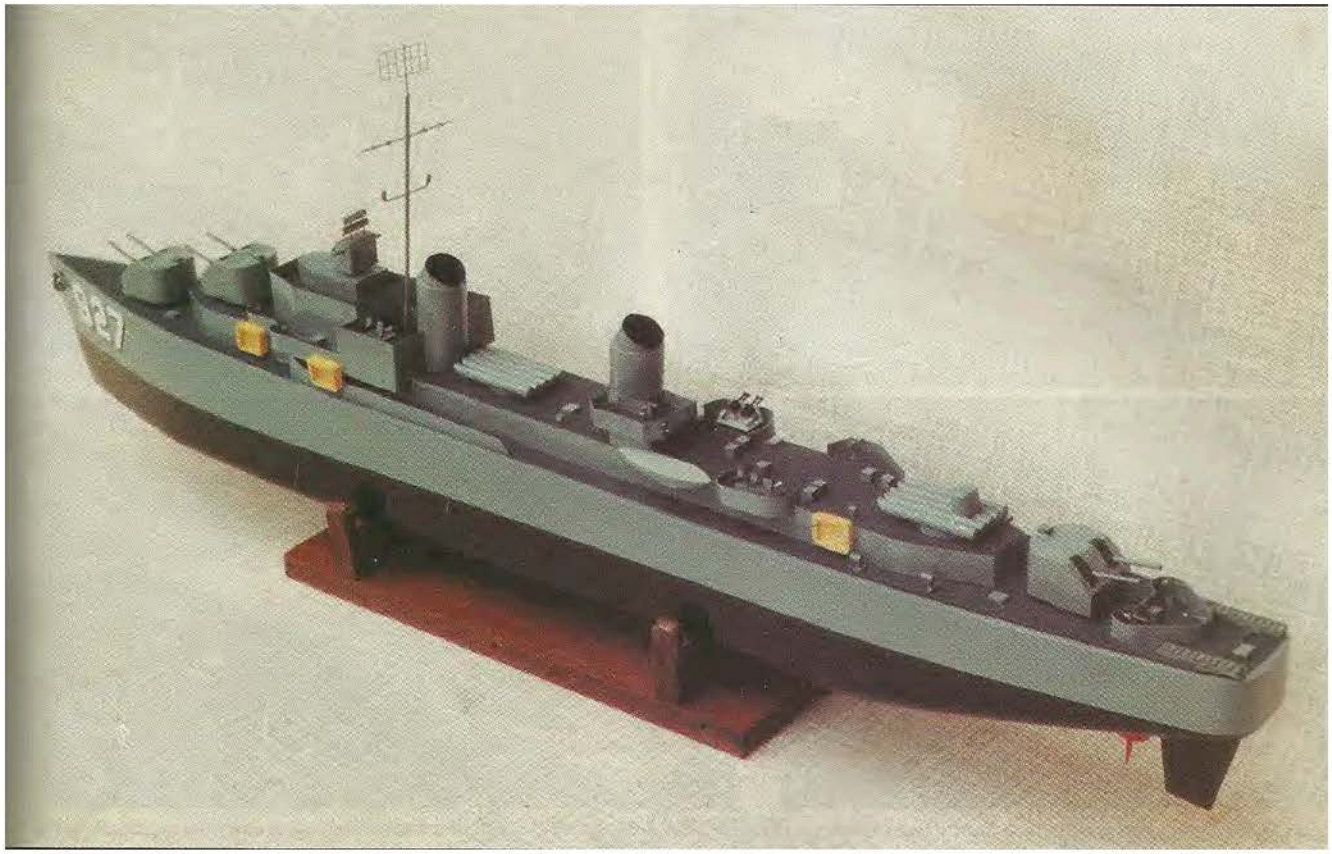


USS HANLEY

By Glynn Guest

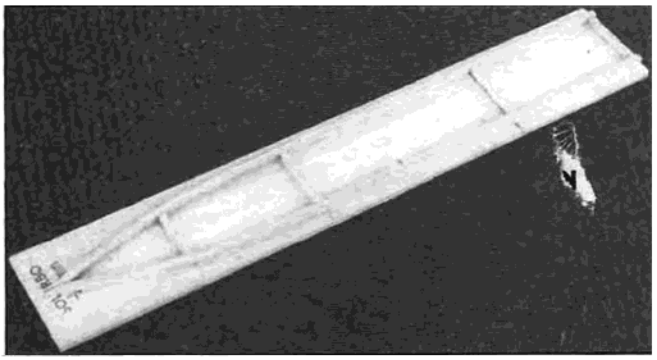
A sport scale destroyer that makes a great entry level R/C model or a nice change of pace for the "pro."

