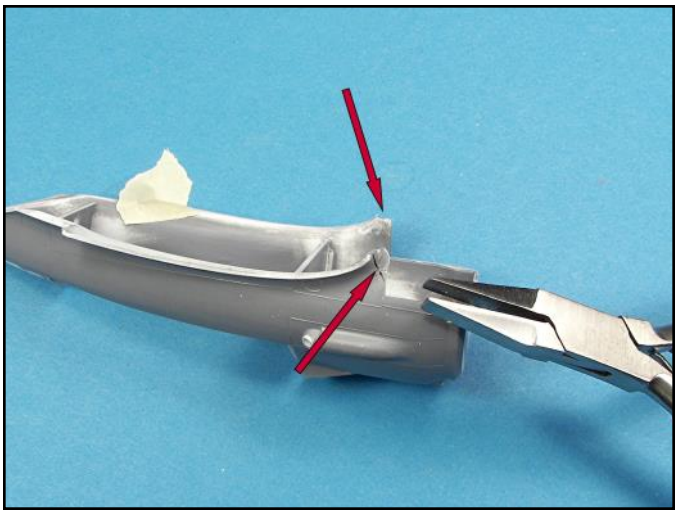
To strengthen the seam between these two parts, small strips of plastic were added. The two forward plastic strips were added for positioning the machine guns.



Test fitting the canopy showed a void, which was fixed by adding a strip of .015 inch plastic that was trimmed and then form fitted into place.

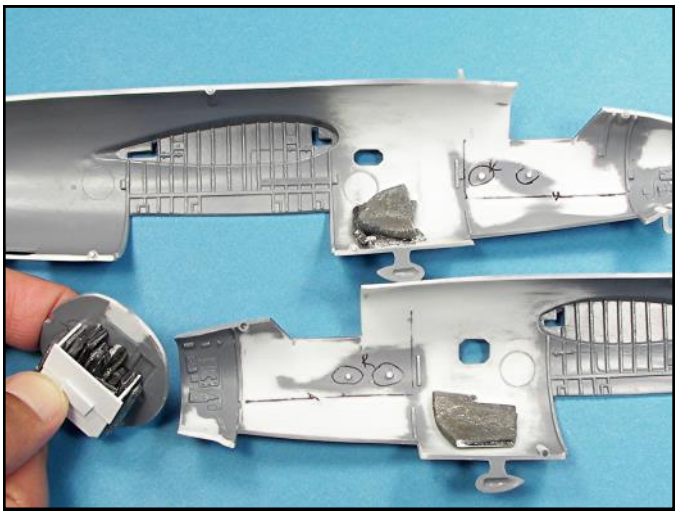


Plastic strips were added along the interior seam lines of this engine nacelle to prevent cracking. The plastic strip (black arrow) was added for hollowing out the exhaust piping.



Both B-26 engine nacelles did not fit well onto the wings. The fit was greatly improved by bending out the tips with flat nosed pliers. Test fitting the wing parts identified this issue and the solution.

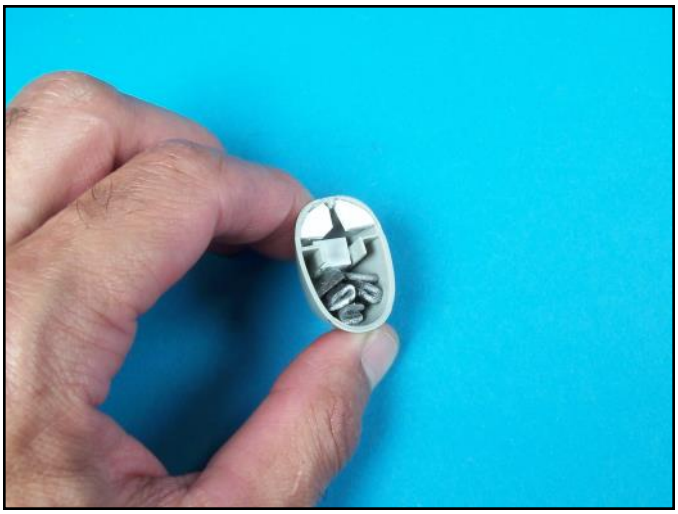
This is how it was determined how much weight was needed to get this 1/48 scale B-26 to sit correctly.



A lot of mashed lead weight was added to interior areas where they would not be seen. A box was also made to hold weight.

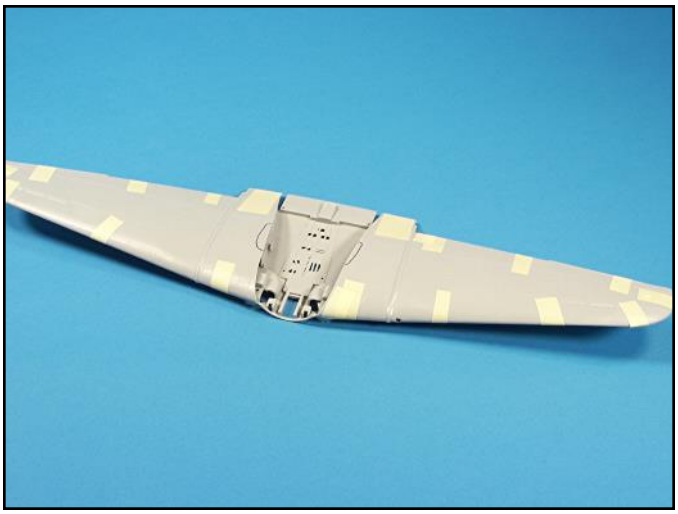
Even the engine nacelles were used to hide small pieces of lead weight to help balance the B-26. To secure the pieces of lead, white glue was squirted into the opening.

The engines of this 1/32 scale P-38 were filled with copper bee bees to help balance the model and get it to site correctly. White glue was used to secure the bee bees in place.

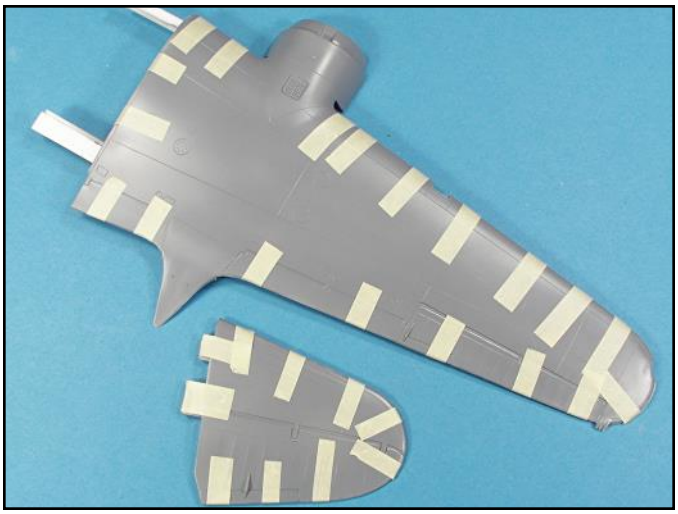


Lead weight was also carefully added to the nose of this P-38, but positioned so that the weight would not interfere with the placement of the machine gun barrels.

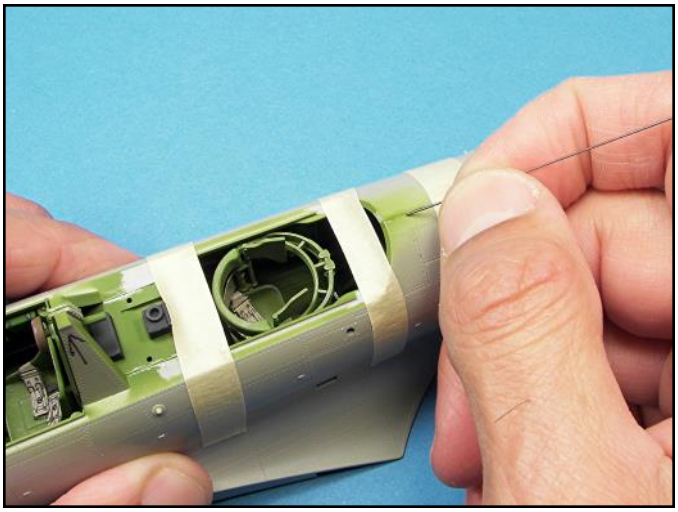
The interior gun details on the 1/32 scale P-38 were not used so that more weight could be added.



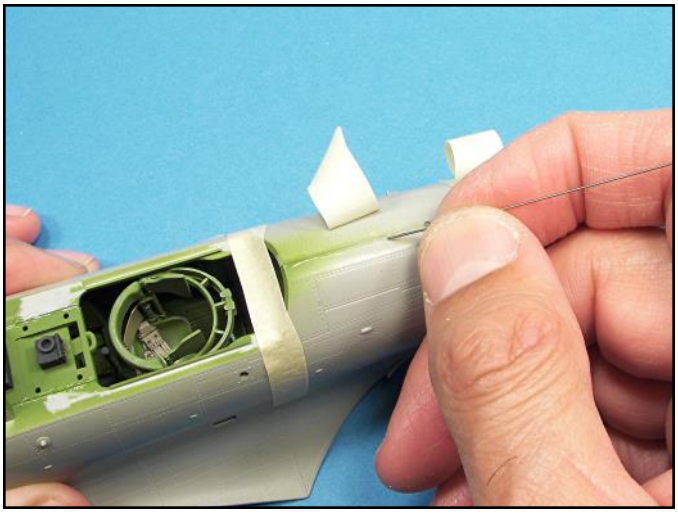
To glue parts together, tape the halves together positioning the parts along the seam line as you tape.



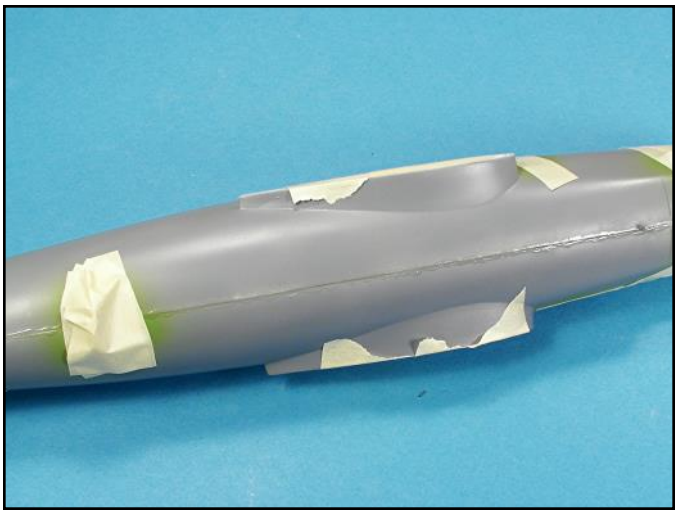
On older kits, you may have to use a lot of tape to get the halves to fit together correctly.



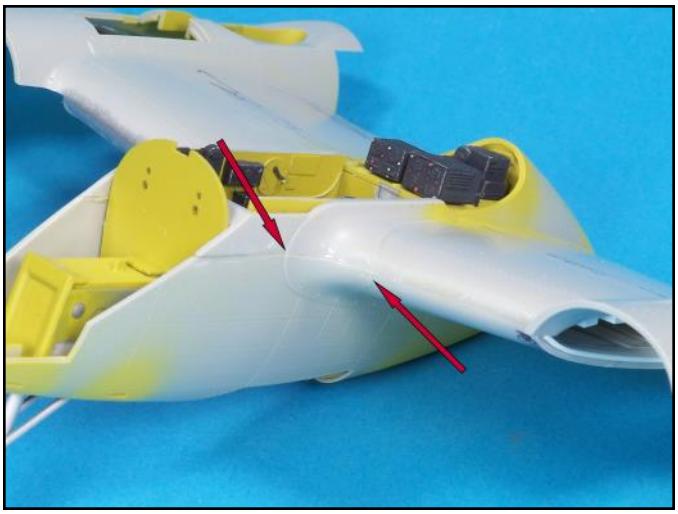
Make a puddle of super glue on a piece of paper. Dip the tip of a thin stiff wire (.015 inch diameter) into the puddle and then apply the super glue along the seam line between the tape locations.



