

## CHAPTER TWO

# HULL AND MAIN DECK ASSEMBLY

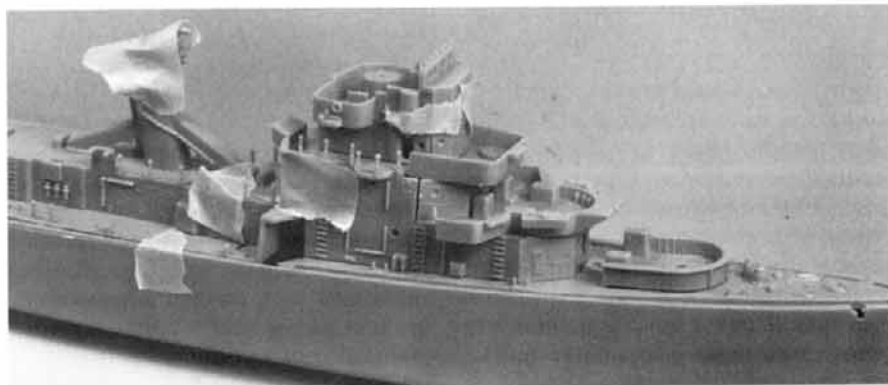
Ship models come in two basic configurations, with full hulls or with partial hulls, more appropriately known as waterline hulls. Most ship models in the larger scales have full hulls, while those in the 1/700 to 1/800 scales are mostly waterline. However, some manufacturers, like Revell, Testor, and Aari, provide full hulls even in these small scales. Most 1/700 scale resin kits are waterline, while the 1/350 scale resin kits either have two-piece hulls or one-piece full hulls.

### GENERAL ASSEMBLY SEQUENCE

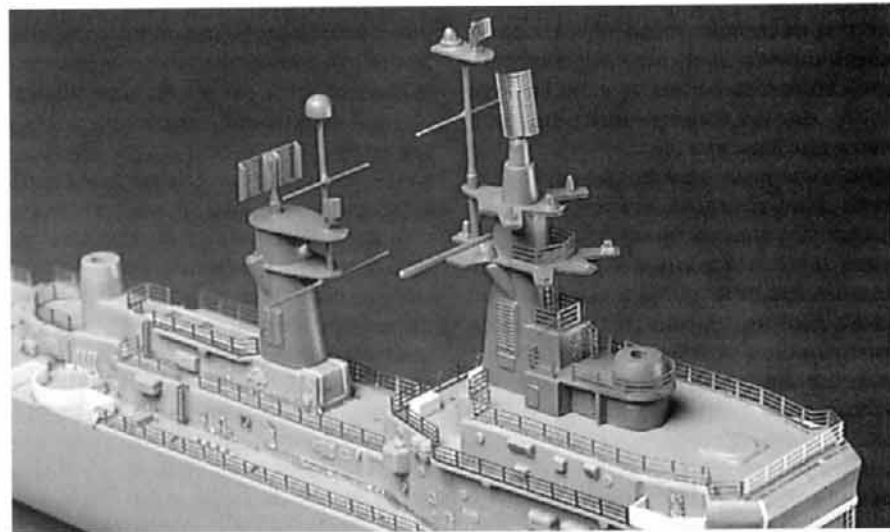
Building ship models is one of the oldest forms of modeling, and the finished products make the most impressive models because of their complex appearance. Ships present the greatest challenge to a modeler because of the small scales and the great number of parts. Even 1/350 scale ship kits are small scale compared to 1/48 scale aircraft, 1/35 scale tanks, or 1/24 scale cars.

The first step in building any ship model is to use the kit instructions as a reference for parts and subassembly requirements, although the actual sequence of building is different from what the manufacturer suggests. Several factors dictate construction sequence, such as painting requirements, dealing with seams, adding detail, and using photoetched railings and fittings.

Do some prefitting before you start construction so you can check the fit of parts such as the hull, decks, and main superstructure components. Use masking tape cut into small sections to join all the parts. First you will have to remove tree stubs and flash and ensure that gluing surfaces are flat. As you assemble the kit with tape you will discover where poor fits, warps, and seam lines are. This is the time to make notes about the fit on the instruction sheet.



Revell's 1/240 scale *Buckley* gets an initial fit check. While this kit has some fit and seam problems, these can easily be fixed and the model turned into an impressive display piece.



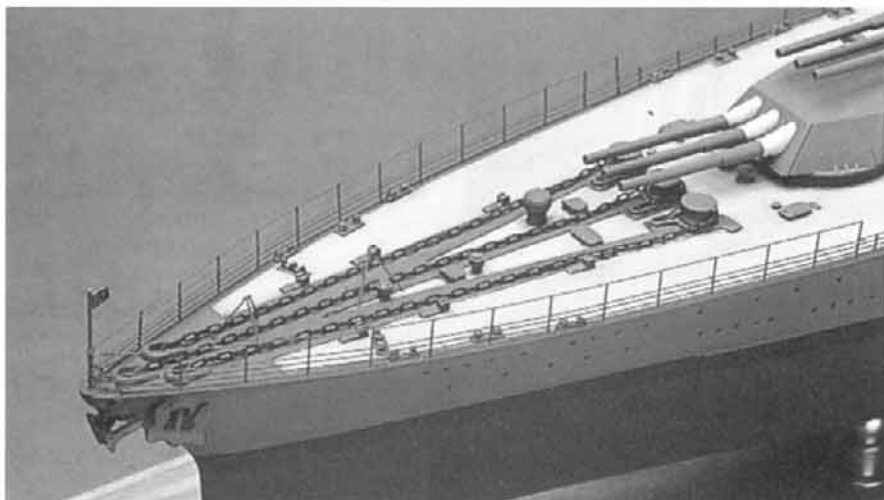
Checking and rechecking the fit of parts will save you a lot of time and frustration. It's like the old carpenter's saying, measure twice, cut once. Monogram's *Halsey* is starting to take shape as the final fitting on the upper superstructure components are now complete. Photo by Glenn Johnson.

Another reason I like pre-assembly is that it gives me a sense of the appearance and size of the model. It also gets me started thinking about details I may want to add and how I am going to deal with seams, warps, and poorly fitting parts.

At this point you also need to decide what colors and paint scheme to use. This is important because it will dictate how you proceed with assembly. For example, if you plan to use a measure 21 paint scheme for an American warship you will have to do



The complex and busy appearance on Commanders Models 1/350 scale USS *California* is achieved largely with photoetch. Model by Lonnie Ottzen, master pattern designed by John Ficklen, photo by Glenn Johnson.



The crisp detail that is incorporated into the master patterns for resin models is clearly shown on Commanders Models USS *California*. The wood deck detail was achieved by using Evergreen V-grooved sheeting, the fittings are largely Evergreen strip and rod shapes, and the hull was made from basswood. Model by Lonnie Ottzen, photo by Glenn Johnson.

a lot of masking and be careful how you assemble superstructure components, attach them to the deck, deal with any seam and fit problems, and then paint areas where seam work was done.

Next I decide how I want to display the model. If it is a full-hull ship and I plan to display it on a wood base I usually select and cut the wood I need as well as the material that will attach the ship to the stand. If it is a waterline ship then your choices are limited to some type of water diorama.

Assembly should start with drilling out portholes on the hull, removing molded railings, gluing hull halves together, and adding the main deck. If you are working on an aircraft carrier, build up the hull, the exterior sections that are associated with the hangar deck, the hangar deck, and then the flight deck. The island structure of the flight deck is classified as the superstructure.

Depending on how you will display the model you may have to secure pedestals to the hull prior to adding the decks. Once you have completed all the work on these parts, add the propeller shaft V struts, the shafts, and the rudder. At this point paint the hull and the main deck and mount the model on its display base or diorama before proceeding with the

superstructure, railings, guns, fittings, masts, and rigging. If you identified fit problems with superstructure sections that you will attach to the main deck, don't paint the main deck until you have attached these parts and filled the seams.

Next assemble the superstructure components. Sometimes you find that working with superstructure sub-assemblies is easier than trying to assemble all the components directly on the main deck. Larger superstructures such as those on cruisers and battleships fall into this category. Once you have the superstructure components assembled you are ready to cut, bend, and shape the photoetched railings. After you have completed all the railings, paint them and set them aside. Sometimes it is easier to add railing sections to the superstructure as you build it up, and other times you can wait until after superstructure parts are attached to the main deck.

The next step is to add fittings such as boats, davits, searchlights, masts, and cranes to the superstructure. Detail and paint them before gluing them to their locations. Then you can start adding photoetched railings to the main deck, and also the guns, torpedoes, depth charges, or missiles. Add rigging, flags, and decals, and as a last step, attach the props.

There are variations on this general sequence and they depend on what type of ship you are building, how you plan to paint and weather it, what details and changes you plan, and how the manufacturer designed the parts and subassemblies.

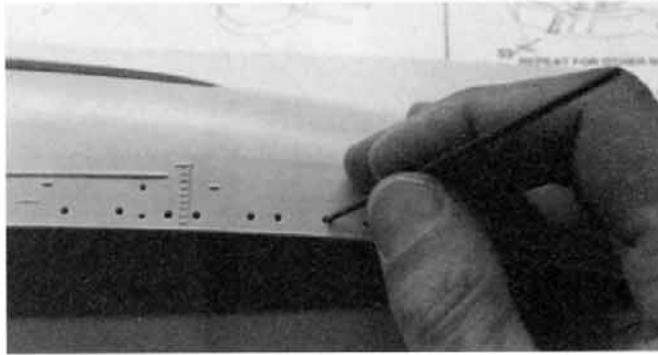
## RESIN MODELS

There are an almost infinite number of model airplanes, tanks, and cars, but ship models have always lagged behind. The explosions in 1/700 to 1/800 scale ships has given model ship builders more subjects than they could have dreamed, but the one problem with them is their small size. Over the past few years new technologies and materials have been introduced into the modeling industry that have changed the hobby. Photoetched parts, resin, and white-metal accessories have added a dimension to modeling that has gone beyond anyone's wildest expectations.

In the ship modeling arena creative scratchbuilders have perfected the art of designing and building models so they can be mass-produced in resin, white metal, and photoetch. Now modeling subjects are available that the injection-molded companies would never have bothered to produce. While the quality of these kits varies from fair to excellent, they are



Porthole rings are good drill bit guides, so if you decide to sand them off wait until you finish drilling out all the portholes. While a pin vise works well, a twist drill will do the job in less than half the time.



You can clean up portholes using a round micro file, but do not use a lot of pressure—a light touch works best.

easy to build and the results can rival or in some cases surpass injection-molded kits.

Resin ship models are manufactured differently and are labor-intensive to produce. First the kit designer builds a master pattern—a scratch-built ship model typically made from basswood and plastic. The designer decides how it will be assembled and how many parts there will be. It has to be designed so it can be easily cast and mass-produced in resin and white metal. Once the designer is satisfied with the patterns, molds are made from them. In this step the model and all subassemblies and parts are positioned inside specially designed mold boxes and liquid RTV is poured around them.

The methods and techniques for producing a working mold that can be used hundreds of times are inexact, and often resin kit manufacturers have to try several times before they get it right. To determine if the mold is good and to ensure that the master pattern design can be reproduced, the manufacturer does so-called test shots. Resin is poured into a mold, allowed to cure, and then removed and inspected by both the manufacturer and master patternmaker.

Sometimes master patterns are changed to correct a casting problem, and other times a new mold must be made using a different technique. White-metal parts are also tested. The workers must then take extra precautions because they are working with molten metal. Once the manufacturer and the designer are satisfied with the

resulting castings they are ready for the next step, which is to do a complete test shot of the model's resin and white-metal parts so photoetch can be designed for it.

