

# TIPS ON BUILDING DIORAMAS



*Our battle-scarred 381st bomb group B-17G has suffered a main gear failure while taxiing in from yet another hazardous mission during the summer of 1944. Note that this aircraft portrays the ravages of combat, weather, and her maintenance crew's determined efforts to keep the old veteran in the air. This aircraft is outfitted with replacement components from newer aircraft, and is still marked with the outdated national insignia on the fuselage.*



## B-17G FLYING FORTRESS *by Sheperd Paine*

Building a diorama is an interesting and realistic way of displaying a favorite model. A scale model aircraft placed in an authentic setting will receive more attention and comments than the usual static model display. All it requires is average model building skills, some imagination and materials usually found in or around the home. Other materials can readily be purchased. Here's how it's done.



*This overall view of our diorama depicts the relatively-featureless ground that was found on many of Britain's airfields. It is obvious that the underside of the fuselage and wing deeply furrowed the grass verges adjoining the taxiway. A large base is recommended for the massive "Flying Fortress."*

### PLANNING

Before you begin the assembly of the model, you should have a good idea of what you want to show in your diorama. You may want to duplicate the scene shown here, or you may wish to develop one of your own. Of help in this area are numerous aircraft magazines and books which have photos showing various types of activity involving aircraft. The photos don't necessarily have to include the specific airplane you are modeling, but they may provide an interesting setting for your model. Of special interest are crashed airplanes and ground maintenance shots showing technicians at work, with related ground vehicles and equipment.

### BUILDING DIORAMAS

After you've decided what you want to do, the next step is to take the plane, figures and any equipment you've made or collected and plan what space you will need. As much of the model as possible should be put together as will be convenient for painting.

Torn or bent parts of a damaged or crashed airplane, as well as shell or bullet holes should be made before the pieces are assembled. Pieces of the model which would be impossible to reach with a paint brush, such as those in the cockpit, should be painted and fitted into place first. Others should be fitted or tacked in place for easy removal prior to actual painting and final assembly. You want a fairly complete model so you can fit the terrain to it. Additional accessories such as bundles of camouflage netting, tarpaulins, ammo boxes etc. can be made, painted, and attached in the final stages of assembly.

## BUILDING DIORAMAS (cont.)

A plywood base at least 1/2" thick is ideal for the average size diorama. It can be cut to the exact size and shape you want. To obtain the dimensions for the base, place the airplane, figures and other components on a sheet of paper, spaced as they will be in the diorama. Using a straightedge, draw an outline that looks right. Allow room for a border of about 3/4" or less all the way around it. The border and sides of the base can be finished by gluing thin hardwood veneer to the plywood. Remember that the base is the frame for your "picture," and that while a sloppy base can make a good diorama look bad, a really classy-looking base can make a not-so-good job look pretty sharp. Varnish or shellac your base to keep it from warping when applying groundwork, and to give it a nice appearance. Even plywood, nicely sanded and varnished can look quite attractive.

Concrete runways can be posterboard or cardboard with a rough texture. You can paint the runway and allow it to dry. Next add oil spills and dirty wear areas for a natural look. Panel separation lines are then penciled lightly and tar caulking is applied. Acrylic paint (tube type) works well for this. Use a gray color because black is too intense. Put some of the paint in a glue syringe and apply, using a straightedge as a guide. The caulking should not be of uniform width. Strive for the appearance seen on actual runways. This is accomplished by increasing and reducing the pressure on the plunger of the glue syringe as you move it along the straightedge. Above all, don't make the caulk lines too wide.

You may wish to show a dirt runway or groundwork adjacent to the edge of a concrete runway. A material similar to papier mache is ideal for this and is available at art supply stores. Mix with water as per directions on the package, then add white glue in a ratio of one part glue to four or five of the ground material for added durability. You can use masking tape to keep the border of the base clean and give a crisp edge. Provide undercuts by scoring the base with a sharp knife to give the ground material something to stick to.

While the ground material is still wet, sprinkle it with fine sand and tiny pebbles. The kind found in the street is best. Next make footprints and tire tracks. Unravalled hemp rope makes excellent grass, and should be stuck into the ground while it is still wet. As it is difficult to paint the ground in the middle of a clump of grass, you might want to dye the ground material before applying it, using food coloring. Sawdust can also be used for short grass. Paint your ground after it has dried thoroughly. For best appearance keep the ground distinctly yellowish but slightly green and your grass slightly brown.