Capillary action will pull the glue down into the part halve gluing surfaces resulting in a strong bond. Once the glue is dried between the taped locations, remove the tape and glue the remaining seam locations.

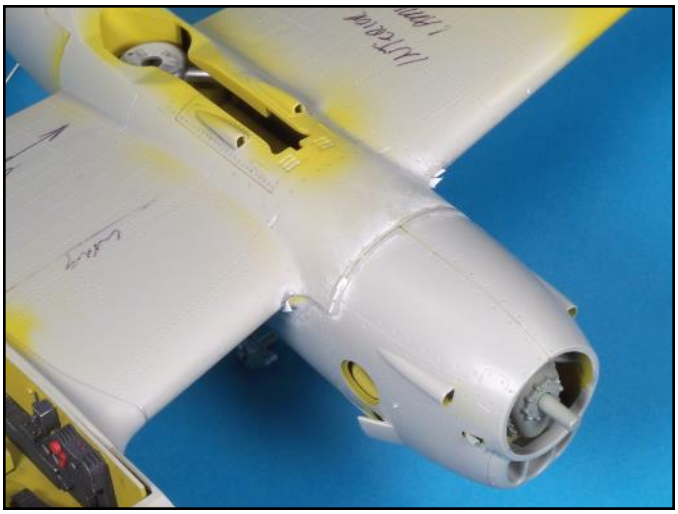


Here you can clearly see that several layers of super glue were applied along the seam line. After the glue has dried, scrape it flat using a number 11 X-Acto blade held at a 45 degree angle, then wet sand the seam smooth.

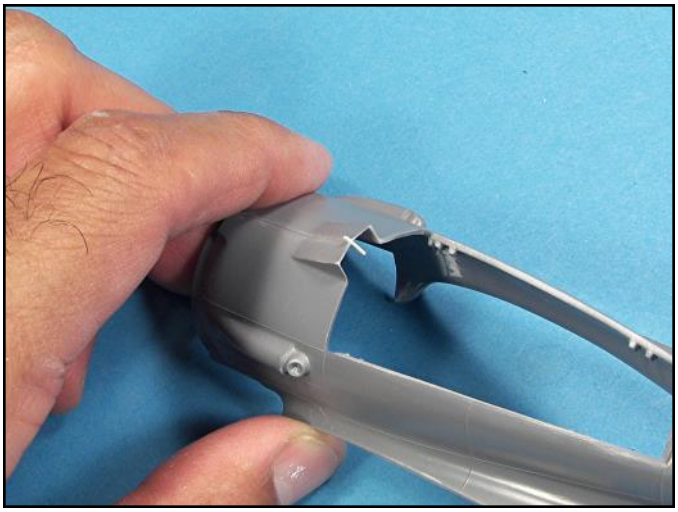


When applying super glue along seam lines be careful not to apply excessive amounts in areas, such as the steps where the arrows are pointing.

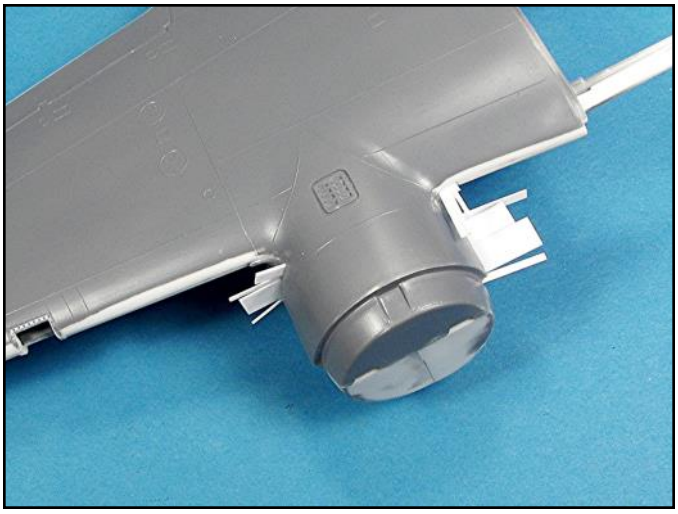
To fill voids along seam lines, I use strips of Evergreen and Plastruct plastic. I apply super glue to both sides of the plastic for a strong bond. This technique works better than filling the void with thick gel super glue or putty.



To fill in even the smallest voids, I insert tiny pieces of plastic and then super glue them into place. The plastic strips also add strength to the seam.

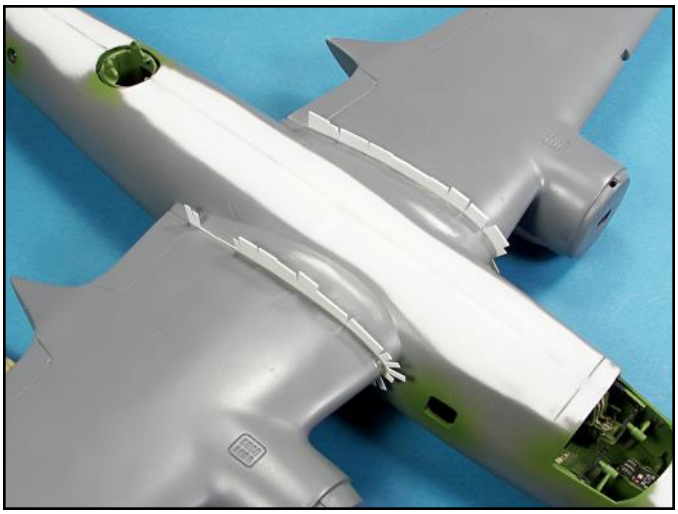


To fill tiny voids at the edges of seams use tiny strips of plastic attached with super glue. The plastic can easily be trimmed and sanded smooth.

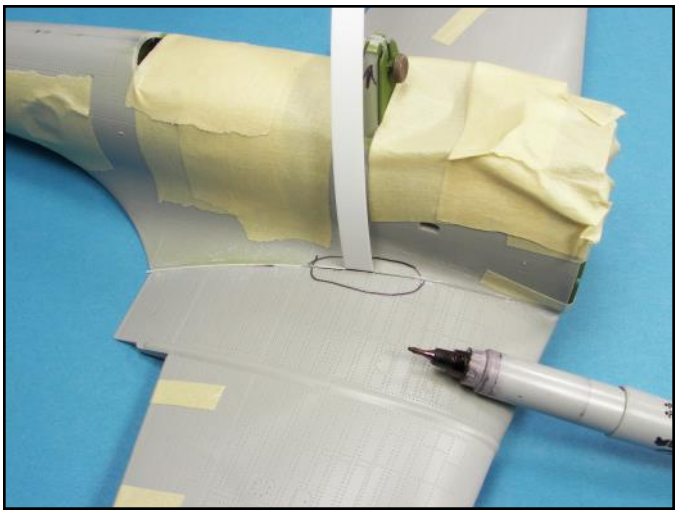


The voids around the engine nacelles and wing attachment areas on this B-26 wing were filled with various thicknesses of plastic strip. After several applications of super glue, the strips were trimmed and then sanded smooth.

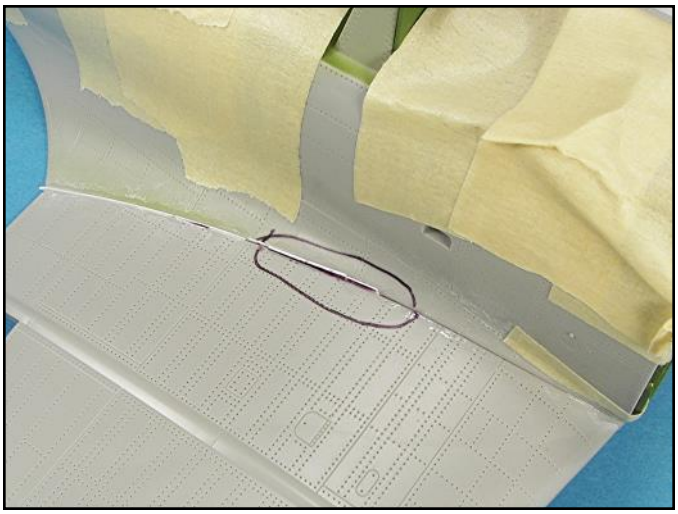
Strips of plastic can also be used to increase a gluing contact surface area and increase the strength of the fuselage to wing connection.



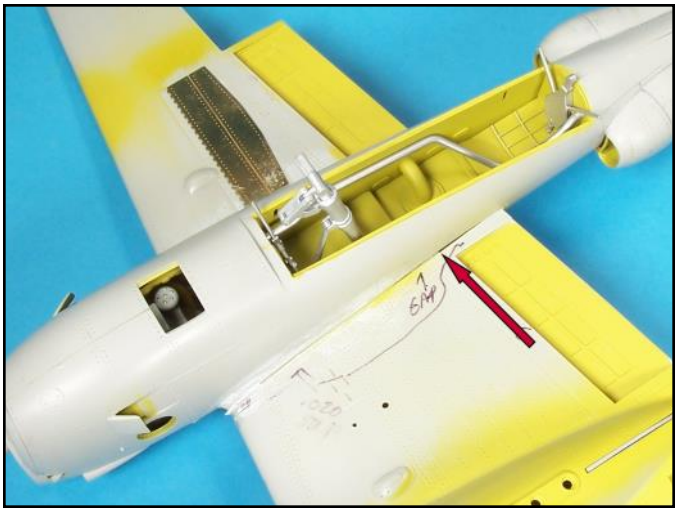
If putty had been used to fill the voids on the upper wing area, the wing attachment points would have cracked due to the amount of lead weight added to this B-26.



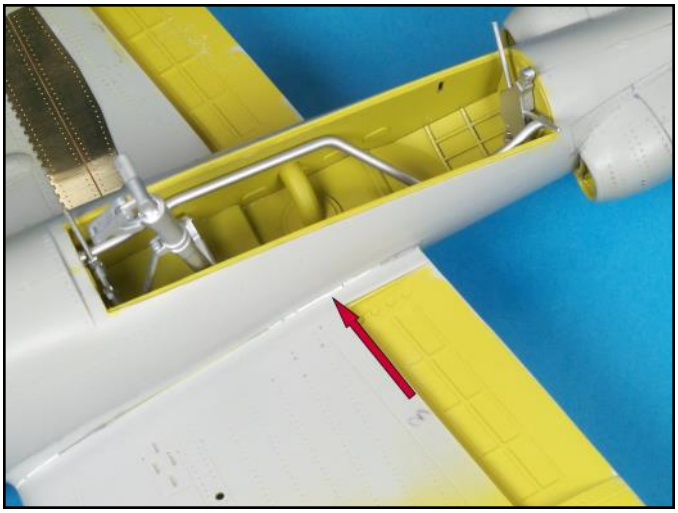
Even new aircraft kits have voids to fill. The wing to fuselage attachment area on this new 1/32 scale Dauntless SBD was filled with various thicknesses of plastic strips. Using long strips makes setting them in place easier.



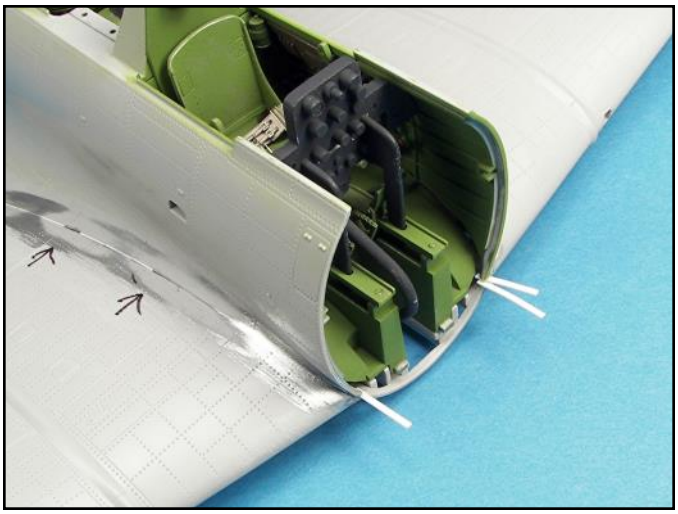
Apply super glue to both sides of the inserted plastic for a strong bond, then trim the strips and sand smooth. Protect surround surface detail with masking tape prior to sanding.