The design of photoetch is another labor-intensive process because the master pattern designer has to assemble the model in stages, take precise measurements from it, and design the photoetched fittings. Next a test run of the fittings is completed and test-fitted onto the model. Problems are identified and adjustments are made to the photoetch drawings. At this point the manufacturer casts a complete model including the photoetch so the designer can assemble the model and create instructions.

The resin and white-metal parts are mixed and poured into the molds by hand, allowed to cure, and then removed and inspected. Rejects are not uncommon, and unfortunately resin can only be used once, while white-metal rejects can be reused. Making master patterns and molds, doing the actual production, the cost of resin, white metal, and RTV material, and the fact that RTV molds only last for a few hundred casting cycles—these things all add up, and this is why resin ship model prices are high.

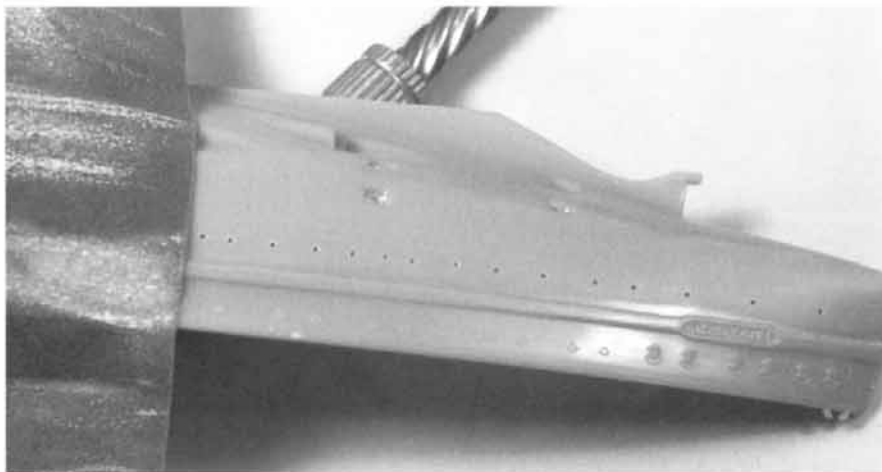
Besides understanding the basics of design and production of resin kits, there are some things about these models you must understand and accept if you want to have positive experiences with them. First and foremost, resin ship kits are not injection-molded kits.

When you open the box of a resin ship kit you generally find a solid resin ship hull wrapped in bubble pack. The kit typically includes the deck, superstructure sections, and deck fittings, several zip-lock bags of small parts in resin or white metal, instructions, and a photoetched sheet. The small resin and white-metal parts are carefully packaged in small bags. All the parts are molded as one piece so you don't have to glue halves together, although they typically have large pour stubs that must be removed. Not having to glue part halves together means a lot less gluing and seam work, which means your model will go together faster.

Many small parts like tower framing, cranes, catapults, railings, gun shields, and depth charge racks are found on the photoetched sheets. Other small parts such as gun shields, small boat parts, and even the propellers are also on these sheets. The majority of resin kits have some form of instructions ranging from good quality three-dimensional drawings to sets and series of pictures that show assembly sequences.

Resin ship kits are assembled with super glue and white glue. The nice thing about resin is that it is unaffected by super glue accelerators. It sands like plastic, and if you make mistakes you can repair them with super glue. You can clean up white-metal fittings just as if they were plastic parts because the metal is very soft. It responds well to sanding, scraping, and even hand-drilling. White-metal parts bend easily, but

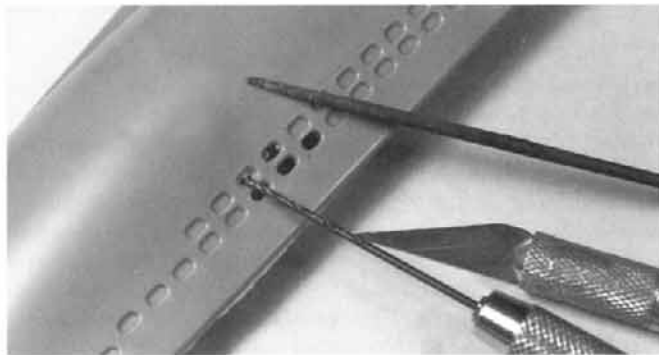




Once the portholes are re-drilled you can smooth out the surface. The raised rings on these portholes are too shallow to be used as a guide for the drill bits.

The drain holes on Gulfstream Fine Scale Models 1/350 scale type IXC U-Boat (bottom, left) were painted dark gray to make them stand out. Model by John Ficklen, photo by Glenn Johnson.

Drain holes on large scale kits like Revell's 1/125 scale U-505 look much better when they are drilled out. A round file, a sharp number 11 X-Acto blade, a set of drill bits, and a twist drill are all you need.



you can straighten them just as easily.

Resin also shrinks. Manufacturers have tried to reduce or eliminate shrinkage by producing one-piece hulls and designing more of the superstructure components as part of the hull.

Resin ship models have improved greatly in the short time they've been on the market, both in quality and selection, and costs are coming down. As you gain experience with the resin, white metal, and photoetched materials of these kits you will want to build more of them, especially the 1/350 scale kits.

### **DRILLING OUT PORTHOLES AND SUBMARINE DRAIN HOLES**

Drill out the portholes before you assemble the hull, because drilling puts extra stress on the glue joints, which may cause them to crack. Drilling out portholes is easy and adds another level of realism. Almost all models have good porthole detail, which makes drilling them out easy. For portholes formed by a raised ring, simply match the diameter of the porthole to a drill bit and use the raised ring as a guide.

Use the stem side of the bit to match the porthole—the flat surface of the stem will make it easy. Drill all the way through the plastic with a twist drill. Once you are done you may want to sand off the raised rings around each hole. While the rings may look okay on models larger than 1/250 scale, on smaller scales I recommend you sand them off.

If the porthole has no raised ring but there are well-defined indentations, you may not be able to use the stem side of the bit to match the diameter. You may have to change bits once or twice to get the right size, because the indentation is not of uniform depth and in some instances may be nothing more than a shallow teardrop shape. Start with a small bit and work to the correct size so you don't wind up with an oversized hole. Here again, use a twist drill and drill all the way through the plastic. To make sure the portholes are along the same line, cut a thin strip of labeling tape and lay it along the base of the portholes that form a row. This will provide a guide as you drill.

If the portholes have a faint raised ring like some of the Airfix 1/600 scale

kits, drill out new ones and sand off the raised detail. Before you remove the portholes lay a thin strip of labeling tape along the base of a porthole line. As you lay the tape you may find that a few are slightly out of line. Once you have positioned the tape, take a pin vise with a needle tip and mark the location of each porthole by laying the needle along the edge of the tape and pressing it into the plastic. These will be the pilot holes for the drill bit.

When you have completed all the pilot holes remove the tape and drill out the portholes. To determine what size bit to use, place the stem end into an existing porthole. Once you have drilled a line of holes, wet-sand the surface to remove raised detail and remove the sanding dust from the drilled-out holes by running the bit back through them. Although the new holes will be slightly lower than the originals, no one will notice. This technique also works for adding new portholes to a ship hull that lacks them.

Drain holes on submarines are another detail modelers sometimes overlook, but they are easy to add. If it's a large scale model and the drain holes are indented you can drill them

out, and if you have a small scale kit or resin model you can just paint them. Drain holes are usually oblong. The best way to cut them out is to drill out the ends with a bit that is slightly smaller than the diameter of the indentation, remove the plastic between the holes with a number 11 X-Acto blade, and remove the excess with micro files. Use the edges of the indentation as a guide just as if it were a porthole.

## HULL ASSEMBLY

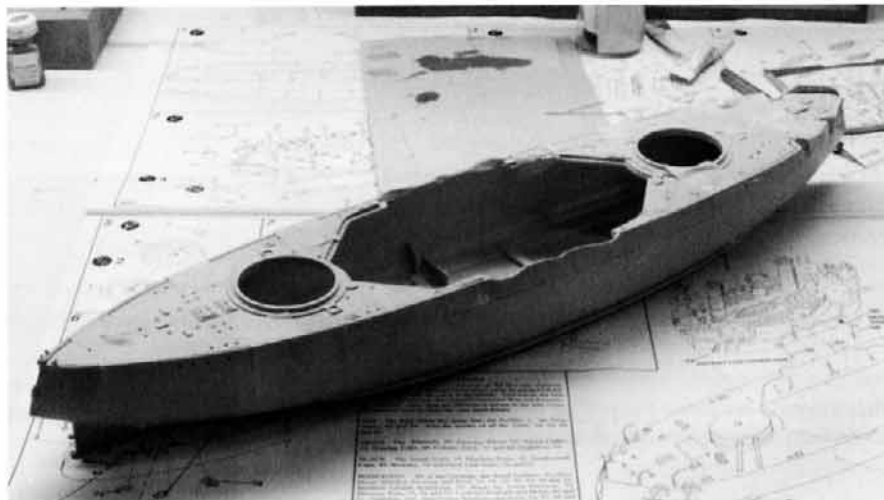
Hulls come in several configurations. The simplest is the one-piece hull, while more complicated assemblies like Airfix's 1/72 scale patrol boats are made up of several sections. While the number of pieces may vary, the assembly technique is the same. To do the job right you need the hull pieces and the main decks, so remove these from the trees and clean the gluing surfaces of the hull and the sides of the deck parts.

The kit may include separate hull layers for the torpedo defense bulges like those found on Heller's 1/400 scale *Jean Bart*. These also must be removed and cleaned up so you can attach them to the hull.

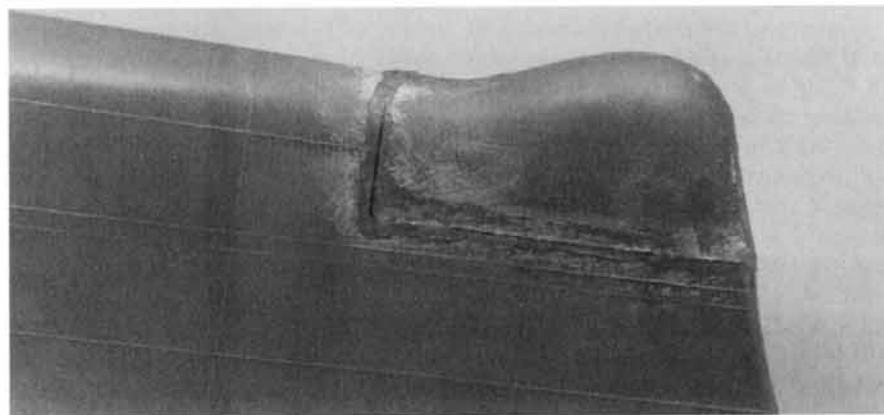
**Before you start.** If the model has molded railings, decide if you want to remove them and replace them with photoetched railings. If you decide to remove any molded railings, do so before gluing the hull together for the same reason as you drilled out portholes—to keep the stress from cracking glued seams. If you decide to remove the railings, see Chapter 3.

Large scale models in 1/200 scale and larger may show some faint lines on the hull where the metal plating is welded, but I recommend sanding these on kits that are smaller than 1/200. Manufacturers also set the black boot strip lines on the hull to make it easy for you to mask and paint. Before you sand off these lines, measure their locations using reference points such as details along the edge of the hull or porthole locations. Record the locations and reference points on the kit instructions so you can refer to them when you are ready to paint.