*Flak damage and a resulting fire forced the crew to shut down the number two engine. The feathered prop can be duplicated by cutting the blades where they meet the spinner, and rejoining them as shown. To duplicate flak damage and shell holes, carefully use a hobby grinder to thin out the cowling, fuselage, and any other panels you may wish to depict as being damaged.*

## EXTRA EQUIPMENT - MINOR CONVERSIONS

Extra equipment used in aircraft maintenance adds immensely to the interest of a diorama. Open or removed inspection panels and engine cowlings are very effective, but remember that internal equipment thus exposed must be produced and involves research and the ability to scrounge up or make the parts. Also effective are service vehicles, maintenance stands and hoists. Less difficult to include are wheels, ammo boxes, crates, fuel drums, bomb carts and bombs, ladders, tools, fire extinguishers, etc. Some of these parts can be found in various kits, others have to be constructed. Tarpaulins can be made by folding moist facial tissue. Place moist tissue over a stack of boxes in a natural drape for a canvas cover. Work in some wrinkles and then apply a thinned solution of white glue to stiffen it. Paint when dry. Rolled camouflage nets can be made using cheesecloth. Ammo boxes and crates can be made with small blocks of wood. You can also use thin sheet balsa wood, index card or sheet plastic, available in many hobby shops. The thin sheets are good for open boxes, cases and lids. Assemble these like real boxes. Other convenient materials to use for scratch building the equipment are metal or plastic tubing, soft wire, and fine wire screen.

Ground maintenance men near equipment shown in reference photos, help in scaling the units to size. Sketch these on paper, using the figures supplied to get the approximate heights and proportions. This makes it easier to build the parts.

## WEATHERING

Assembling the model is only the beginning. You should spend at least as long painting it as you do putting it together. Oil base paints or paints for styrene plastic should be used. Painting instructions accompanying your model kit will indicate whether flat or glossy paint was used on a particular airplane.

Combat aircraft were maintained in flying condition but did show signs of the beating they took. Dents and patches were sometimes apparent. A diorama of a crashed plane would of course show extreme damage. Propellers would be bent and fuselage and wing might be broken, with jagged edges at the breaks.

To bend propeller blades, heat the plastic over the flame of a candle very carefully. Be patient and hold the plastic high above the flame. You want to soften the plastic, not melt it. Remember that the thinner places are liable to melt before the thicker ones are soft. Test the plastic occasionally with a blunt instrument to make the desired bends. Scrape smooth any sharp edges which have been rounded by the heat. You want them to look bent, not melted. Practice this technique a few times with some plastic scraps before trying it on the model. Plastic melts very suddenly and you don't want to ruin it.



*In that most B-17's taxied on their outboard engines, only the bottom blade of the inboard prop was bent, whereas the whirling blades of the outboard propeller were severely distorted by the mishap. The blades are bent as described in the text. Note the nose art on this B-17. Though you may wish to copy an actual aircraft, you can also create your own nose art, as our modeler did.*

## WEATHERING (cont.)

To simulate torn jagged edges of a broken wing, sand the plastic from the inside of the piece until it is thin. A small powered hand grinder is very handy for this. Next cut through with a knife to create the jagged break. Bullet and shell holes can be made with the point of a hot knife.

It is wise to refer to photos showing this type of damage so that a realistic effect can be duplicated. Some of the internal details such as spars, ribs and bracing will also need to be reproduced using thin sheet plastic.

In painting the model, weathering accomplishes several things - it indicates aging and wear, and it highlights detail, thereby making the model more realistic. Weathering of small scale aircraft requires somewhat different and more subtle techniques than those used for armored vehicles. Tanks get filthy, airplanes merely dirty.

An operational plane flown for long periods will exhibit noticeable signs of service. Exposure to the sun and other elements, plus age, will alter its original color to a lighter shade. This change would occur mostly on the upper surfaces, so painting the model an authentic factory fresh olive drab for instance will not be suitable for a weathered plane. Other service signs are oil and exhaust stains, and some chipped paint exposing the metal in heavy wear areas. You don't want to overdo the aging process to the point where it loses realism. It is best to refer to photos to check stain patterns which would occur on the specific plane you are weathering.

The drybrush technique so effective for armor is usually too heavy-handed for use with aircraft, except in small areas. There are two techniques which seem to work best for aircraft - pastels and the "wash."

Pastels are colored artist's chalk, which is powdered by rubbing on a piece of sandpaper and applied with a soft brush. Some dazzling and very subtle effects can be achieved with this method. Its chief disadvantage is that it is not very permanent, being only a powder. If you do not expect your model to last for centuries, and plan to keep it covered and protected from dust and greasy fingerprints, this is a shortcoming you can easily live with. Pastels may be made more permanent by overspraying with a matte varnish or fixative, but since this will greatly alter their tone and appearance, experiments should be done on different colored sample pieces before proceeding to the actual model.