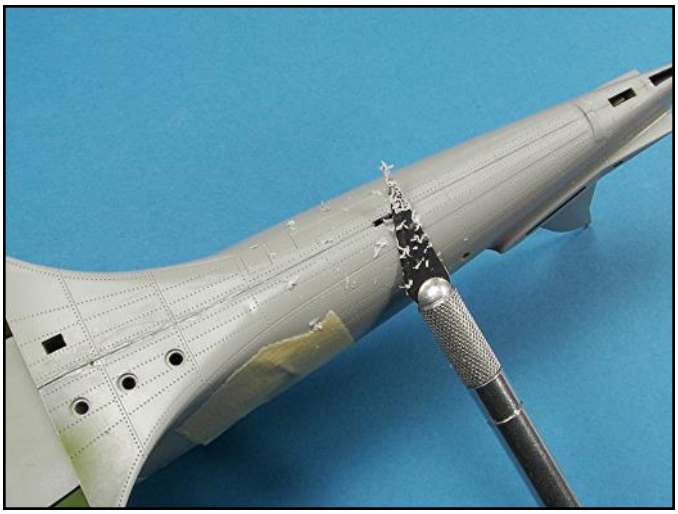
The tiny voids where the booms attached to the wing underside could have been filled with white glue; however, to improve the strength of the joint, plastic strips were added.



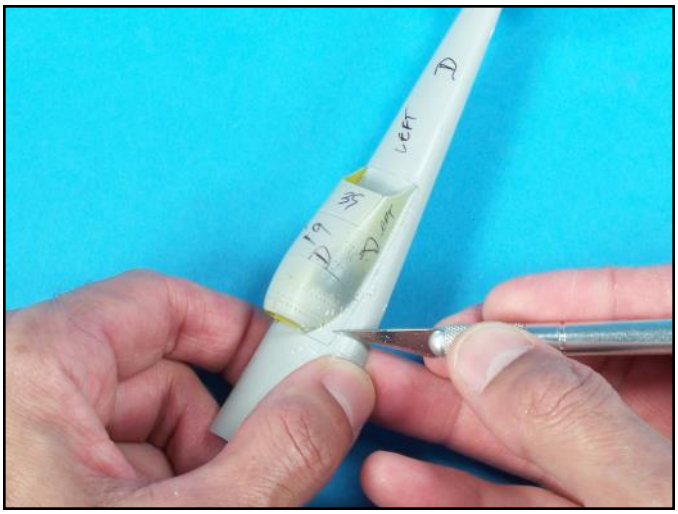
The strips have been added and sanded smooth.



Here is another example of using strips of plastic to fill voids and add strength to the overall assembly.

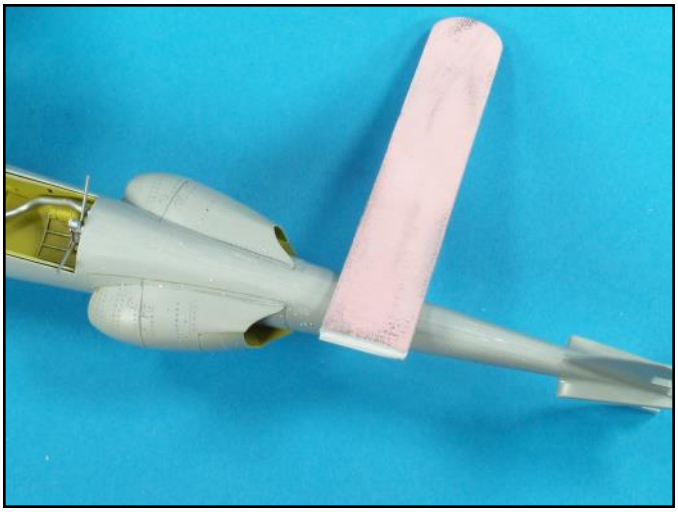


Seam lines along fuselages and wing edges are best scraped first to remove as much of the excess super glue as possible before you wet sand the surfaces smooth. Number 11 X-Acto blades are perfect for this type of work.



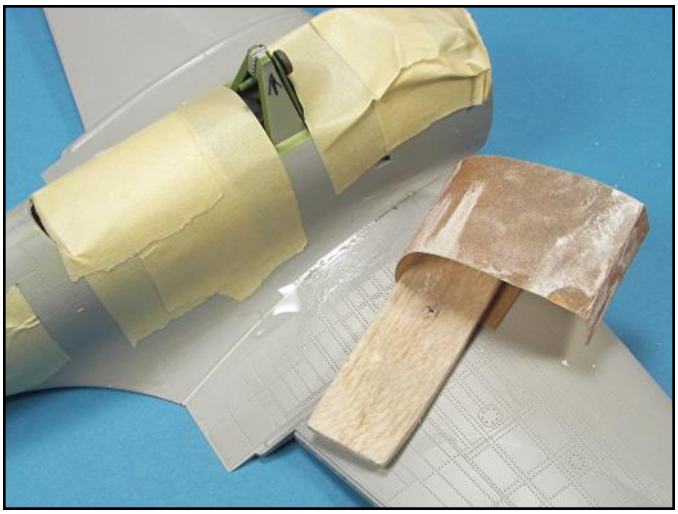
Number 11 X-Acto blades are also great for contouring and scraping parts that do not fit well into their locations. Sometimes you have to remove a lot of plastic to get the parts to fit correctly and make those pesky seams disappear.

For sanding flat or semi flat surfaces, wrap strips of sandpaper around lengths of balsa wood to smooth out the plastic. Once this is done you can wet sand with finer grades of sandpaper. Polish the plastic with 0000 steel wool.

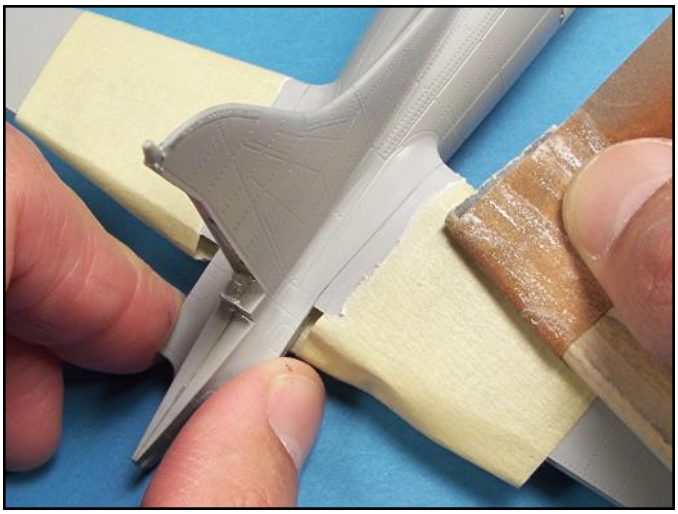


Sanding sticks work great along the seam lines of fuselages and the edges of wings to smooth out the plastic and the super glue. I like to smooth sand first, then wet sand, then check for flaws.

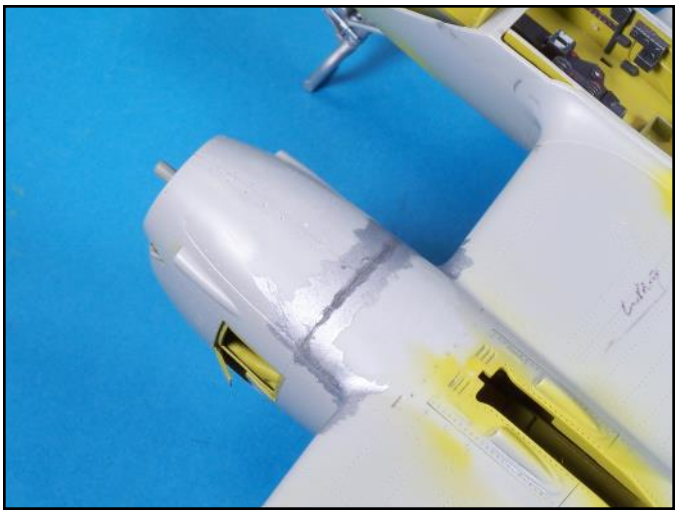
Balsa wood wrapped with sandpaper can also be used to smooth out the seams at wing to fuselage attachment areas. One caution here is that you can easily create a depression if you are not careful, so check your work frequently.



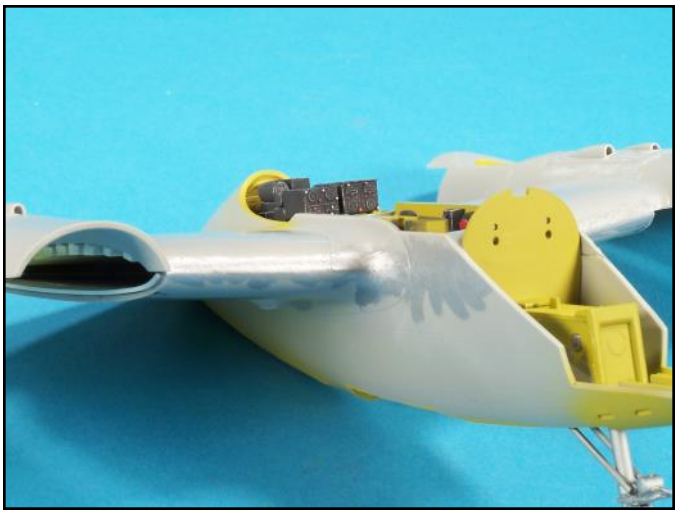
Wrapping sandpaper around balsa wood also minimizes damage to surrounding surface detail. Always wet sand where possible to polish the plastic while you are sanding and to extend the life of the sandpaper.



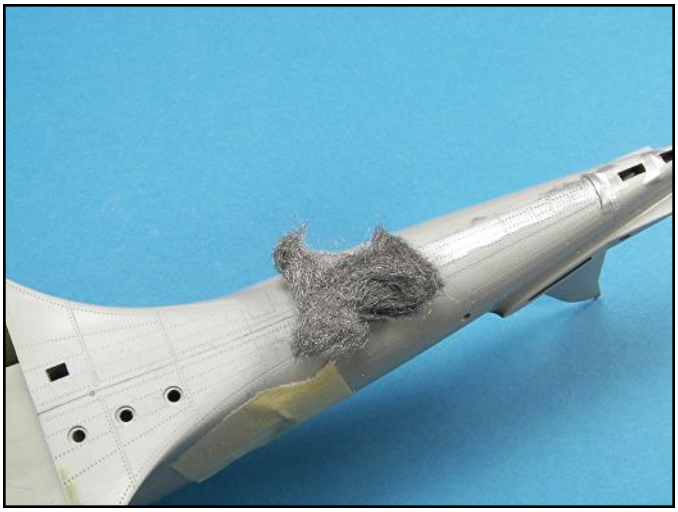
Here, masking tape is used to protect the surrounding surface detail.