**Taping.** When you are ready to assemble the hull, tape the parts together using liberal amounts of masking tape. Be sure the hull halves match up. If there is warpage be patient—this can



When fitting the hull halves together always use the deck to help form the hull. The deck will also add strength to the hull while you are working on the hull seams.



Sonar bow domes that do not fit very well can be fixed easily with super glue and sandpaper. The hull lines on this 1/400 scale Monogram kit as well as the molded-on anchor should be removed.

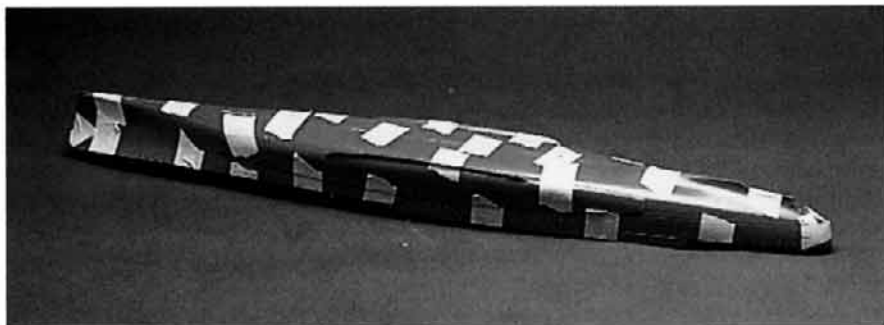
be corrected by adjusting the position of the hull parts as you tape them together. Refer to any notes you took during your pre-assembly check.

Once the hull halves are taped, position the main decks onto the hull and tape them into place. Once you have the entire assembly taped together you can start adjusting the hull halves if necessary by removing, adjusting, then adding more tape so they fit better.

It is crucial to use the decks to help adjust and secure the hull assembly because the decks add strength and help form the hull's shape. In most cases the decks can also help correct any warps the hull may have and the slight twists that thin-walled

plastic hulls sometimes exhibit. In addition, if you don't temporarily tape the decks to the hull while gluing the hull, you may find the decks don't fit properly later.

**Gluing.** Once you have the hull taped the way you want it you can begin gluing. Use the super glue seam-gluing technique described in the section on seams in Chapter 1, but don't glue the decks to the hull at this time. Once the glue is dry you can remove the tape and add super glue to the areas where tape was. For large scale models like Heller's 1/400 scale ship series and Airfix's 1/72 scale patrol boats I recommend you add a layer of super glue to the seam line along the inside of the hull. In addition, I



Position the torpedo bulges on Heller's 1/400 scale *Jean Bart* carefully. Remove the aligning pins on these bulges, or they will interfere with your efforts to set the bulges at the same locations on both sides of the hull. Photo by Glenn Johnson.

recommend that you add lengths of  $\frac{3}{16}$ " x  $\frac{3}{16}$ " Evergreen strip stock across the bottom of the hull and along the sides to strengthen it and limit flexing.

Now you are ready to scrape and sand seams and add more super glue as filler to problem areas. Before working on seams, tape the deck sections back in place to strengthen the hull. When you have finished give the seam a coat of silver paint, identify and add super glue to any flaws, remove the paint with Polly-S paint remover, and sand. Areas where you applied super glue to the silver paint will take on a silvery color that will remain after you remove the paint. This will act as an indicator for your sanding efforts—when it disappears the flaw is fixed. Wet-sand as much as possible to reduce the abrasion to surrounding plastic.

Adding torpedo bulges takes a little extra care in that you need a good gluing contact surface between the thin edges of these parts and the hull. As you blend in the edges along the sides of the hull, the outer edges of these parts may become paper-thin and actually lift off the hull, creating a void. The only way to deal with this problem and to prevent it from spreading is to push thick-gel super glue into the void so it will fill the surrounding interior area. Once the glue has dried gently sand the area smooth.

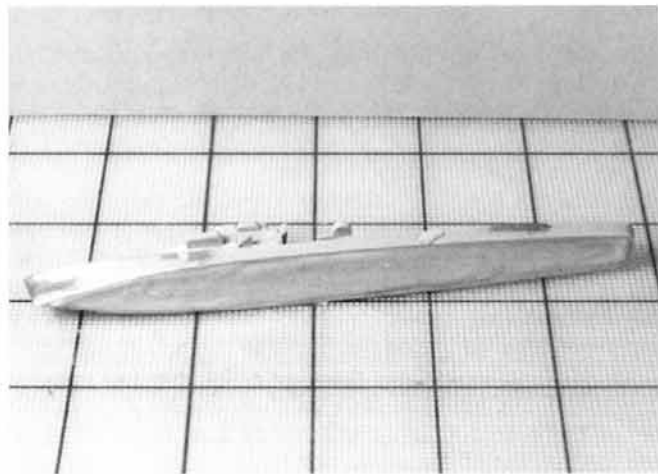
When I installed the torpedo bulges on Heller's 1/400 scale *Jean Bart* this very problem occurred, and I finally solved it by pushing glue under the paper-thin area where the part was blended into the hull. This problem can also arise if you are adding sheet plastic to the side of a hull to represent increased armor protection.

The only way to ensure that voids don't appear around the outer lip where it is blended into the hull is to be sure there is a good gluing contact surface all the way around the shape you are adding.

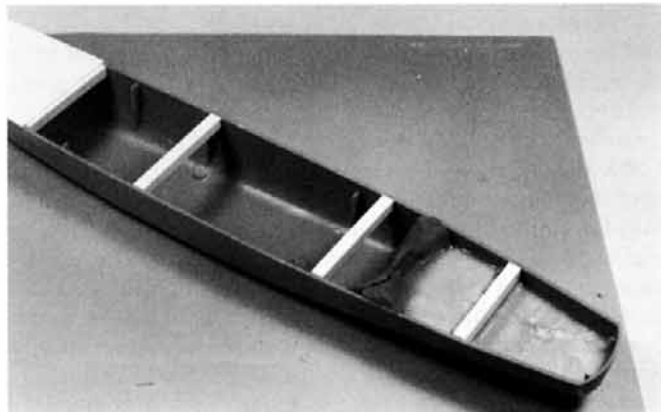
**Adding resin.** Once you have completed the hull you are ready to glue the decks in place, but there are some additional things I recommend before you close up the hull. First, if you plan to display your model on brass pedestals, add a resin base inside the hull in each area where a brass tube will project into it. The block of resin will provide a secure base for the brass to rest on and will give the hull some extra weight and strength. See Chapter 6 on displaying ship models for more details.

You may also want to add resin at the bow and stern. I usually add resin to the bow if I plan to drill holes in the deck where anchor chains will emerge and in the area where the anchors will be located. This will give you a solid plastic depth to work with, especially if the anchors sit in indented areas where the deck meets the hull, like those found on many destroyer escorts.

Use modeling clay to create a box, then position the hull so it will be level at the bow area. Pour the resin in, being careful not to let it interfere with the placement of the deck. When it is dry remove the clay and glue the resin block in place by running super glue around its edges. I sometimes add resin to the stern to add weight and



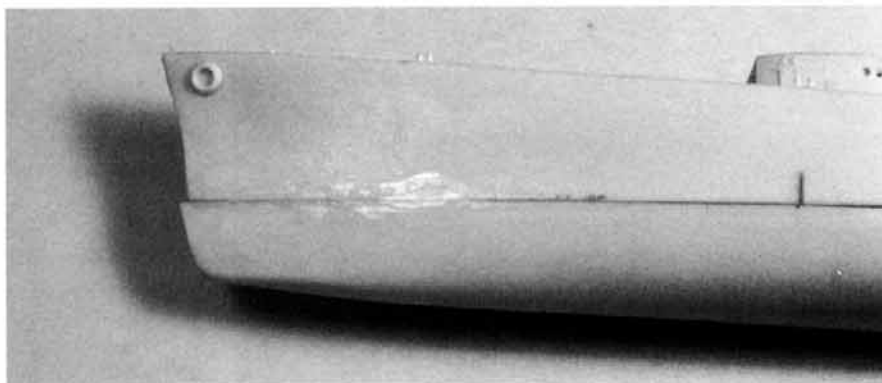
Resin can be used to fill the hulls on 1/700 scale models so that they are heavier and stronger. To smooth out the resin run the part across a stationary piece of sandpaper.



Using putty to make boxes for resin pouring is easy to do, but you need to be careful that as you work the putty in place you do not change the shape of the hull. Here Revell's 1/240 scale *Buckley* is sporting hull reinforcing strips that will be used to help support the new deck.



The misalignment on the bow of this resin kit 1/350 scale *Fletcher* class destroyer can easily be fixed with sandpaper and super glue. Sometimes these types of problems can be fixed by positioning the lower hull so that the stern areas are misaligned, which is easier to fix. Model by Bill Teehan, photo by Glenn Johnson.



strength to this area. This is especially important if you plan to rework the area, add a keel, rework the rudder, or replace or add hull protrusion housings. The hull protrusion housings are the contoured protrusions in the hull where the propeller shafts emerge.

### RESIN HULLS

**One-piece hulls.** Whether resin ship models are 1/700 scale or 1/350 scale the hull, deck, main superstructure, and main deck fittings are generally molded together as one solid piece.

For resin ship models with one-piece hulls, carefully remove any stubs and flash. Normally the pour stubs are pretty thin where they meet the hull and you can almost snap them off. If the stub is thick, use a razor saw to remove as much as possible and sand off the remainder using Flex-I-File sanding sticks. Sand seam lines and flash from along the keel. Check the hull for roughness and small pinholes. Sometimes resin can have a rough surface, but this is easily fixed by wet-sanding, starting with 320-grit sandpaper and working up to 600-grit.

Fill pinholes with thick-gel super glue, hit the glue with an accelerator, and sand smooth. Super glue accelerator has no side effects on resin so you can apply it liberally. To ensure that the glue gets into small pinholes, run the edge of a number 16 X-Acto blade across them as you apply the glue. This will force it into the holes. If you get holes around portholes, simply fill the porthole with super glue, sand it smooth, and redrill. I don't recommend using putty for filling pinholes because it is too thick.

**Mismatched multiple-piece hulls.** The one minor glitch with resin ship models is working with multiple-piece hulls. Resin tends to shrink at non-uniform rates, often resulting in upper and lower hulls that do not exactly

match. The problem occurs in the lengths of the upper and lower hulls and the widths of the hull parts. To fix hulls that are mismatched, sand the contact surfaces flat to remove excess resin by running them across stationary pieces of 100- to 120-grit sandpaper taped to a pine board. Once you work the resin down to the hull, switch to finer grit sandpaper to smooth it out.

The quick way to remove this excess is with a belt or disk sander. If you use the belt or disk sander, be sure to check your work frequently, because the sander will remove the excess quickly and you don't want to eat into the hull area. Using electric sanders will create heat that can warp the resin, so keep contact between the resin and the sander at a minimum. Finally, be sure to wear safety glasses.

For big models like Commander Models 1/350 USS *California*, tape several sheets of sandpaper together if you are sanding manually. Hold the hull section firmly in both hands and run it back and forth across the sandpaper, alternating the side of the hull closest to you. I recommend this because you will have a tendency to put more pressure on the side closest to you. I use paper-backed sandpaper for this phase and a rough grit to speed up the process. Check the fit of the parts frequently so you don't sand off too much.