The "wash" technique is more permanent, but requires the use of two different kinds of paint. Paint the model with one type of paint, and weather it with the other. The two types should have no possibility of mixing or dissolving the coat of paint underneath. Usually the best way to proceed is to paint the model with an oil-based paint, and weather it with a water-based paint, or even simple poster colors. To apply oil streaks, for example, place a small dot or dots of brownish black to the point at which the oil spill is supposed to originate. Take a tissue lightly moistened with water and wipe across the dots (still wet) from front to rear. This should give a gradual fading effect, and ensure that the streaks run parallel, as they would if they were caused by the flow of air across the surface. If you don't achieve the effect you want the first time, use the tissue to wipe it clean and try again. The wash technique is also excellent to run black paint into the recesses of the ailerons, rudder and flaps to pop out the detail. A draftsman's ruling pen and india ink is also good for this. There is no reason why you can't use the "wash" and pastel methods together, in fact, this is probably the best method.

## CONVERTING AND PAINTING FIGURES

A frequent problem facing the modeler is how to indicate in a small scale the size and proportion of the original. Some sort of yardstick is required, and the most easily read yardstick is the height of a man. For this reason, it is always a good idea to include at least one figure with your model, preferably standing next to it.

Most Monogram aircraft kits include a pilot figure. Some have two or three figures. Other 1/48 scale figures can be obtained by shopping around. These may not be molded in the exact action poses to suit your diorama but all is not lost. The pose of figures can be converted quite easily with a bit of practice. Using a fine razor saw, the figures can be cut apart at the waist and "swapped." The same can be done with arms, legs and heads.

Heads, torsos, arms and legs can also be turned, and resultant gaps filled with plastic body putty and sanded smooth if necessary. If you find it too difficult to cut and fit figures in this manner, you should attempt to create a scene which will look good using available figures.

The appearance of the figures will be greatly improved if you paint in additional highlights and shadows, following the sculpted clothing folds already on the figures. The same technique can also do a great deal for the face. For good faces remember two things - servicemen are out in the sun a lot and their faces should literally be a shade of tan or light brown, rather than pink or off-white.

For variety, don't paint any two articles of clothing the same shade. Color depends on how often the item was washed and a variety of colors can add life and give a weather-beaten appearance to the figures.

When adding highlights and shadows to the figure, don't be timid. If you are too subtle in your color changes, they won't be noticeable at all and all your effort will be wasted. Even dramatic changes from highlight to shadow can be made to look quite subtle by carefully blending the edge between the two colors with a brush moistened with turpentine, if oil base paints are used. For other paints, use the solvent specified.

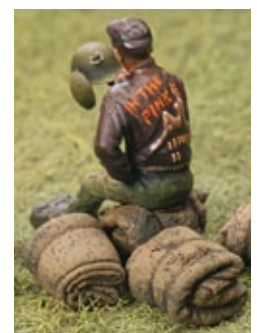
## FINAL ASSEMBLY

Use epoxy or white glue for attachment of the plane, figures and any remaining accessories. Tires should be flattened a little where they come in contact with the ground. Use the point of a razor knife to make undercuts in rubber or plastic so the glue will hold well. After the glue has dried, touch up areas which require paint or build-up of terrain. Pay close attention to little details. Clever little touches can do much to enhance the fascination of your diorama.