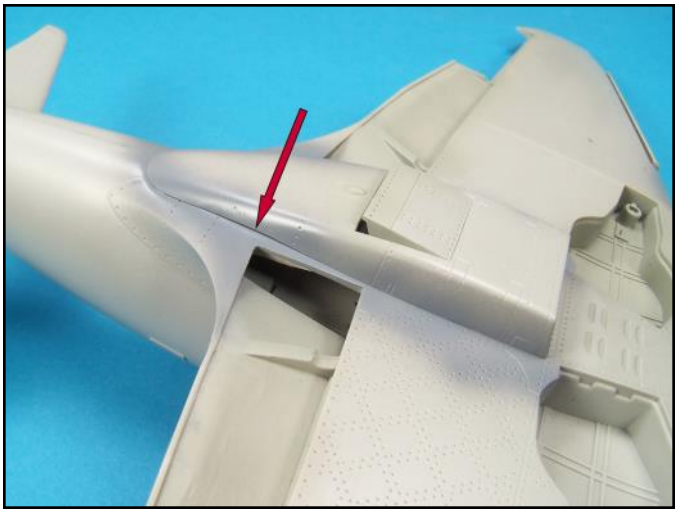
After the initial seam work is done, check it using silver paint, which will highlight any flaws. Reapply more super glue and repeat the scraping and sanding process.



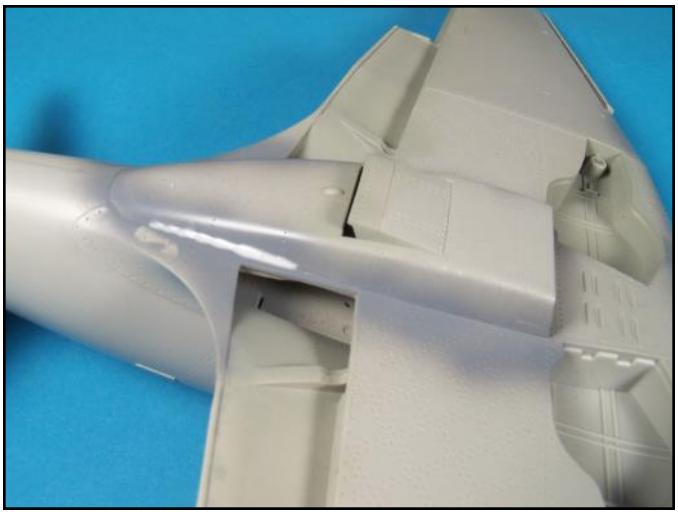
The seam lines on the wing and at the attachment point on the fuselage had several iterations of gluing and sanding before all the seam work was corrected. The final coat of silver paint was removed with a 0000 grade steel wool pad.



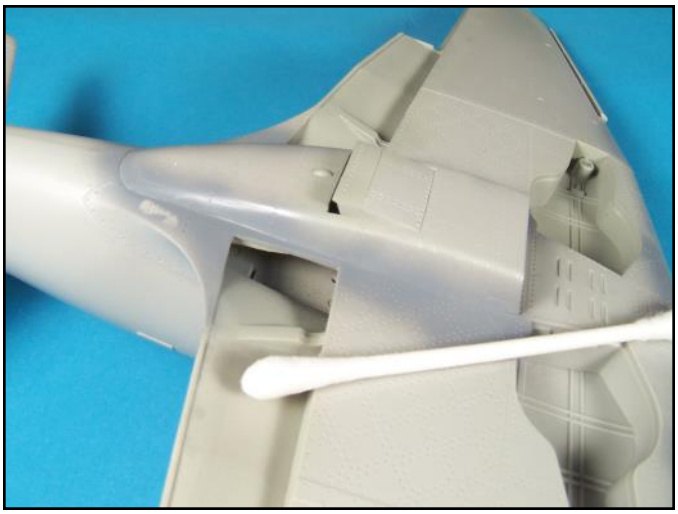
You can also use fine grade steel wool to polish plastic.



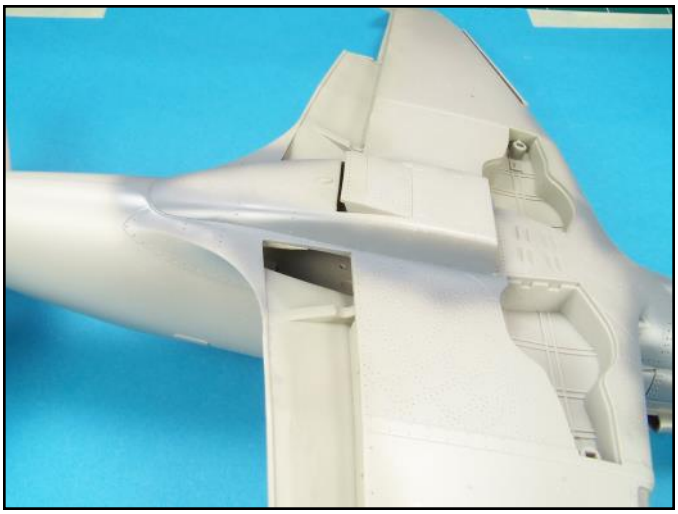
Some voids are in places that are impossible to fill without damaging the surrounding plastic and the surface detail. Step one is to apply some primer to the area where the void is. This will provide a surface for the glue to stick too.



For these types of voids, use Elmers white glue to fill the void. Make a puddle of the glue on a piece of paper and apply it with a thin stiff wire or a toothpick. You have to work quickly, as the surface of the white glue dries quickly.

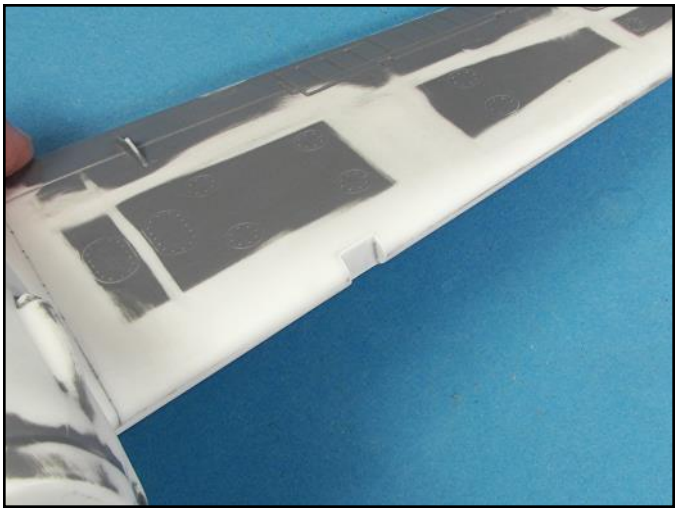


Before the surface of the white glue begins to set, contour the glue with a damp Q-Tip. Use a new Q-Tip for each pass that you make over the surface of the white glue.

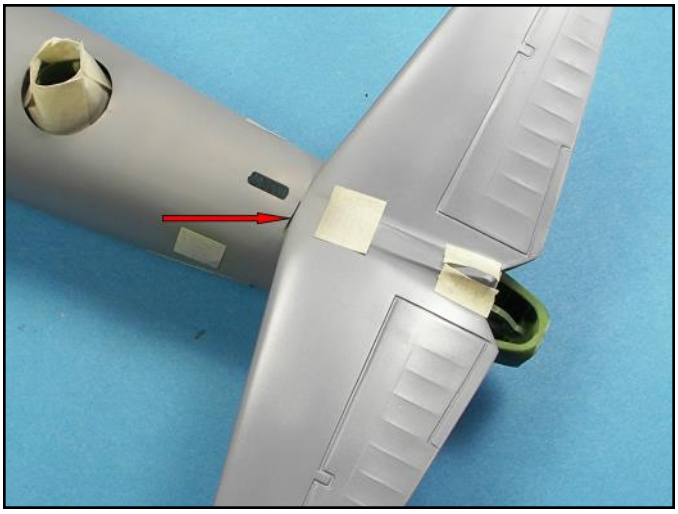


Once the white glue is dry give it a light coat of primer. Check for flaws and repeat the application of the white glue to completely fill the void. Prime the dried glue between applications.

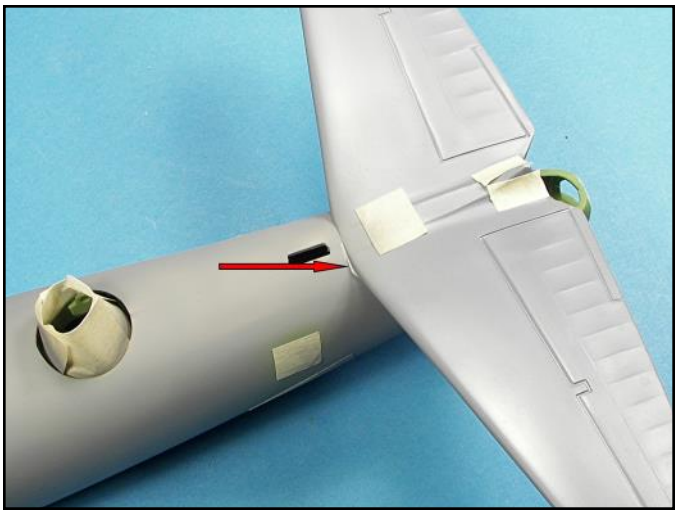
While working with seams, you may have to also address other issues. Sometimes wing lights are openings with a clear plastic cover. Fill the opening with thin strips of plastic attached with super glue.



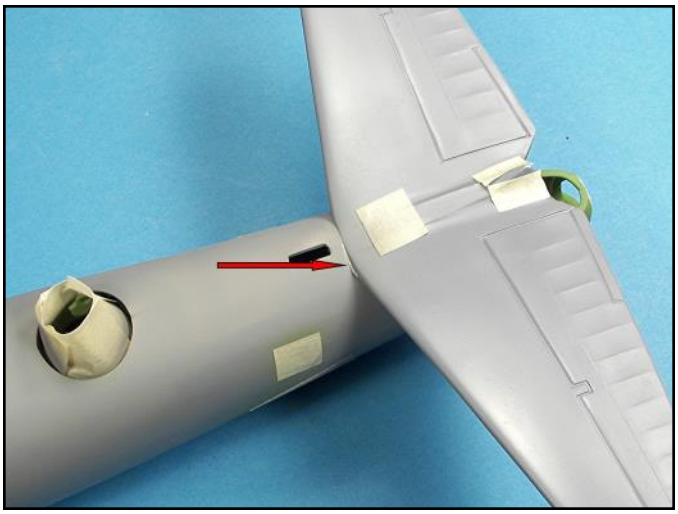
The excess plastic was trimmed and then the surface was sanded smooth. After painting an HO scale train lens was added.



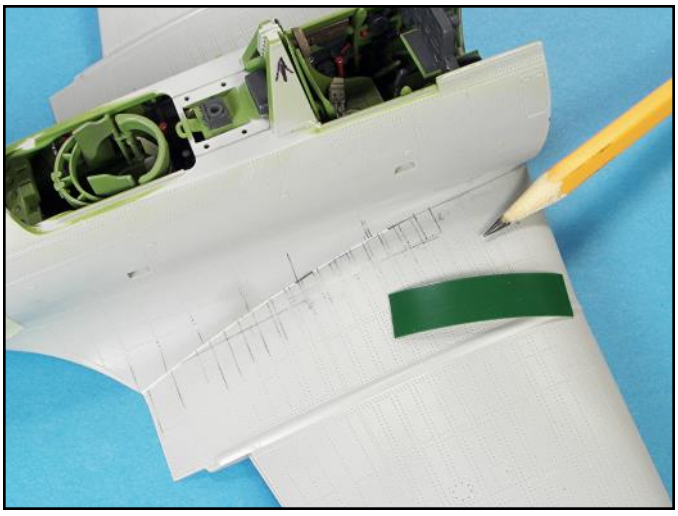
Here is another good example of a hard to fill void.