**Taping.** The next step is to tape them together. Try to match them as closely as possible. If you one hull section is wider than the other, try to center the smaller piece to minimize the overhang you will have to fill and shape. You may also find that a section is slightly bowed, but this can easily be fixed with tape. Start at one end of the

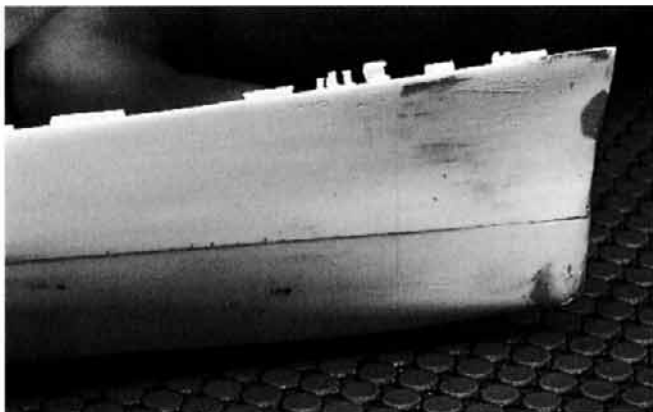
hull and work your way to the other, adjusting and tightening the fit between sections as you go.

If the hull lengths are slightly different, match the bow stems on the upper and lower hulls first. It is easy to match the lower hull bow stem to the upper stem, but it can be difficult to completely rework the edge of the bow and get a straight line that is not skewed to one side, so match them as closely as possible. Stern areas are pretty easy to sand and shape because they are larger and the stern usually has smooth curves that are easy to follow with sandpaper.

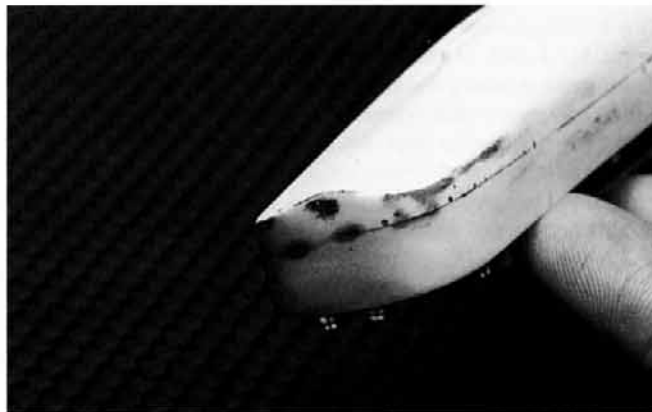
**Locating pins.** When you have the hull positioned and taped I recommend you modify the hull sections to accept a set of brass rod locating pins. This will ensure that when you remove the tape, add super glue to the contact surfaces, and put the hull sections back together, you will get the parts positioned exactly the way you want them. The glue will bond the resin almost instantly, so you don't have much time to change the position of the sections. Be sure not to locate the brass rods where you plan to drill holes for your display pedestals.

Drill the locating pinholes in a set of two or three holes along the keel line that are the same diameter as the brass rod you want to use. I recommend rod because tubing can bend. Drill all the way through the lower hull section and about 1/4" into the upper hull. Next, insert the rod to check the fit, remove the tape, and cut a set of rod lengths that are slightly short, so the rod will not protrude from the bottom of the keel.

Mate the hull sections together again to double-check the fit and glue the rod into the hull, being careful not to allow any glue to seep out around



The bow area of MB Model's 1/350 scale *Fletcher* class Destroyer was reshaped and the misalignment fixed using both putty and super glue. Model by Bill Teehan, photo by Glenn Johnson.



Stern areas are easier to fix because of the large shape, although you have to be careful that you do not change the angle at the stern area. Model by Bill Teehan, photo by Glenn Johnson.

the base of the rod. The easiest way to do this is to apply a small amount of Duro's quick-gel to the inside of the hole using a thin wire applicator.

**Gluing.** Cut some new lengths of tape so you can reach them quickly, apply small amounts of Duro's quick-gel super glue on the contact surface area of one side of the hull section, slide the lower section onto the brass rods, press the two sections together, and quickly apply masking tape to the bow, midsection, and stern to hold the halves tightly together. Next apply regular super glue to the seam line between the masking tape, taking care not to let the super glue get under the tape. The capillary action of the glue

will cause it to seep in between the hull parts. Let the glue set, then remove the masking tape and glue these areas and fill the locating pinholes in the keel with quick-gel super glue.

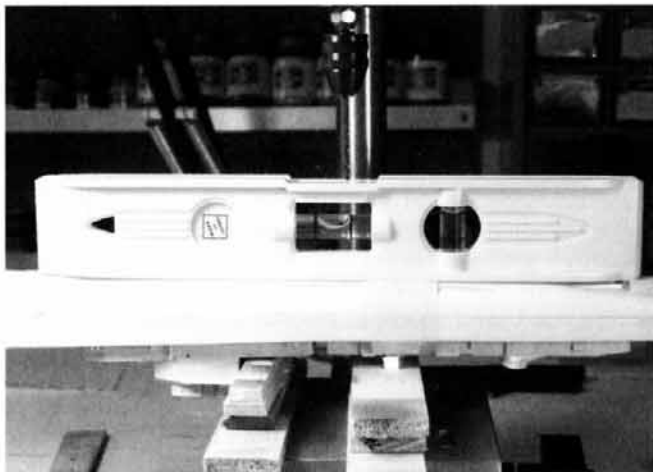
Once the glue is dry fill in voids with quick-gel super glue and sand and shape the hull. If the difference in size between the two sections is minor you can just sand the hull smooth. If there is a large overhang on one side along the length of the hull you will need to do some filling. I use Duro's quick-gel super glue or putty to fill in these areas and a flat-ended X-Acto knife to smooth out and contour the filler so it matches the larger section

of the hull. When the glue or filler is dry I sand and shape and smooth out the hull as necessary.

Once you are finished with the hull assembly, redrill all portholes on the hull. Most resin ship kits do not have clean, well-pronounced portholes, but the ones that are there make great pilot holes. Match the drill bit to the size of the porthole and drill to a depth of approximately 1/8" using a twist drill.

### MAIN DECK INSTALLATION

There are two basic kit configurations for deck attachment. In the first you attach the deck to the top edge of the hull, and in the second you fit the



To ensure that the brass aligning pins will sit straight in the hull you can use a Dremel drill press, a small hand level, and small strips of balsa wood to get the hull level prior to drilling the holes.



The portholes on the hull, superstructure, and small boats of Commanders Models 1/350 scale *California* are well done, but drilling them deeper provides for a greater perception of depth as well as perfectly rounded portholes. Model by Lonnie Ottzen, photo by Glenn Johnson, master pattern designed by John Ficklen.



To prevent large scale decks from flexing glue some reinforcing strips to the underside, but be careful not to place them where they will interfere with the installation of deck parts that have locating pins.

deck into the open space of the hull, butting it up against the hull's inner edges. Whether the deck is steel or wood will define the techniques required to glue the deck in place and deal with seams and voids.

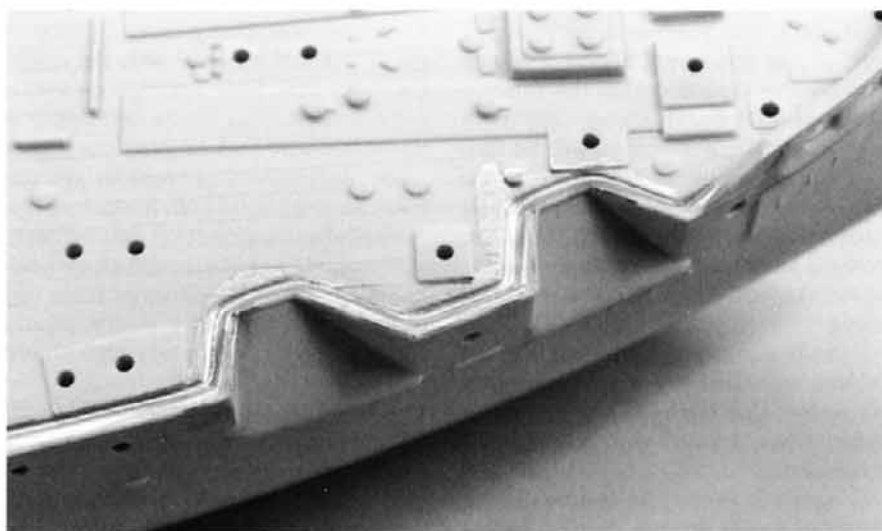
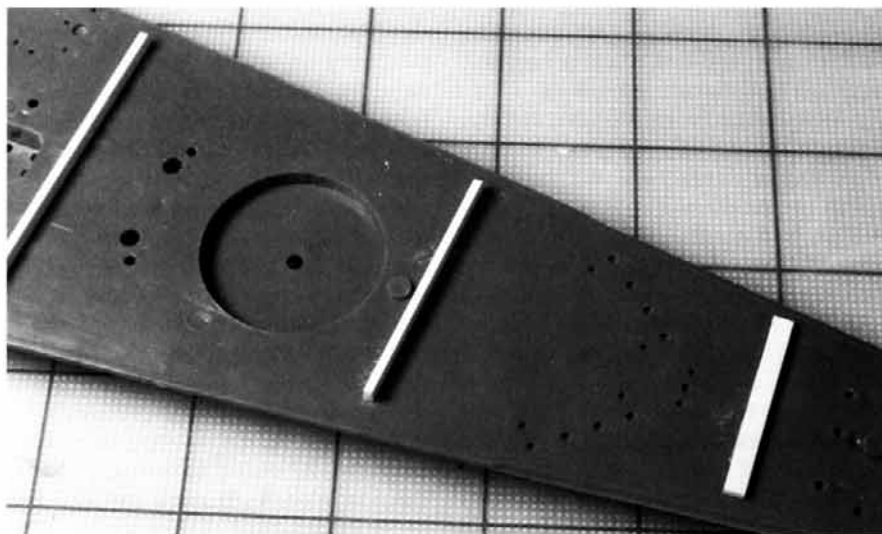
If you are working in 1/400 scale or larger, consider gluing stiffeners to the underside of the deck to prevent flexing. Use Evergreen  $\frac{3}{16}$ " x  $\frac{3}{16}$ " square stock and glue the strips into place with super glue. Cut them about  $\frac{1}{4}$ " short on either side of the lip of the deck so they won't interfere with the deck-hull contact area, and don't attach them over openings that will have positioning pins, such as the main guns.

**Taping and gluing decks.** For a deck that you attach to the top of the hull, position the deck or deck sections into their locations and tape the deck to the hull so there is no space between the lip of the deck and the lip of the hull. Run a bead of super glue along the seam line. After it has dried remove the tape and finish gluing the seam. For areas that need filler use the thick-gel super glue or add liberal amounts of regular super glue using a lead pencil applicator.

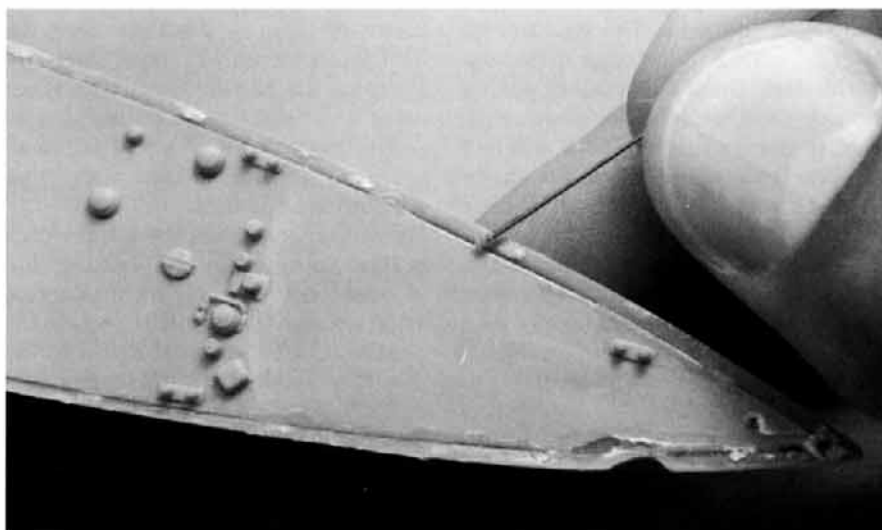
After the glue has dried, sand the seams smooth, check for flaws using silver paint, and apply super glue where needed. When it is dry remove the silver paint using Polly-S paint remover and sand. This works for both steel and wood decks.