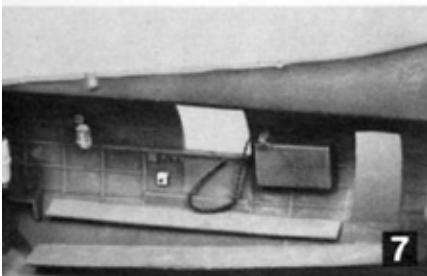
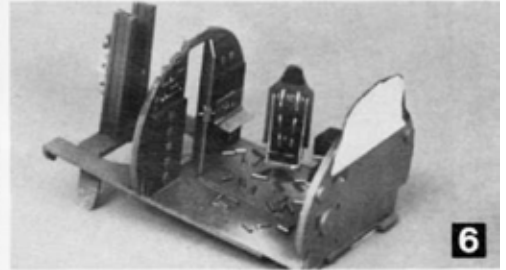
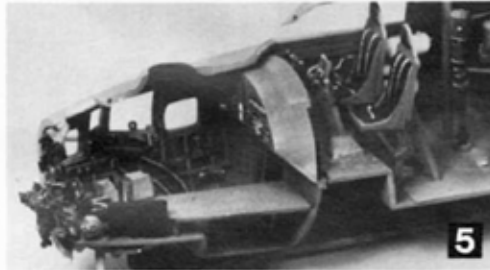
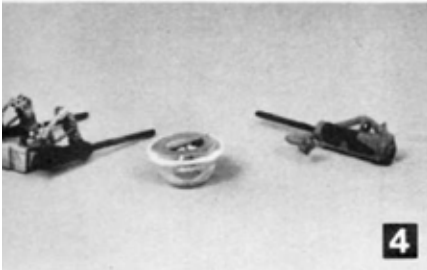
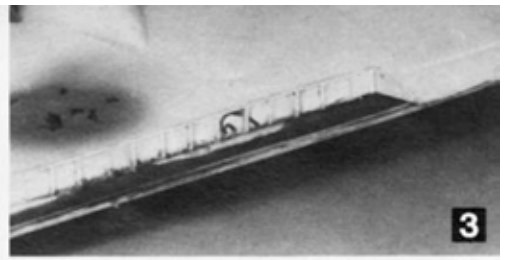
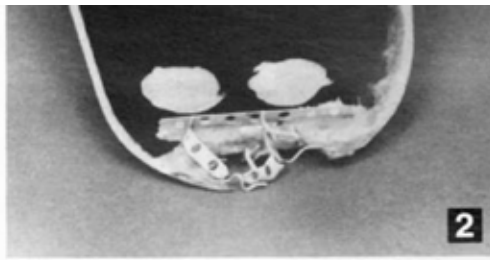
Imagination, not skill, is the key ingredient. Imagination, in painting, in "pirating" parts from other kits for super-detailing, in scratch building or in designing your diorama, can put you on a par with the best model builders in the world.



The radio gunner's compartment clearly shows the effects of a nearby flak burst. Note the extended flaps on the trailing edge. See the construction photos to duplicate the flap detail. The damaged landing gear that caused the accident can be created in the same manner as the bent propeller blades.



Though he may have a headache, this veteran crewman gazes in awe at the flak helmet that saved his life. The flak helmet was scratch built, and the gear he is sitting on was formed from moist rolled facial tissue. The unofficial jacket decoration was readily available from the Squadron artist. It is difficult to paint such intricate detail but be patient and try it if you so desire.



1. To create holes caused by flak, use a hand grinder to thin out the wall. Then punch a hole through the thinned styrene with a hobby knife and twist to make the edges jagged.

4. Detailing small items throughout the aircraft can add a great deal to the overall authenticity of the finished diorama. The machine guns and astrodome have been modified as shown above.

7. Since we chose to open the rear door, it was necessary to add floor detail and scratch built ammunition belts to the waist area.

2. If you decide to portray damage in a larger area, you will have to add some internal structure. Small strips of drilled styrene have been added to this wingtip prior to final assembly.

5. The detailed interior yearns to be super-detailed here and there, but remember that much of your work may be quite difficult to see after final assembly.

8. Before it is dry, shape the ground to simulate the damage done by the careening aircraft.

3. Carefully cut the flaps from each bottom wing. The open section formed by the two wing halves was filled with sheet styrene, and detailed as shown.

6. Shell casings were scratch built from stretched sprue, and a piece of sheet styrene was added to simulate an open door.

9. It is probably best to put your model in place to check the authenticity of the overall diorama.

## CONSTRUCTION NOTES

The aircraft that was modeled does not depict any specific aircraft of the 381st bomb group. Although the overall color scheme is accurate, the aircraft name and squadron code is fictitious. This enabled us to portray an aircraft that exhibited many of the marking and finish details found on the average WWII heavy bomber after extended use in the skies over Europe.

Be careful with the battle damage that you decide to duplicate. Remember, that the damage must be placed in such a manner that the aircraft could fly home safely or so severe that it would force the aircraft to crash before the mission was completed. Don't hesitate to consult photos of damage that occurred to actual aircraft.

When weathering your aircraft, remember that an engine fire would create smoky black stains on the wing and quite possibly the stabilizer. Surely, flak damage or shell holes in the wings would create some fuel seepage before the tanks sealed. If you apply silver paint to simulate areas of chipped paint, remember that the control surfaces were fabric, and some areas along the leading edges were fitted with rubber deicer boots. Fine wire can be added in numerous areas to provide extra detail. The elevators were sectioned from the stabilizers and repositioned as shown.

The figures used in the diorama were changed very little from their original configuration. The crewman that is inside the forward crew hatch was taken from a "Black Widow" kit. Have patience painting your figures, as they can make or break a diorama.



The flak-ravaged tail surfaces were formed by carefully grinding the styrene on the back side before assembly, and then cutting the thin remaining wall of styrene to resemble jagged metal. Remember, if major damage is attempted, as shown on the horizontal stabilizer, that some interior details must be added. Note that the B-17 control surfaces were fabric covered, and would not be jagged after they were damaged.