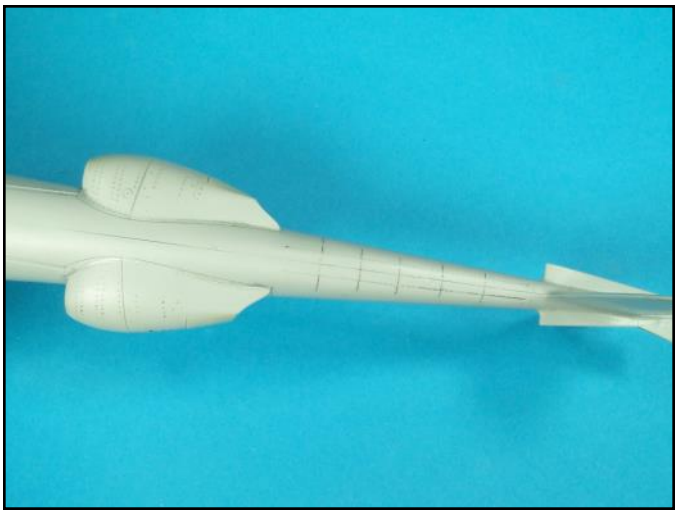
Several applications of white glue were applied and between coats the glued was contoured, allowed to dry, primed and then more glue was added and the process repeated.



One final coat of primer was applied to check for tiny surface bubbles.



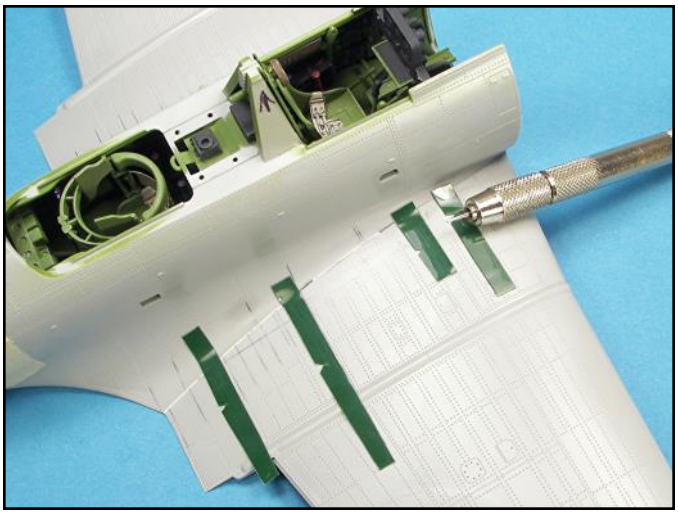
The first step in restoring surface detail is to draw the panel lines. I use a small length of labeling tape to set the lines and mark them with a soft lead pencil with a sharp tip.



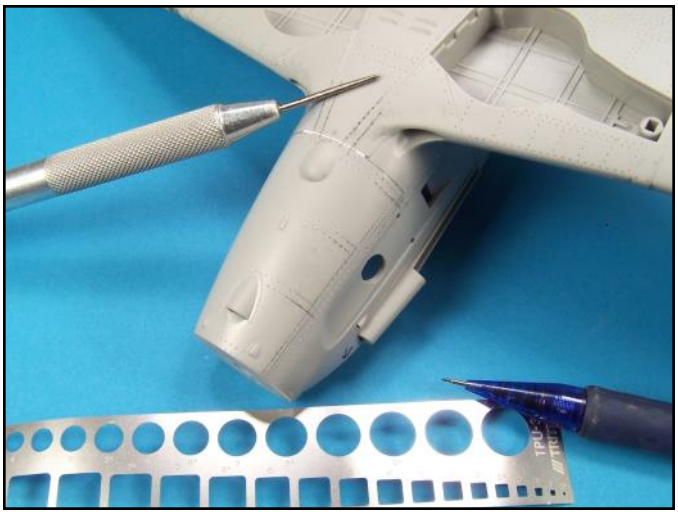
Here is another example of drawing panel lines. On tight curves you can make the labeling tape more flexible by reducing the width of the tape.

Here you can see how the labeling tape has be cut down so that it will lay across the surface of the fuselage. The thickness of labeling tape is just high enough to provide a secure edge guide for the scriber.

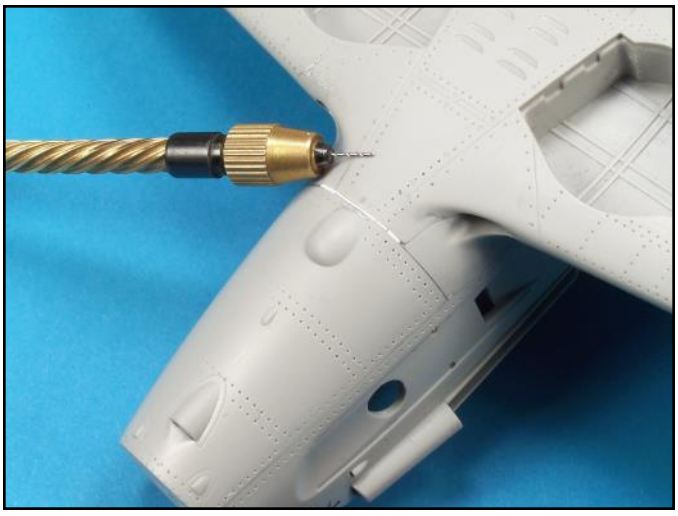
Flat surfaces are much easier to work with because there is much less of a chance that the scriber will skip off the edge of the labeling tape. If it does, fill the damaged area with super glue and sand it smooth.



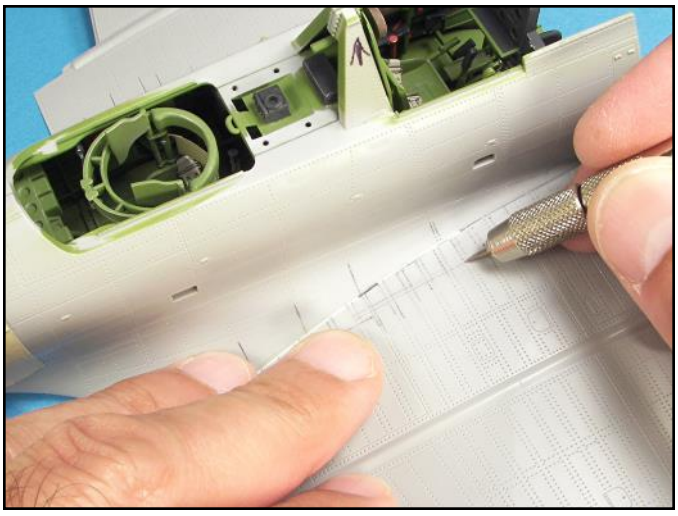
Sometimes you can set several lengths of labeling tape at once to speed up the panel line restoration process. It is important that the labeling tape lines up with the existing panel lines.



You can restore rivet detail with punch tool, but it is important that you set the locations with a pencil first along straight lines. After you are done, smooth the surface with 0000 steel wool.

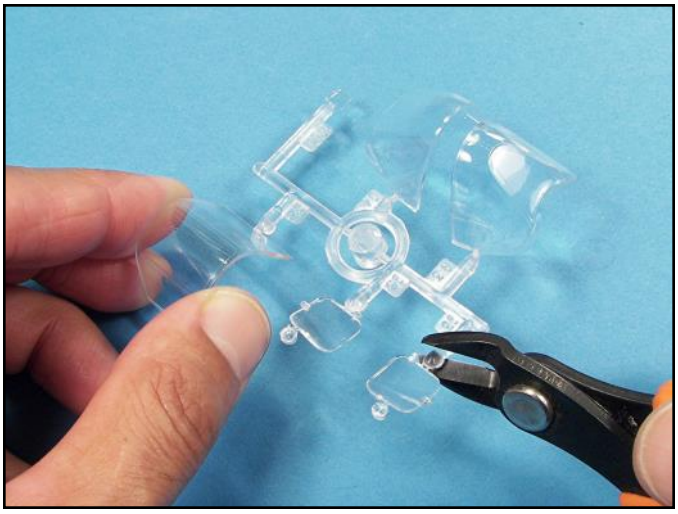


You can also use your punch tool to set the locations and then use a number 80 drill bit (.0135) to make the indentations round and all the same shape. Just a few light twists of the drill will do the trick.



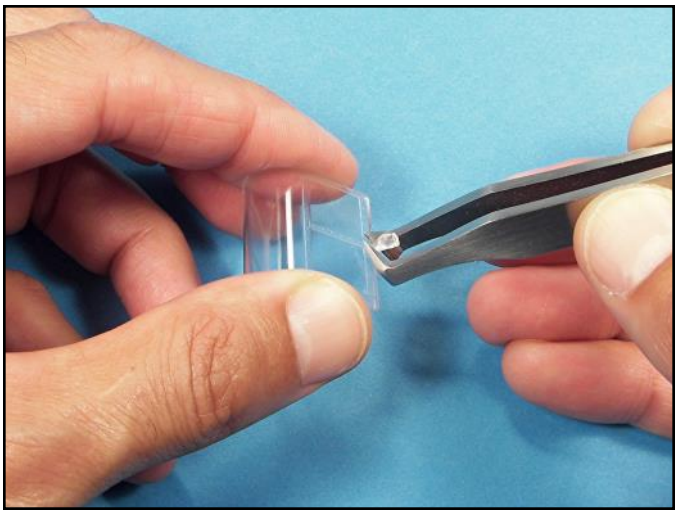
When you have to replace lots of surface rivet detail I recommend using the punch tool. Go slow and use light pressure to set the indentation.

Using 0000 steel wool to remove surface burs and to polish the plastic, also leaves a dark residue on the panel lines and rivets from the pencil marks. Use this pencil residue to check your work and then remove it with a toothbrush.

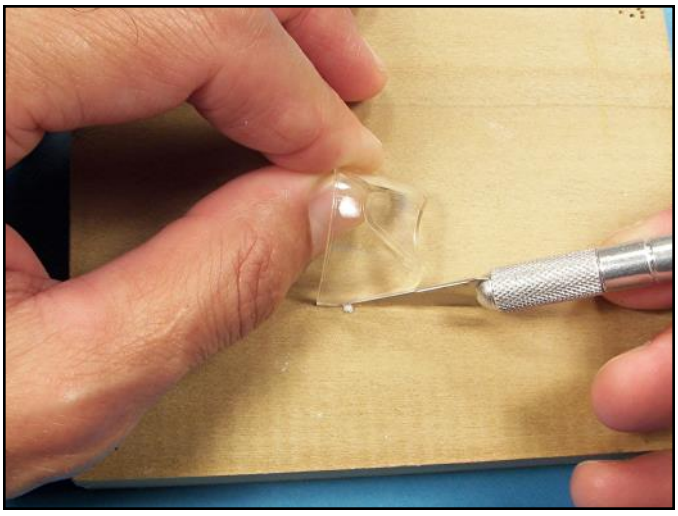


When removing clear parts from their trees, do not snip close to the part. Some clear plastic can be fragile and the stress induced into the plastic when sniping can result in stress cracks in the surface of the part.

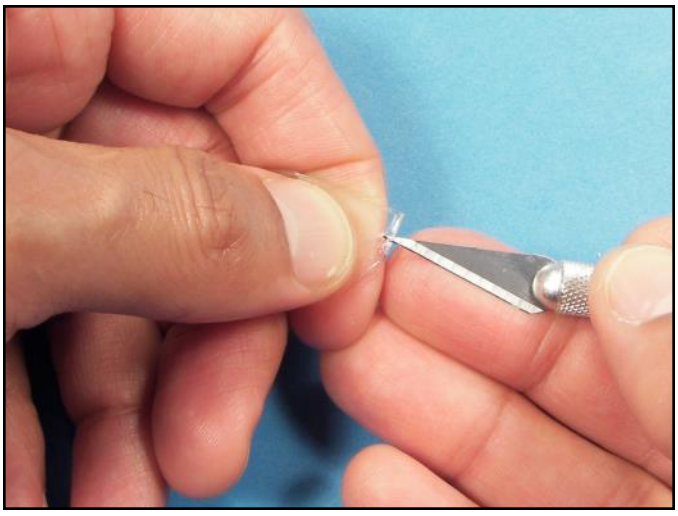
Use a despruing tweezer cutter to remove the remaining tree stubs from the parts.