For a deck that butts up against the inner edge of the hull, be careful, especially if it is a wood deck. You want to minimize damage to the scribed wood deck because it will increase the rescribing you will have to do. Another problem area is

**The deck on Monogram's 1/400 scale *Halsey* has received applications of both thick-gel super glue and regular super glue. The deck detail for the chains will be replaced once the seam problems are solved.**



The void between the deck and the side of the hull on Glenco's 1/225 scale *Oregon* is wide, but if the deck is glued so that it will not flex, putty can easily fill this void.



sections of the deck that are not quite large enough and don't butt up against the inner hull, resulting in a void.

Usually decks will fit fairly tightly, although some models may have a slight void uniformly around the deck, which is usually not a problem. Insert the deck in place and secure it with tape. Working down both sides of the hull at the same time, start from one end and work towards the other, matching the placement of tape on both sides of the hull. This will help ensure that the lip of the hull will take on a uniform appearance as the deck is tightly fitted into place. If you have voids, don't force the hull to decrease the gap area—this may deform its shape. You can fill in these areas later.

Once you have the deck taped into place, run a small bead of super glue along the seam. When it is dry remove the tape and glue the remaining areas. Be careful when applying glue along the seam. You will be limited in the amount of repair work you can do because of the damage you can cause to surrounding detail or to the scribed wooden deck, so apply minute amounts and keep it concentrated along the seam.

Make sure the entire seam is glued to the hull. If there are voids, glue these too. Use thick-gel super glue on these areas, applied with a flat-tipped X-Acto knife.

Apply a bit of the thick-gel to a piece of paper so you have a line of glue. Cut a small amount of the glue with the flat edge of the knife blade and apply it to the void. Lay the knife edge flat against the edge of the deck and pull it toward the edge of the hull, away from the deck. The glue will fill the void with little or none deposited on the deck. Don't worry about getting the glue flush with the deck—you only want to ensure that the deck and hull are glued together. Once you have filled the void, apply some accelerator to cure it, taking care not to get any on the surface of the plastic. You are trying to achieve a uniform bond between deck and hull so when you apply filler and sand, the deck will not flex. This is especially important if you are going to use putty to fill the void. Any flexing will crack the putty as you try to scrape and sand it, so be sure the entire perimeter of the deck is glued to the hull.

The next step is to work on seams that have no voids. To minimize your sanding, carefully scrape the dried super glue with the tip of a number 11 X-Acto blade. Be careful not to gouge the surface of the plastic. Scrape at about a 45-degree angle, and don't use a lot of pressure. If the edge of the hull is higher than the deck you will have to scrape down the lip of the hull so it is almost flush with the deck. Let the sharp edge of the blade do the work for you.

Once you have the glue scraped down you can start working on voids. I usually add putty to these to bring them level with the deck and hull. Lay strips of masking tape along the edge of the deck where the void is. This will protect the surface from putty. Squeeze some putty onto a piece of paper the way you did with the quick-gel super glue. Slice a section off with a flat-edged X-Acto blade and apply it the same way you applied the super glue—only now you want to get the putty level with the hull. Apply it in layers and do not glob it on. Immediately after applying, pull the tape off by peeling it back over itself away from the putty. When the putty is dry, gently scrape it flat. Go slowly and shave small layers at a time.

Now that you have the entire hull-deck seam surface scraped flat, gently sand the entire seam line using a medium-grade Flex-I-File sanding stick with its end cut straight. Before you start, protect the surface of the deck with tape. Gently wet-sand the seam area and be sure to hold the sanding stick flat. Work down to an extra-fine grade. As you sand, be careful not to indent the area so it is lower than the deck you covered with tape. Once you are done, check your work with silver paint and apply more super glue to areas that need it. If you find small voids in the putty, fill them with super glue and sand smooth.

**Scribing wood grain lines.** If the deck is steel you are finished, but if it is a wooden deck you may have to scribe small areas of the plastic to restore the continuity of the wood deck. To do this, take small strips of labeling tape and lay them on the deck, using the existing wood lines to set it straight. Use a Bare Metal Foils plastic scribe held at approximately a 45-degree angle, and with light pressure run it

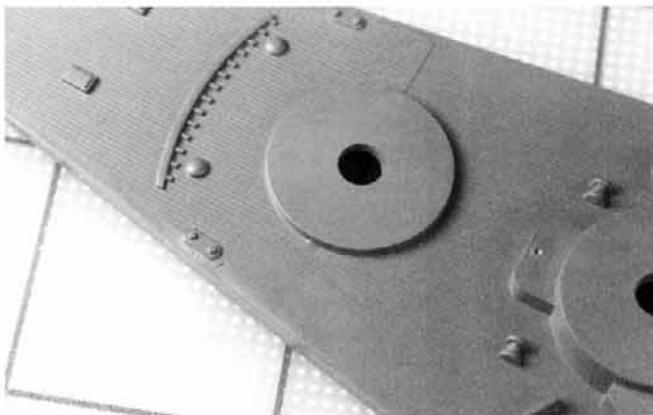
along the surface. It will remove a very thin sliver of plastic. Light pressure will also ensure that the tip of the scribe runs along the edge of the labeling tape. If the wood deck lines are already scribed, all you have to do is connect the existing lines to the new ones. If the deck has raised lines to simulate a wood deck, simply run the scribe to the point where the raised line starts. Once the deck is painted the eye will not be able to distinguish between the raised line and the scribed line. Aircraft modelers use this technique all the time to restore panel lines across seam areas.

In the smaller scales use light pressure and in the larger scales use slightly more pressure so the lines will be a bit deeper. Scribing is easy to do even in 1/700 scale, but it is tedious and you must go slowly. If you slip with the scribe, place a minute amount of Duro's white tube super glue applied with a thin wire to the mistake. After it is dry, mask off the surrounding area and gently sand the glue flat using a fine-grit section of sandpaper wrapped around the tip of a length of balsa wood. Use light pressure so you don't indent the plastic surface. When you are done, remove the tape and rescribe the area.

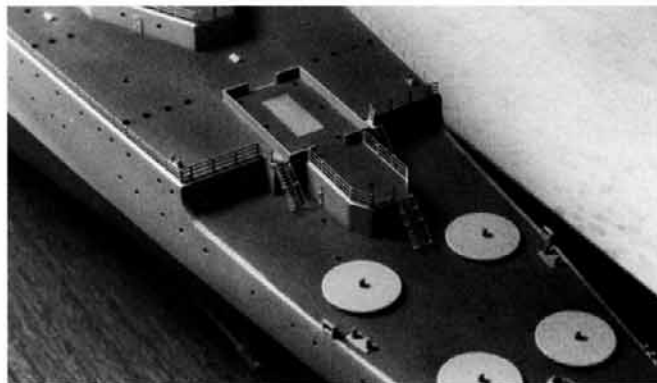
**Mating deck sections.** Some steel and wood decks come in several sections that need to be mated in areas where no superstructure will cover them. This is the situation with Tamiya's 1/350 ship series like their *Missouri* or *Enterprise*, and even on some 1/700 scale ships like Fujimi's *Iowa* class battleship series. If it is a steel deck, as on the *Enterprise*, you can fill the seams and sand them smooth, but mating wood decks and getting rid of the seam line is a bit tougher.

For all scales you will need to build some support under the seam area so it will not flex when you are working with the seam line. Before you do this, check the fit of the decks and be sure the edges butt up against each other as tightly as possible. Also check to see that deck sections are level. If one is slightly higher than the other, determine the cause and correct it before gluing the decks down.

Glue a lip under one of the deck sections so it overhangs the underside of the deck along the mating surface. Be sure it is sitting flat so the



The wood deck sections on Hasegawa's 1/700 scale *Iowa* class battleship have been fixed. Once the area is painted and weathered you will not be able to detect where the seam was.



Painting demarcation lines between the edge of the wood deck and the ship's hull is another way to help hide lost detail or flaws. In combination with weathering and the addition of photoetched railings, any flaws along these areas will never be noticed.

other deck half will not be higher. Once this is done, install and glue the deck section with the lip and then lay down the other.

Before installing the second section, run a small bead of Testor's glue along the lip, lay down the deck, position it, and tape it into place. Work fast because this glue will start to set in a minute or two and you have to maintain some pressure along the seam line where you applied the glue so the deck will not buckle up. Once the glue is set, finish gluing the deck to the hull using super glue.

Now you are ready to work on the seam between the two deck sections. For all scale models apply minute quantities of Duro's white tube super glue along the seam. When it is dry, tape off the surrounding area to protect detail and sand the seam line flat. Use a fine grit and apply minimal pressure. Concentrate your efforts along the seam, but also contour the surrounding deck surfaces as you sand. Once you are finished, check your work with silver paint, apply small amounts of glue where needed, and repeat sanding. To restore the wood lines in these areas, rescribe the lines using the labeling tape and a Bare Metal Foils panel scribe.

For deck seam lines with voids like the mid-deck section of Tamiya's USS *Missouri*, insert a small section of plastic as a spacer. Secure the deck in place with tape and measure the approximate size of the spacer. You want it slightly oversized so you can

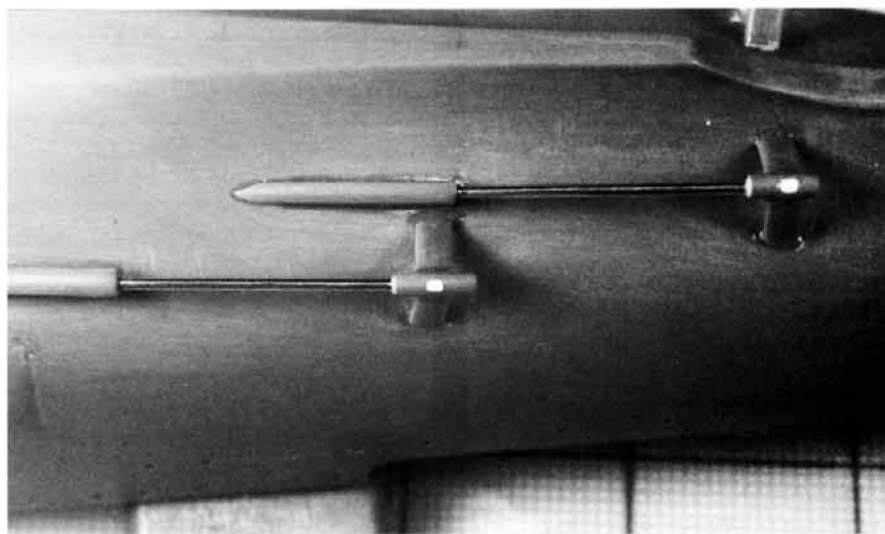
form-fit it in place. Glue the spacer to the deck section. After the glue is dry form-fit the spacer into place by using a Flex-I-File sanding stick to shave minute amounts of plastic from the spacer. Once you have it fitted you are ready to glue this section down, fill the seam areas with super glue, sand it smooth, and rescribe.