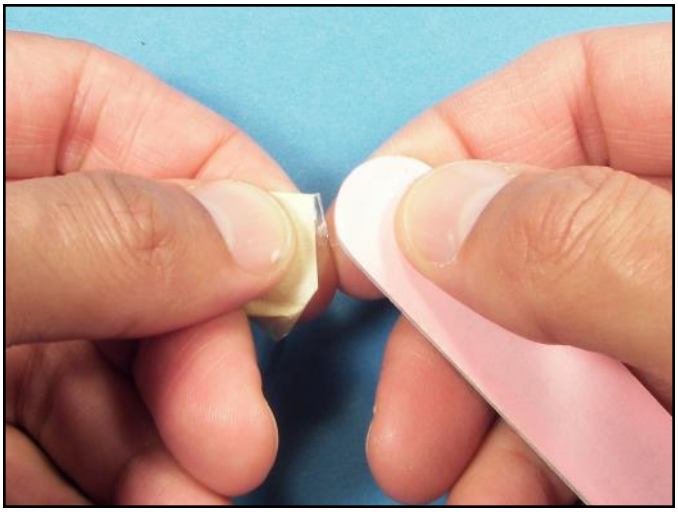
When cutting, be sure that the flat surface of the stub is sitting up against the cutters blades. This cutter is **not** positioned correctly and there is a good chance it will cause an indentation at the attachment point or a crack in the part.



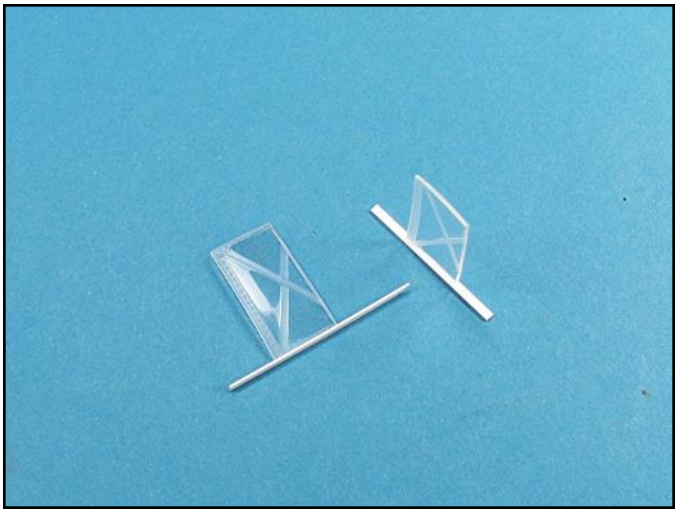
Trim any excess plastic off of the part using a number 11 X-Acto blade and do all your clear plastic cutting and slicing on a raised hardwood block.



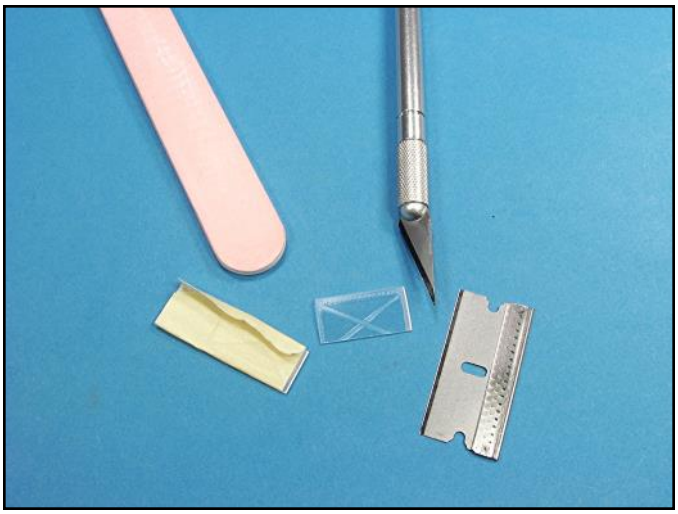
Sometimes the best trimming efforts will still leave a slight bump at the stub attachment point. In these cases, carefully peel off the excess plastic with the tip of a number 11 X-Acto blade.



To sand the plastic at the attachment point, cover the clear surface with masking tape to protect it and use the tip of a sanding stick to carefully wet sand the plastic smooth.

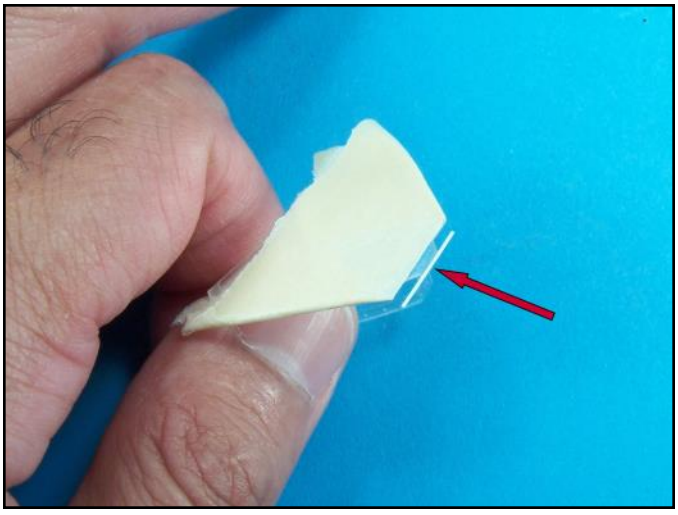


These clear parts are not wide enough to fit snugly into their locations, so thin strips of plastic were super glued onto the surface. Masking tape was applied to the surface to prevent the super glue from fogging it.

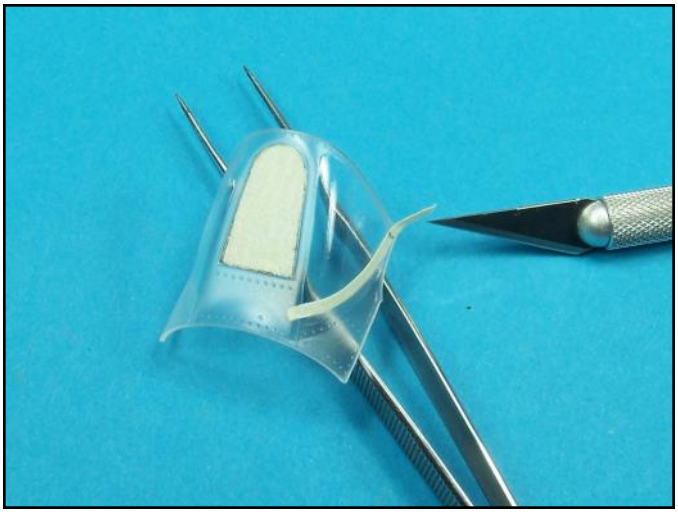


The excess plastic was carefully trimmed and sanded smooth.

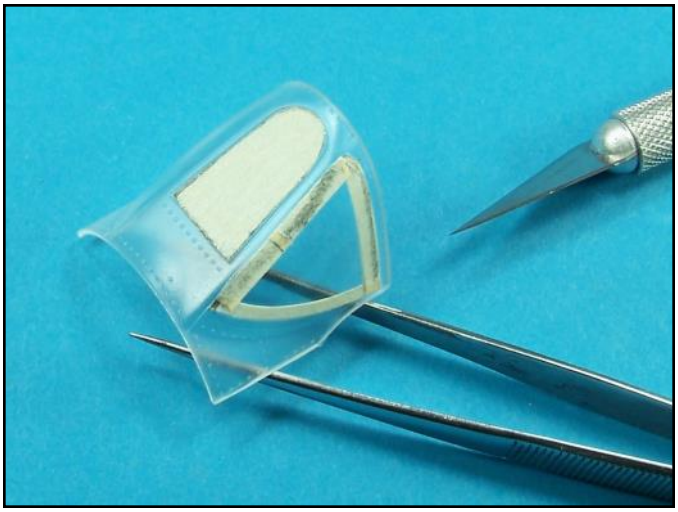
Now these clear parts fit tightly into their locations.



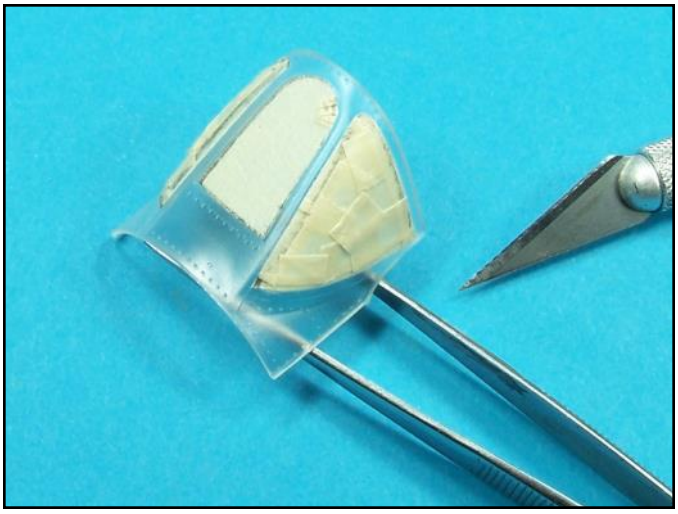
This canopy had to have a tiny length of plastic attached to get it to sit level on the cockpit canopy tracks.



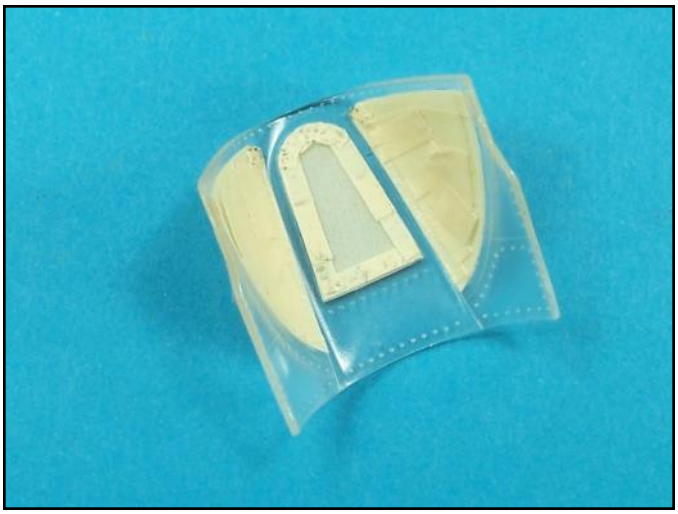
Masking clear parts depends a lot on the shape of the clear area and the height of the framing. On this part, I used one piece of tape over the front, which was traced along the framing with a pencil. I then cut along the trace line.



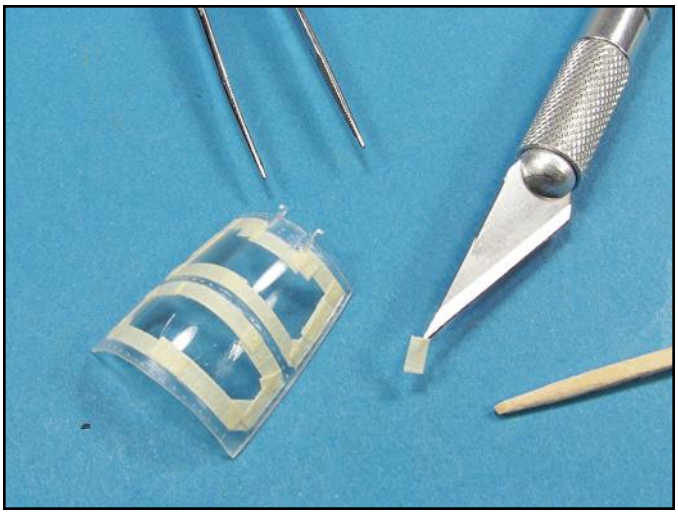
Another method of masking is to use thin strips of masking tape to outline the framing and then fill in the open area. Be sure to use a sharp blade when cutting masking tape. I use a pencil tip to help snug the tape up against the framing edge.