### SHAFTS, V STRUTS, RUDDERS AND PROPELLERS

Shafts and struts are easy to install, but there are several things you can do to improve their appearance and accuracy. I always check the fit

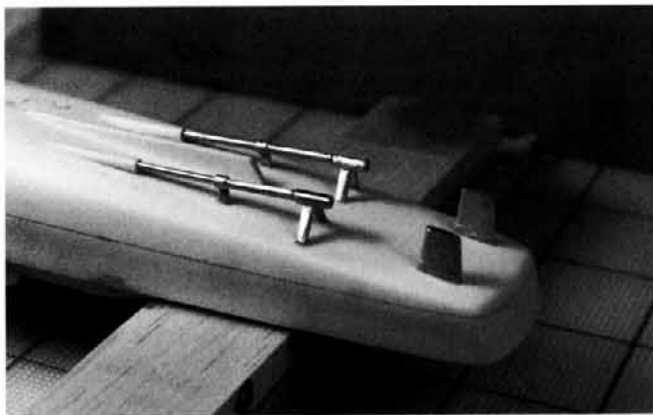
and appearance of kit-supplied shafts and struts. Check to see how the struts sit on the hull, how the shafts fit into the hull protrusions, and that the shafts are straight. This is a good time to check the fit of the propellers on the shafts. Next, remove mold lines on the shafts and struts by lightly scraping them with a number 11 X-Acto blade, being careful not to distort the roundness of the shafts or the flat shape of the struts.

Shafts and struts can also have round mold marks that can either be raised or indented. Carefully scrape off the raised ones. To fill indented ones use Waldron's punch tool to make a

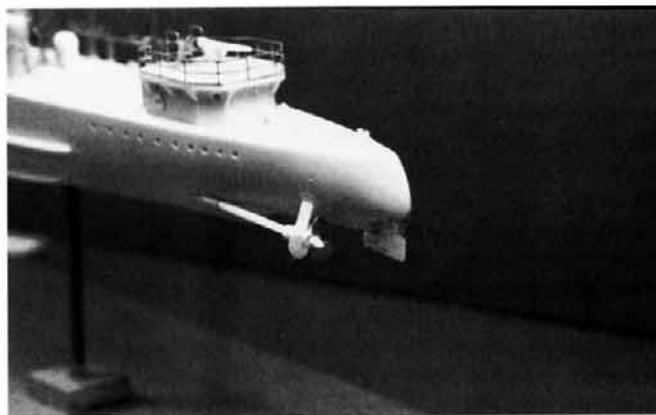


The stock plastic shafts on the 1/400 scale Heller kit were replaced with brass tubing. The indented injection marks were filled with thin plastic disks punched out with Waldron's punch tool.





The white-metal, one-piece shafts and V struts on MB Model's USS *Gearing* were slightly modified so that they would sit correctly on the hull. Be sure to lightly sand the gluing surfaces of white metal so that the super glue will have a good bonding surface.



Gulfstream Fine Scale Model's 1/350 USS *Ward* has one-piece resin shafts and V struts, which makes them easy to blend into the hull. Model by John Ficklen.

disk. Glue the disk in place with super glue and sand smooth using a combination of Flex-I-Files and Flex-I-Pad sanding sticks. The Flex-I-Files are great for maintaining curved and round surfaces.

When you are ready to install the shafts and struts, set them in place using small strips of tape. Apply a small amount of super glue where they meet the hull. When the glue is dry remove the tape, apply more glue, and sand the contact surface between the struts and hull to blend them in. You may need to apply several coats of glue to achieve this. For small cracks use white glue as a filler.

If the kit's shafts are bent or if they appear to be out of scale you can easily replace them with brass or plastic rod or tubing. To do this, carefully cut the shaft from the strut if they are molded as one piece, and drill a shallow hole into the strut where the shaft goes using a drill bit slightly larger than the size of the rod or tube.

I also recommend drilling holes in the hull where the shafts will attach to. Make these holes also slightly larger. The slightly larger holes will allow you to adjust the fit of the struts and the shafts. Here again position them with small sections of tape. Be sure the shafts are the same length and that the struts are positioned at the same locations on both sides of the hull. Once you have the parts positioned glue them in place and blend the struts into the hull.

Generally real ship struts form a V shape at the outermost location while the middle one can either be another V strut or a single strut. Some models accurately represent what the shaft and strut assembly looks like, but if you are building anything other than a patrol boat and the manufacturer has supplied single struts at the outermost locations, chances are it is inaccurate. To fix this, cut off the strut, tape the shaft in place, and form fit a new set of struts on each shaft. Use the techniques described in Chapter 5 for scratchbuilding shafts and struts. Fill in any locating holes left on the hull by the strut.

Resin ship models usually supply separate parts for shafts and struts. Shafts are usually brass rod, although I have seen some white-metal shaft and strut combinations. If you get white-metal shafts, scrape off the seam lines and check the strut connections to be sure they are straight. Resin strut parts will blend into the hull without too much work, but white-metal ones take extra care. I have found that blending the white-metal struts into the hull works best if you use Duro's super glue. Use the glue to fill in voids between the strut and the hull and coat the base of the strut with the glue to form a good seal. Before gluing struts, check them for bends, and form-fit the strut bases so the angle matches the angle of the hull. Apply a small amount of super glue around the bases of the struts to secure them.

Just about every set of instructions for model ships shows the rudder being installed at the same time as the hull halves are glued together. I guess this is a holdover from the era of models with working parts. I recommend not adding the rudder until after you are done working on the hull. If rudders are hinged to the hull, simply cut the rod that forms the hinge so you can fit the rudder into place after gluing the hull halves together. Cut the rod so that when you fit the rudder in place you will see the rod, but it will just touch the contact locations on the hull. This is much better than breaking the rudder off while you sand and shape the hull or install the main deck.

Most ship models have somewhat accurate rudders, but they may be too big or the angles may be incorrect. If you decide to use the kit's rudder simply cut and shape it to the correct configuration. Often kit rudders are too thick. You can correct this easily by running the part across sandpaper to thin it out. Be sure to contour the edges as well. If the rudder hinge locations have a loose fit simply add plastic strip using super glue and fit the rudder into place. While rudders are seldom the centerpiece of your model, a rudder that looks too big or too thick or does not fit properly will stick out like a sore thumb, so don't overlook this detail.

You don't have to paint shafts, struts, or the rudder prior to installing them on the hull. You can paint these

parts easily with an airbrush afterward. Don't worry if it can't reach tiny areas of the underside of the shafts because they won't be visible, especially after you mount the model on its base.

Although propellers are added long after you have mounted the model on its display base, I want to mention propeller preparation and painting. Most ship kits have good propellers, although they all need to be cleaned up. Check the blades carefully for sink marks, and use small drops of super glue to fill them. Resin ship kits sometimes have white-metal propellers and sometimes they have photoetched ones. White-metal propellers can be cleaned up the same way as plastic ones and generally are good representations of the real thing.

Photoetched propellers take a little work. Bend the blades using flat-tipped needle-nose pliers, being sure to bend them in the same direction. You can eye the bend angles of each and get pretty close, so don't worry if one is slightly off. Once you glue them in place and mount the model it will be difficult to detect any difference in the angles. Propellers also have a nose piece, which is usually made of white metal and glued to the center of the blade. To set its position, use a tiny drop of white glue to hold it in place. This will allow you to center the nose. Once the glue has set, apply super glue to the perimeter of the nose for a good bond between the brass and white metal that will automatically fill in seams and voids.



Masking around stern areas is time-consuming, but if you use small sections of masking tape the job will be easier and the masking will protect the painted surfaces.

Propellers are usually a dull bronze color that can be achieved by using Testor's brass metalizer paint with a small amount of burnt iron metalizer to deepen the color. I fill a 3/4-ounce paint jar about a quarter full of brass metalizer and then add a few drops of burnt iron. Give the props two good coats and rub the surfaces with a Q-Tip to bring out the color. To dull the metalizer, give it a coat of clear flat.

### PAINTING THE HULL, DECK, AND MAIN SUPERSTRUCTURE

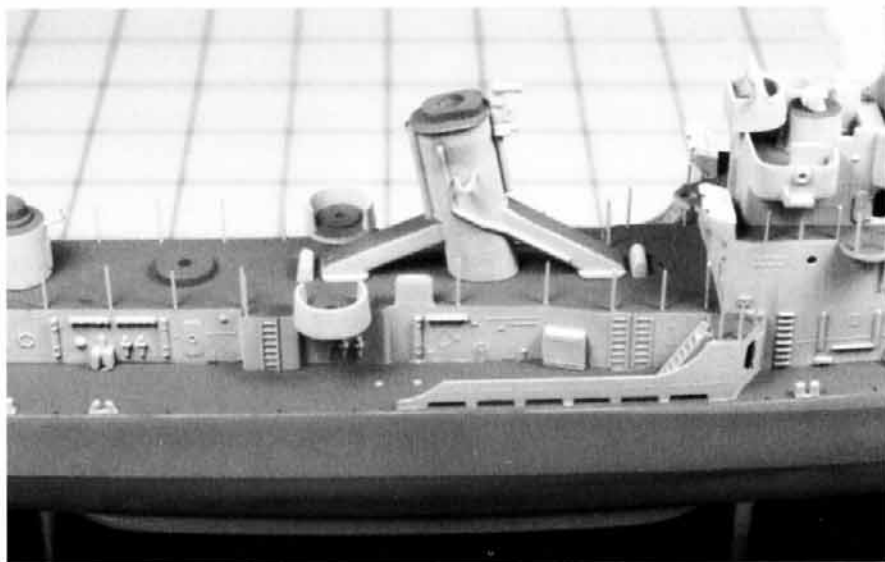
**Preparation.** To paint the hull, deck, and superstructure clean the model with Polly-S Plastic Prep applied with a soft toothbrush and prime the entire assembly. When the paint is dry give one last check for flaws and scratches. Fix these and blend in the surrounding primer by wet-sanding with 600-grit sandpaper. To sand the primer, let the paint dry for at least 48 hours. Again clean the surface with Polly-S Plastic Prep to remove sanding dust and set it aside to dry. Since most kits have some level of the superstructure molded into the main deck you can paint the superstructure as you paint the rest of the assembly. Paint individual superstructure components separately, glue them into place, and fill the seams with white glue.

**Airbrushing tips.** Before we discuss hull, deck, and superstructure painting

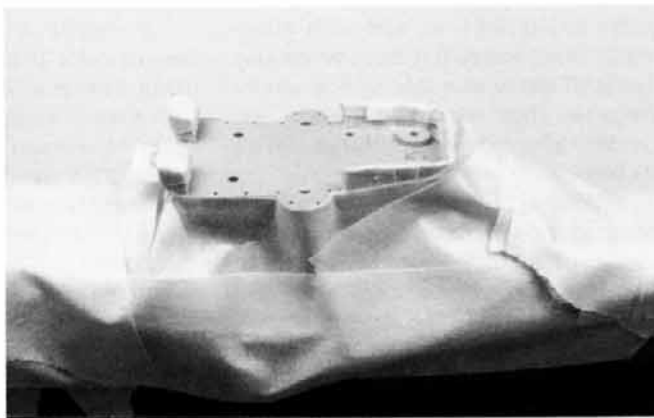
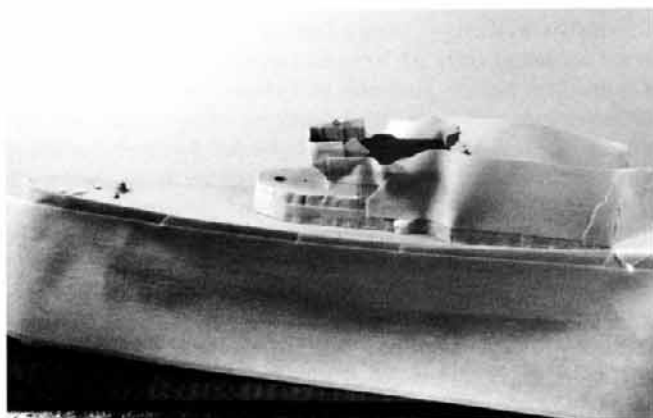
I have a few tips about painting with an airbrush. Depending on the paint scheme you choose you may be doing a lot of masking. When you airbrush, don't direct the full force of the spray toward a tape line at more than a 45-degree angle. The pressure may push tiny amounts of paint under the edge of the tape. Be especially mindful of this when painting the various colors on the hull where you have a lot of nearly flat surfaces. You will have a tendency to hold the airbrush so the full force of the air is directed towards the edge of the tape.

Ship colors above the waterline can vary from light sea gray to several shades of blue and gray to some pretty exotic camouflage color schemes. Depending on the scheme, you may have to paint the hull in stages. The amount of masking you have to do also depends on your choice of paint schemes. Always plan your painting so darker colors are applied over lighter colors. This reduces the masking you have to do, ensures that lighter colors don't turn out darker because of the undercoating, and reduces the number of paint coats.

To illustrate, let's say you want to paint the hull a U.S. Navy measure 22 paint scheme. The first step is to paint the upper forward section of the hull and all vertical sections of the superstructure haze gray. When the paint is dry, mask off these areas and paint the



The deck colors on Revell's *Buckley* are very crisp. There are clean demarcation lines between the deck and the superstructure, which were easily achieved with 3M painter's masking tape.



Two good examples of good masking techniques on the main deck and on upper superstructure decks. Using small sections of masking tape cut with a straightedge makes the job easier.

rest of the hull above the waterline navy blue. I usually mask the side of the hull first and run small strips of tape at the edge of the deck where it meets the hull edge. I then add larger sections of tape to cover the entire superstructure. Around the stern you may have to cut small square sections of tape and carefully apply them along the curve. Once masking is complete, go back over the masked surfaces and ensure that the tape is secure. A toothpick or small pencil eraser works well for these checks. Once the navy blue color is dry I paint the hull red, apply the black boot stripe, mount the hull on its display base, and paint the blue color on all horizontal surfaces.

**Boot stripe and hull.** Almost all ships have black boot stripes and a dark red hull below the waterline. For the boot stripe I recommend Testor's flat black paint with a few drops of flat white added to lighten the heavy black color. For the lower hull color I use Testor's flat red with a few drops of flat black added so the result is almost a blood color. Both colors are mixed in Badger 3/4-ounce paint jars with approximately a quarter of the jar filled with flat black for the boot strip and approximately half the jar filled with flat red for the lower hull.

There are two ways to add red and black to the hull. The easy way is to mask the hull at the upper boot stripe, paint the hull red, run a second line of tape to outline the lower boot stripe, then spray the black. Essentially you are painting black over red. The second approach is to

run tape where the red terminates, spray the hull, remove the tape, outline the upper and lower boot stripes with tape, then apply the black. This will result in even layers of black and red paint.

Cut the masking tape into lengths so one strip is long enough to lay along the entire side of the hull. Chances are the curve at the stern will be too sharp for one strip to bend around, so you will have to run a small strip across the stern that connects with the two side hull strips. If you have sanded off all the boot stripe hull lines that the manufacturer provided, first mark these locations on the hull with a soft lead pencil and set the masking tape.

If you sanded off the boot stripe lines and didn't record their locations, or if you are building a resin ship, you need to ensure that both strips of tape are at equal heights along the sides of the hull and that they are straight. If you hold the tape taut—but not to the point where it will stretch—and carefully lay it along the hull, you can almost get it to lie along a straight line. Because of the curves around the bow, it may have a tendency to curve downward, so be mindful of this and lay it straight. To check it, set the hull on your workbench and position yourself about 2 feet away and at eye level with the tape. At this distance you should be able to detect any problems. Once you get one side done you can use the bow and stern termination points to help set the tape on the other side. The stern section of tape is easy to set. All you have to do is connect it to

the edges of the port and starboard tape locations.

To ensure that the boot stripe is the same thickness all around, cut sections of tape to the exact thickness you need and place them every few inches along the line of tape. Once you have set these all around the hull, butt the second length of tape against the opposite edge of these small lengths. After you have completely taped the hull, remove the small sections and paint the boot stripe.

Once you have painted the hull, mount the model on its base and begin masking and painting the superstructure parts attached to the deck, and the deck itself. You can easily protect all painted surfaces on the hull as well as the display base by covering them with thick strips of tape. If the superstructure components and the decking are different colors you must mask carefully. For example, if the vertical surfaces are one color, say light gray, and the decks are another color such as sea blue, mask all vertical surfaces, paint the decks, then remove the tape on the vertical surfaces, mask the decks, and paint the vertical surfaces. This is tedious, and I recommend a relaxed state of mind for masking. If you get tired or nervous, set it aside for a while.

You can also use toothpicks to push the tape around raised details and to tuck it under details that don't touch the deck. If some of the decks are wood you will have to do even more masking, as they must be protected when you paint the upper surfaces.

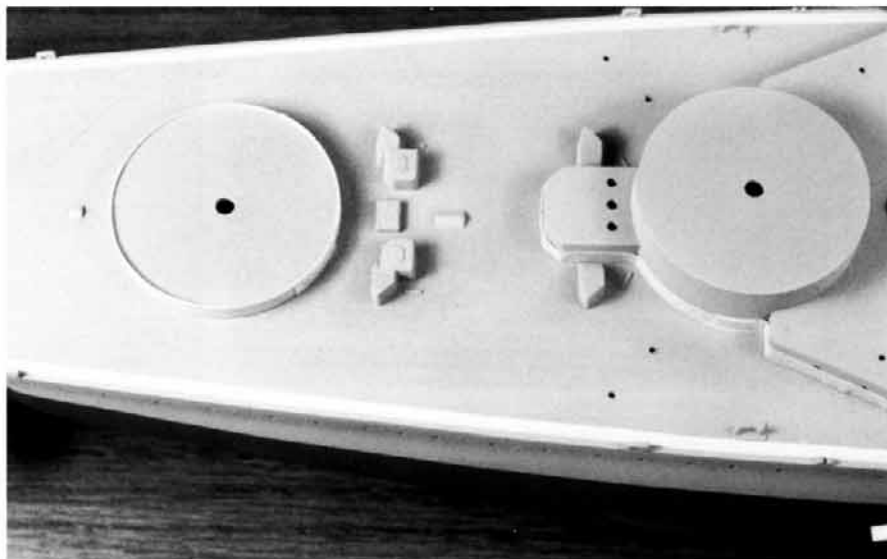


To set the demarcation line between the edge of the wood deck and the hull, run a thin strip of tape along the deck to set the thickness and then run another strip along the outer edge of the tape to cover the edges of the hull.

**Wooden decks.** If I have wooden decks I save this painting for last and do it by hand. I have found that the best color for wood decks that are to be painted a natural wood color is Testor's flat dark tan. You can slightly lighten or darken it with flat brown or flat sand colors. I also recommend adding a few drops of Testor's thinner to the paint for a smooth flow. Use small flat brushes for all deck painting. I have found it easier to paint around superstructure and raised deck details first with a paint swath about 1/8" wide. I use a flat brush about 1/16" wide for this and always stroke away from vertical areas. Once you have a deck section outlined you can use a larger flat brush on the rest. Give the deck one even coat and repeat the process for the second coat.

To set the demarcation line between the edge of the wood deck and the side of the ship, lay a thin length of tape along the deck to set the distance between the end of the wood and the edge of the hull. Next, run another length of tape that covers the exposed area along the edge of the deck, which should be very small. Once you have this second length of tape in place you can lift off the first. This way you have a consistent demarcation line defining the edge of the wood deck. If areas of the wood deck were sanded flat when you were removing the seam line between the deck and the hull, chances are you can hide this very well once you have painted and weathered the deck.

If you are going to paint drain holes on a small scale submarine, mask around them and paint them flat black with a few drops of flat white added. Use a small detail brush and be sure to paint the inner edges of the indentation. Masking these indentations is tedious, and if you have a steady hand you can most likely get away with just masking along the lower and upper edges and taking your chances around the curves. Add some hints of rust along the bases of



these holes for that extra detail that represents a submarine that has been at sea.

### PARTICULARS ON AIRCRAFT CARRIERS

Aircraft carriers are unique because they have two superstructures. The first wraps around the exterior of the hull at the hangar deck level, and the second is located on the flight deck. The hangar deck superstructure also contains many ship fittings such as boats, boat cranes, guns and missiles, hangar deck doors, and the elevators. The flight deck superstructure usually houses additional guns and missiles as well as the radars and communications systems. The perimeter of the flight deck can combine both support equipment for flight operations as well as guns and missiles and other equipment.

**Hangar decks.** Model aircraft carrier hangar deck superstructure components usually come in long sections that contain scribed and molded-on detail as well as locating holes for the ship's equipment. Check the sections for dimples and raised or indented ejection marks and correct them. These sections also contain the hangar deck door detail as well as the elevator doors. Manufacturers usually represent these doors in open, partially open, or closed configurations.

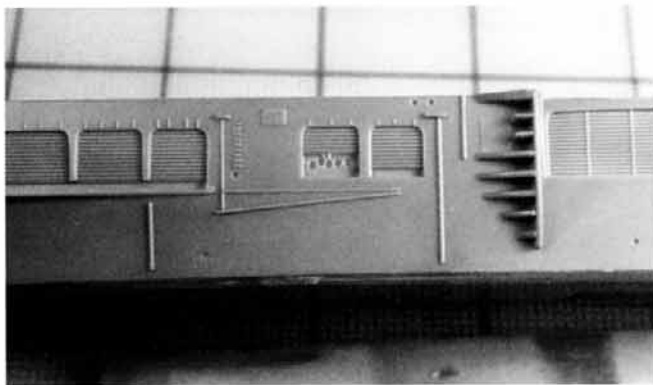
Doors that are usually open have voids, such as on Revell's 1/540 scale *Saratoga* or *Forrestal*, while others, like Hasegawa's 1/700 scale *Essex*, have plastic where the open space should

be. I recommend you remove the plastic, as it looks unrealistic. The simple way is to drill a series of holes along the perimeter of the plastic, run a number 11 X-Acto blade between the holes to remove the excess, then remove what's left with a set of micro files.

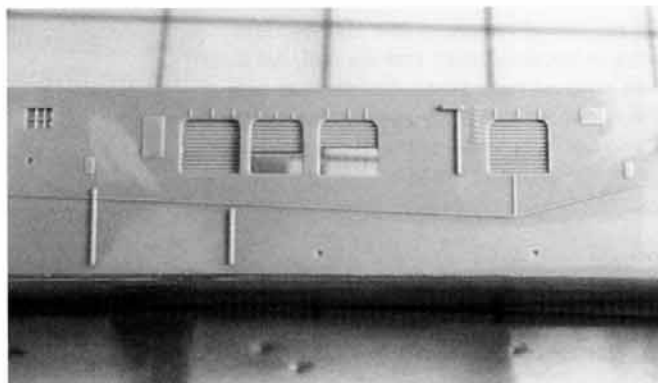
Now that you have an open space you need to install sections of sheet plastic on the inside to represent the hangar deck. It's not really necessary to install an entire hangar deck because you will not be able to see all of it once the flight deck is installed. On small scale kits you can cut sections of sheet stock and glue them to the inside of the hull. Cut squares big enough to span the opening plus about 1/4" on either side. The depth of the sheet stock should be about halfway across the hull's width so it will appear to span the distance to the other side. Next, form-fit the edge of the sheet stock against the base of the door. In most cases this will be easy, as the doors are usually located along the flat surfaces of the hangar deck superstructure.