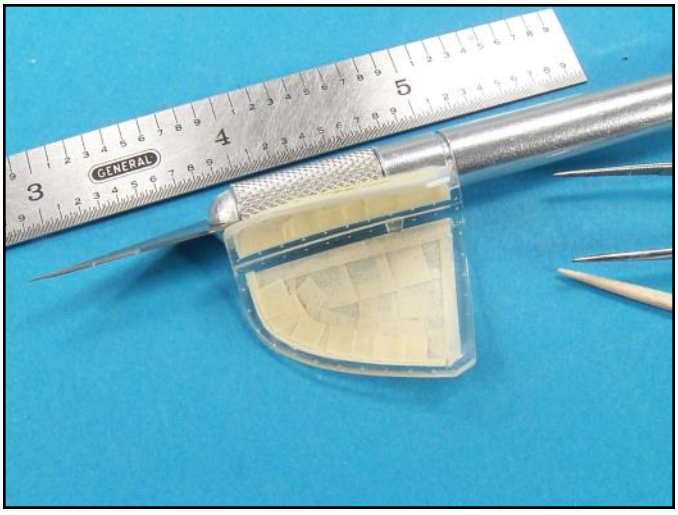
The interior area outlined by the masking tape is then filled in with additional strips. I set the tape in place with tweezers and then use a toothpick to push the masking tape down onto the clear plastic.



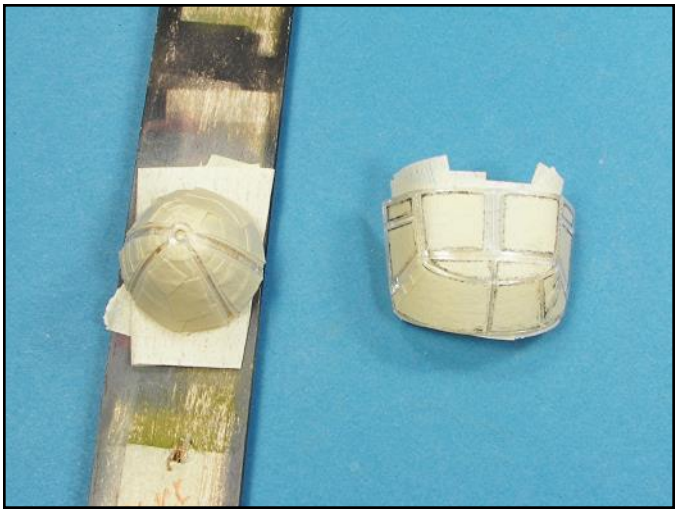
Once the outside area is masked, I mask the inside. I use the outline of the exterior masking tape edges to guide me in the placement of the interior tape.



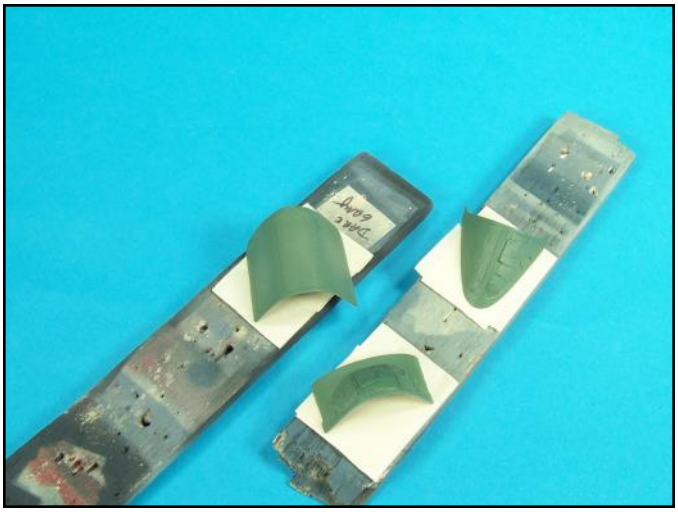
Here is another example of taping along the edges of the framing. In this case, I used small lengths of tape. I always cut the tape using my trusting metal sewing ruler so that the tape edges are straight, clean and sharp.



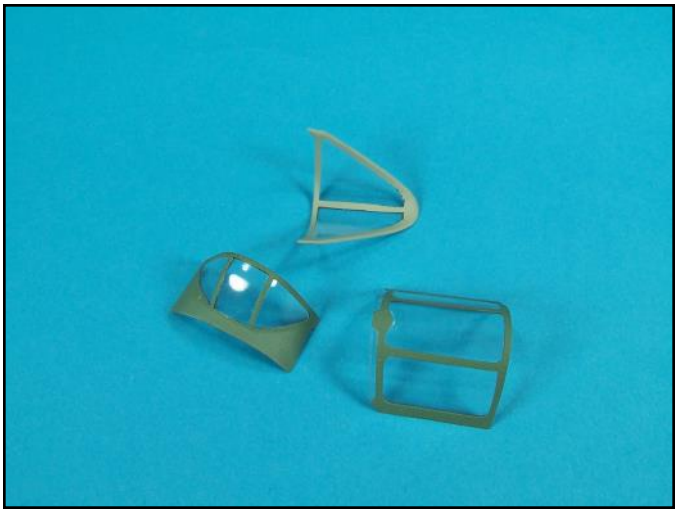
Sometimes you have to use small lengths of tape to create a curved length. I then use the tip of a toothpick to push the edges of the tape strips to make the line smooth.



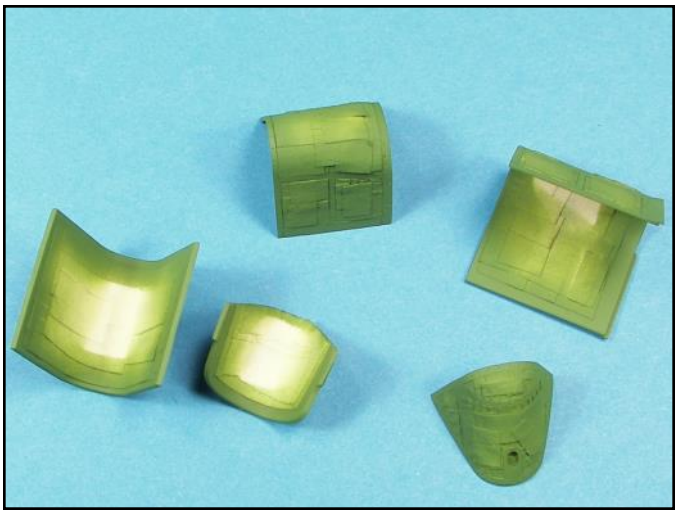
These B-26 clear parts are now ready to be airbrushed. Note all the tiny sections of masking tape used to cover the edges and clear areas between the framing.



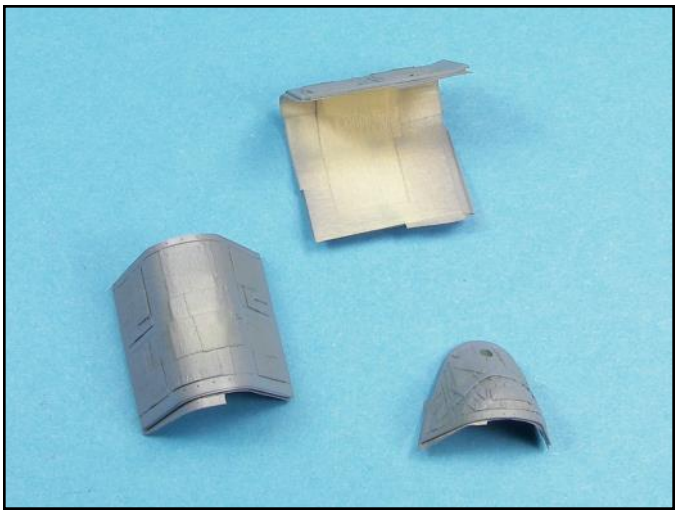
I tape the clear parts to lengths of balsa wood and airbrush them. Once the paint is dry, I peel off the tape using the tip of a number 11 X-Acto blade.



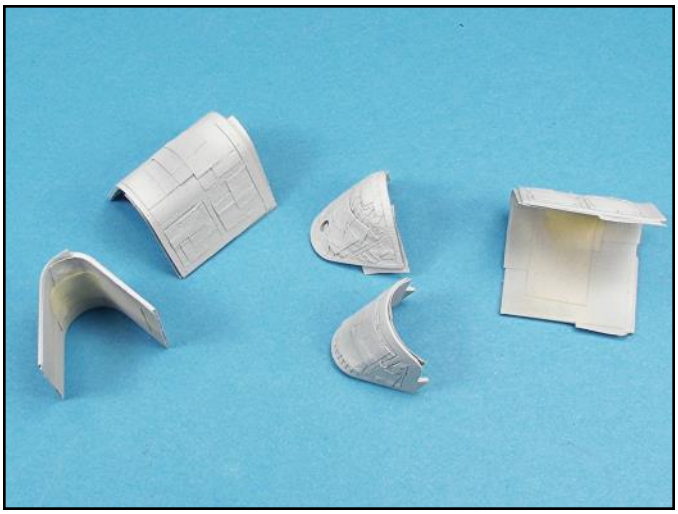
These canopy parts were well masked yet a little overspray got onto the clear areas. If the overspray is just a dusting you can carefully scrape off the paint using the tip of a toothpick.



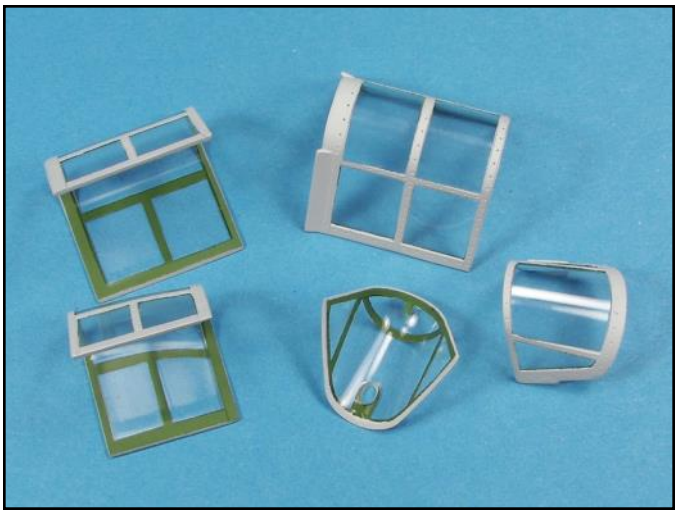
Pay close attention to this technique! These canopy parts had their exterior framing completely masked and only the perimeter framing on the inside areas masked. The parts were then airbrushed on both sides with the interior color.



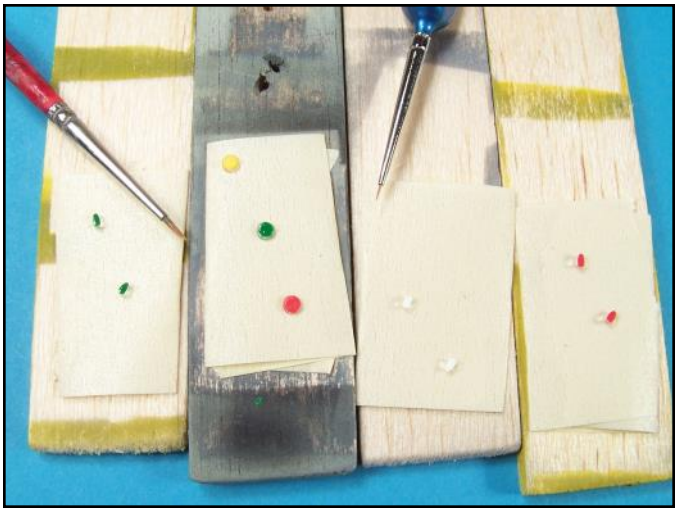
Masked was applied over the interior perimeter framing and then the exterior framing was primed to restore the exterior framing to a neutral color.



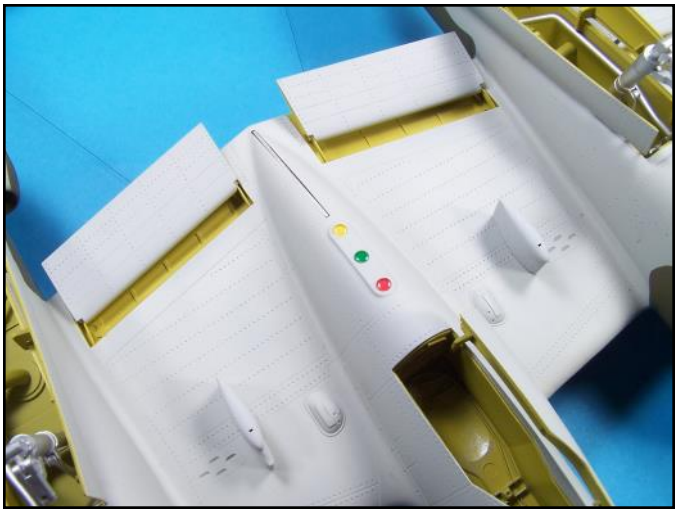
The exterior framing was then airbrushed with light gray. This stepped process is a quicker way to paint both the interior and exterior framing without having to mask all of the interior framing.



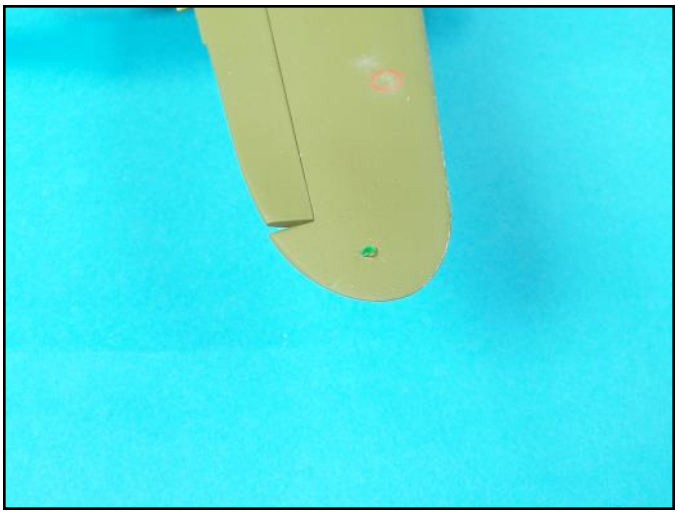
The interior color around the perimeter is painted and the remaining interior framing also appears to be painted, although it is just the bottom coat on the exterior framing that you are actually seeing.



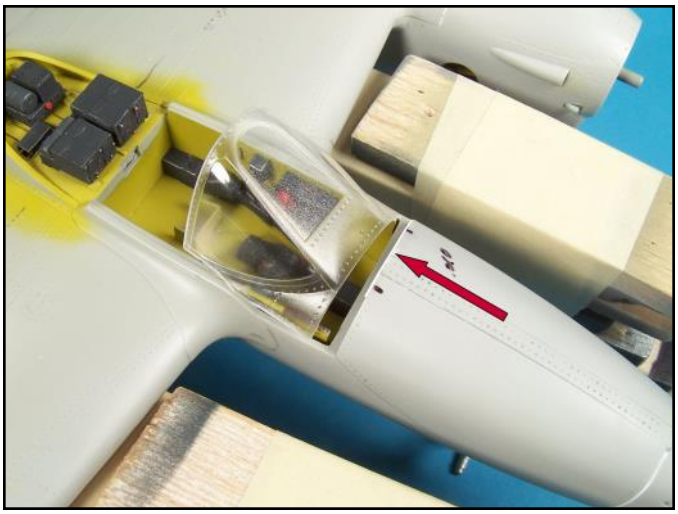
To paint formation lights and navigation lights, carefully paint the undersides of these clear parts with a detail brush. Attaching them to masking tape makes it easy to paint these tiny parts.



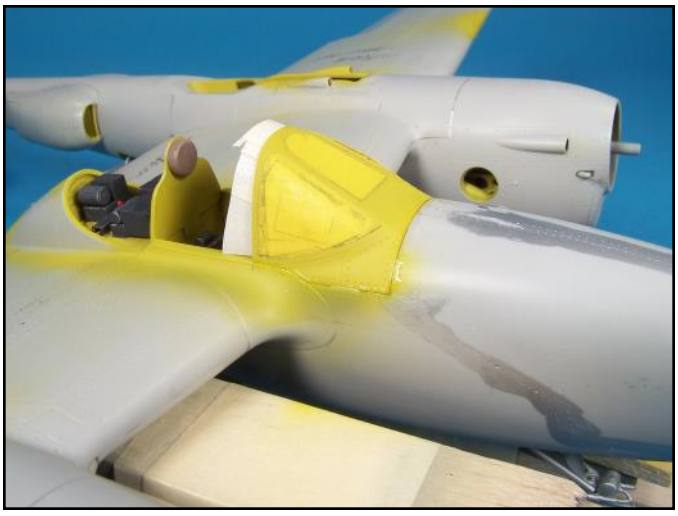
The formation lights on this P-38 were glued in place with tiny drops of Elmers glue applied to the inside lip where the parts will sit. I then used the tip of a toothpick wrapped with a tiny strip of masking tape to position the parts in place.



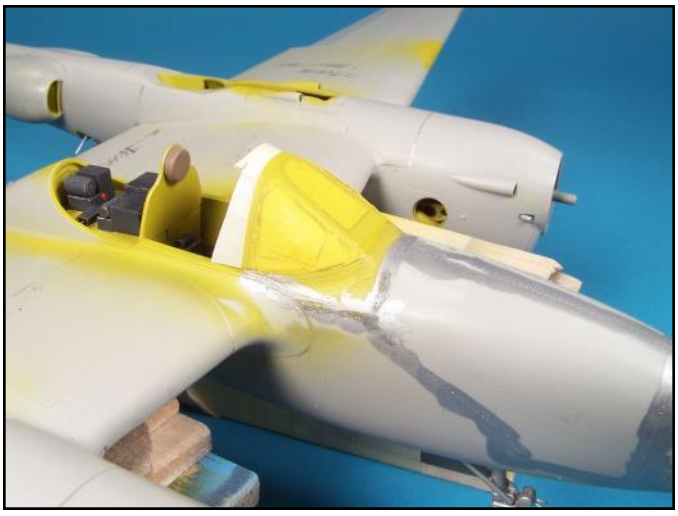
These tiny formation lights can be challenging to set in place and I have found that the openings in the wing tips where the parts sit needed to be slightly enlarged to get them to fit correctly.



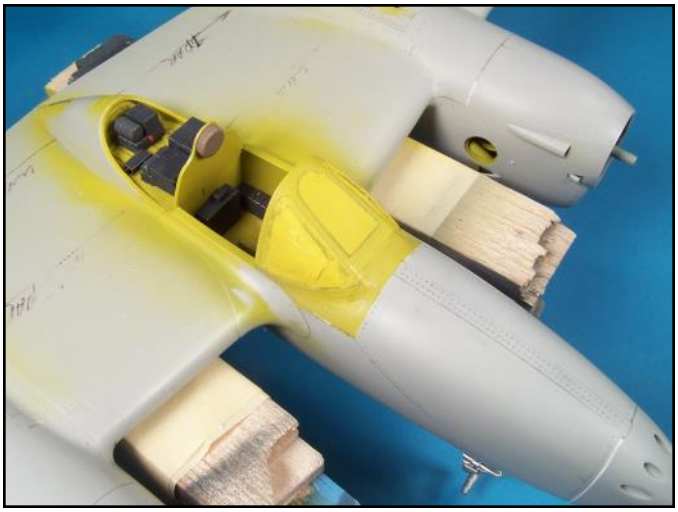
Some newer kits, like this P-38, have the canopy windscreen attached to a section of the fuselage. The first step is to make sure the part fits snugly into place and add extra plastic where necessary to get a tight fit.



The canopy was masked and airbrushed with the interior color. The interior was also masked to protect it from getting fogged by super glue. Several applications of super glue were then applied to fill the voids.

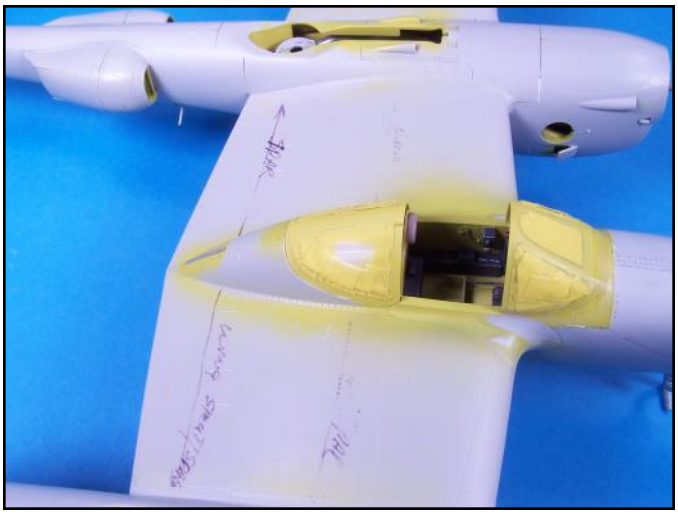


Several applications and wet sanding sessions later the seam line is getting its last coat of super glue. Aside from filling the seam, the edges of the part also needed to be flattened to match the sides of the fuselage.

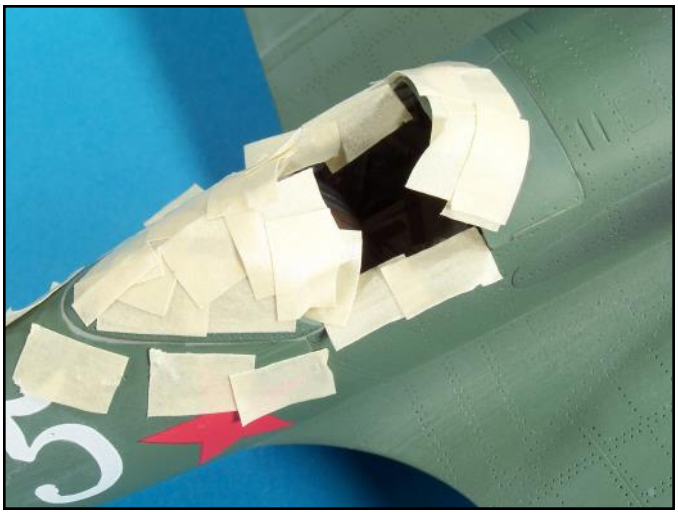


The part is now complete. The seam line is filled and the part is contoured into its location. Panel lines and rivet detail have also been restored. The interior masking was also carefully removed.

This model had a combination windscreen/fuselage part. The seam line is clearly visible, because white glue was used to fill the seam (bad mistake).



White glue works great to attach canopy parts and fill tiny voids between the canopy framing and the fuselage, like the rear canopy section on this P-38. White glue adheres best to flat painted surfaces.



This canopy sat slightly forward of its intended location. To fix the mismatched colors, carefully mask around the area and then airbrush light coats of paint to blend in the fuselage and canopy frame using very low air pressure.

The clear parts on this B-26 were dipped in “Future Floor Finish/Pledge with Future Shine” prior to masking and airbrushing to help hide all the scratches in the clear plastic. Note how clear and shiny the clear parts are.

The clear parts on this SBD Dauntless are what I call the “traditional attachment type clear parts.” All the canopy parts, including the wind screen are separate and distinct.