Position the sheet plastic along the bottom edge of the hangar deck door and apply super glue to the contact areas between the hull and the sheet stock where the sheet stock extends beyond the door opening.

On large scale kits you may have to add reinforcing strips to the underside of the sheet stock to prevent sagging. If you did a good job of form-fitting the sheet stock against the door's edge you will only have a slight seam to fill. The best way to fill this



Drill out as much excess plastic as possible and then remove the rest with a number 11 X-Acto blade.



To finish the shaping of these open areas use a flat micro file.

without having to sand it is with dilute white glue. Run a small quantity along the seam and remove the excess with a damp Q-Tip.

Whether you are building small or large scale aircraft carrier kits, once you install the flight deck the interior of the hangar deck will become a dark hole. Don't forget to paint the hangar deck prior to attaching the flight deck. Another added touch of realism is to position some aircraft on the hangar deck near door openings. This does two things: it gives the appearance of a busy hangar deck, and it obscures the area behind the aircraft, making it appear as though the deck extends all the way to the other side of the hull.

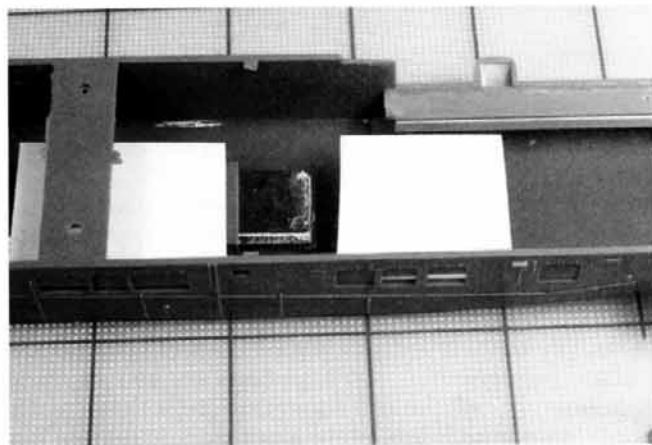
Once you have finished adding the hangar deck and any other details you want, you are ready to work on the base. Do not permanently attach it to the base just yet because you still have

parts to add. Next, add the shafts and rudders and paint the model, including the hangar decks. Some aircraft carrier kits may direct you to install photoetched railing sections during construction of the hangar deck superstructure. This is because some railing locations may be just about impossible to reach once the hangar deck superstructure is complete. To avoid this problem, tape all the hangar deck superstructure parts in place and identify those areas long before you begin constructing the kit.

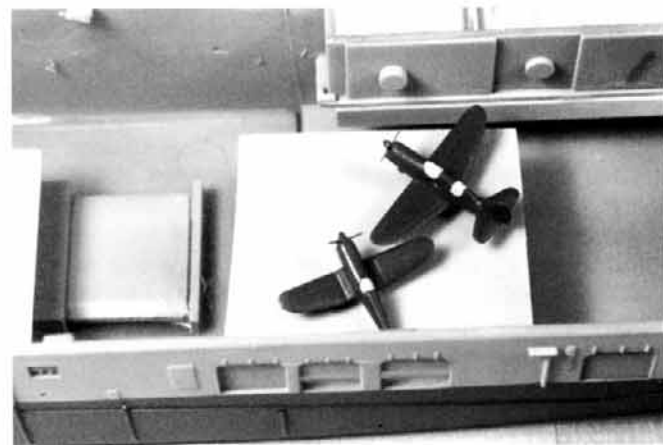
**Flight decks.** Once you have completed the hangar deck superstructure work and have painted the model up to this point you are ready to install the flight deck. The nice thing about aircraft carriers is that the overhang of the flight decks make them easy to glue, and it's easy to hide the glue seams. The first thing to check is that

a flight deck is level when it's in place. Also, be sure the deck itself is not wavy. Chances are you will have a good fit. Most flight deck fit problems are associated with excess flash that you missed during clean-up. This is easy to correct by running a sanding block over the affected area. Be sure to mount the model on its display base while you are checking the flight deck so you don't break off the shafts or rudders.

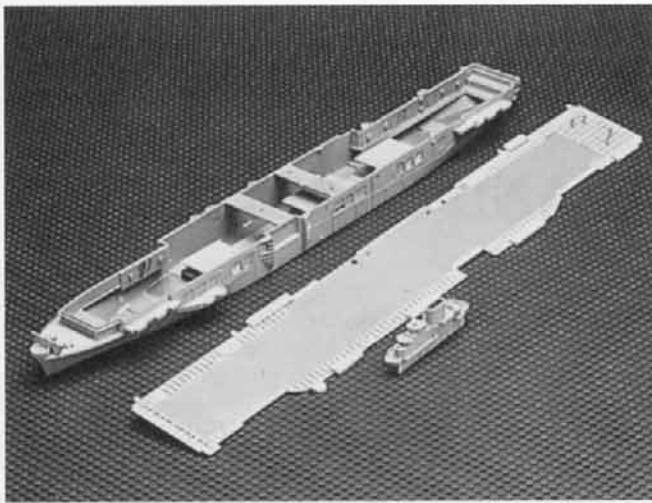
Once you have checked and corrected fit problems, paint the underside of the flight deck up to where it meets the hull. The easy way to do this is to mark the locations using a pencil while the flight deck is attached to the hull, then mask these areas off. Once the underside of the flight deck is painted you are ready to glue it to the hull. Position the model on its display base and then place the flight deck on



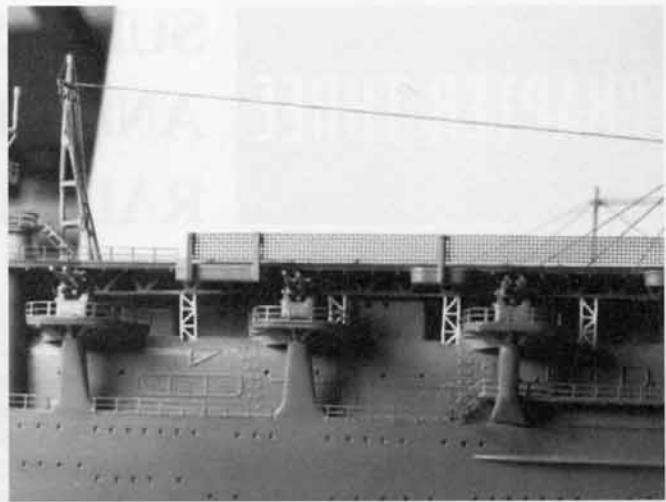
Gluing sheeting to the inside of the hull areas to represent the hangar deck is easy to do, but you must be sure that they are level.



These airplanes are being tested for positioning prior to painting the interior areas. Positioning airplanes on the hangar deck provides that extra touch of detail.



The underside of the flight deck on this 1/700 scale kit has been painted and is ready to be installed after the hull painting is complete. The assembly of this model has been reduced to three basic components: hull, flight deck, and island superstructure.

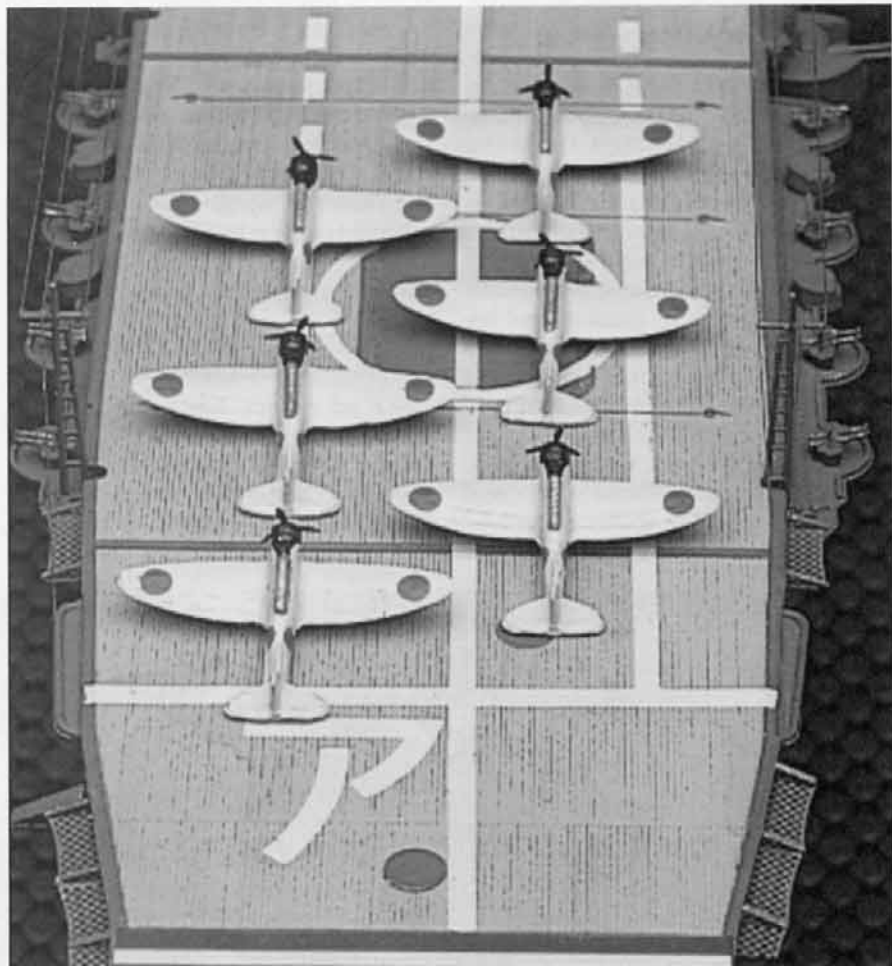


Nichimo's 1/500 scale *Akagi* needs some extra support detail on the flight deck overhangs to improve the accuracy of the kit. Most Japanese aircraft carriers had lots of support girders under their massive flight decks, and adding these makes for a highly detailed model. Model by Scott Weller.

the hull. Tape it securely to the hull, remove the model from its display, and turn it upside down on your workbench. To protect the flight deck, lay some balsa strips between it and your workbench. Using a small wire applicator, run a bead of super glue around the perimeter of the underside of the flight deck along the contact surface between the hull and the flight deck. Once it is dry touch up the area with paint and a small brush.

Now you are ready to mount the hull on its base. Once you've done this it's time to paint the flight deck. To protect the areas below from overspray, run tape around the perimeter of the flight deck and attach sheets of paper to extend the covering all the way down the hull. Once you have painted the flight deck install all the parts on the hangar deck superstructure including photoetched railings. Next, work on the flight deck superstructure and then add decals and remaining parts and photoetched railings. Add rigging and antennas and finally, add the planes.

There are many variations on this procedure and the method you use will depend on the actual aircraft carrier design, how the manufacturer designed the kit's parts, and what details you want to add. Use the kit instructions for guidance, plan your construction carefully, and follow your plan.



A combination of masking and painting and flight deck decals was used on Nichimo's 1/500 scale *Akagi*. Model by Scott Weller, photo by Glenn Johnson.