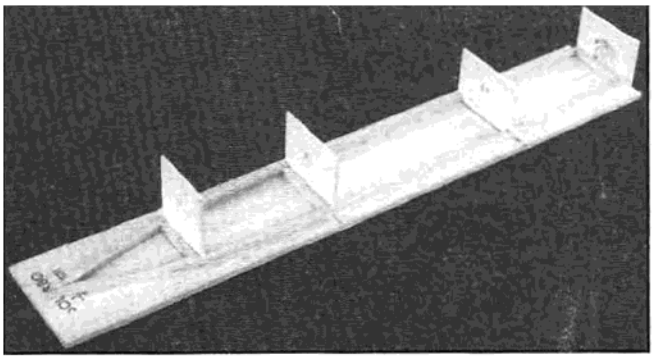
Like most readers, I started my modeling career as a youngster with small aircraft kits. The enthusiasm of youth was enough to overcome all the initial disasters and I was hooked on this hobby. Looking for greater performance lead me away from gliders and rubber models into gas powered ones. Control-line was mastered reasonably quick, but free-flight became a long series of accidents! Returning home with the latest model as just a collection of bits in a bag, was beginning to dampen even my high spirits. In this situation, the model boating activities of a school friend suddenly became interesting.

The first boat I designed was a freelance destroyer which drew heavily upon my aeromodeling skills. The hull was designed after the fashion of a fuselage with two sheet balsa sides separated by bulkheads, the nautical name for formers! The bow and stern sections were made by pulling the sides inwards, the sides coming together at the bow but with a bulkhead across the

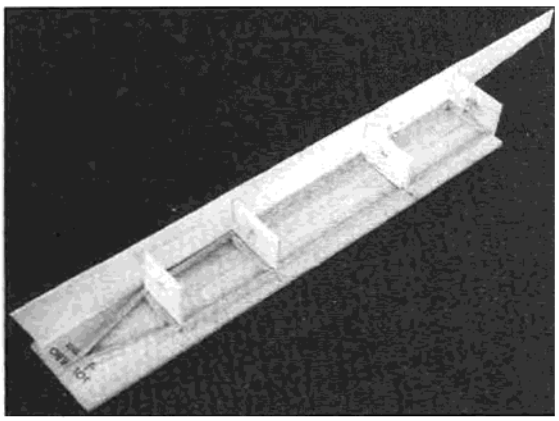
Editors Note: *The construction article presented here on the "USS Hanley" has been developed to provide modelers interested in R/C boats with a simple, quick building model that can be successfully built and operated by nearly anyone. By keeping things simple and cost effective, the Hanley provides a great way for a new modeler to get started, or for an experienced modeler to utilize that "old radio," and some of that pile of wood we tend to accumulate. So whether you're new to R/C or just looking for a change of pace, this model can provide you with many hours of enjoyment. Have fun!*

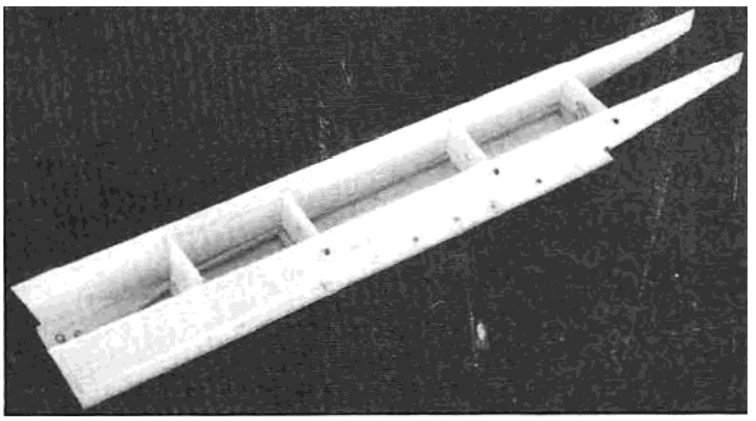
Oh yes, don't forget that this is a "surface vehicle" and must be operated on the proper surface frequency.





LEFT: Hull base is made from 1/4" x 4" sheet and 1/4" sq. strips. RIGHT: Bulkheads fitted in place on hull base.





LEFT: First side sheet is attached to hull bottom and bulkheads at B2-B4. RIGHT: Both side sheets now glued in place from B2 aft to B4.

stern. The hull bottom and decks were then covered with sheet balsa. Compared with the more traditional methods of building model boat hulls, my creation was undoubtedly crude but effective. The 32" long model looked and sailed remarkably well despite the low power of a small electric motor and four dry cells.

About this time, a holiday job allowed me to save up enough cash for a single channel outfit; yes we are talking about quite a few years ago! This was installed in a few aircraft, gliders and gas powered, but never produced a very successful model. A new destroyer model was built for this radio gear and proved much more enjoyable even with the absence of a motor control. A little later on, a proportional R/C outfit was purchased and, yes, you have guessed right, after a couple of aircraft disasters it ended up in a boat.

Since then, the aircraft and boating sides of my hobby have run more or less parallel. This has proven beneficial to both areas since the need to build strength, lightness, and reliability is an asset irrespective of whether the model flies or floats. Most of my boats were based upon slim warships which are notorious for poor stability. The use of balsa construction avoided any such problems since the light hull and superstructure inevitably require ballast in order to float at the correct waterline. This makes the models very stable and can be sailed in "scale" typhoons if you have the nerve!

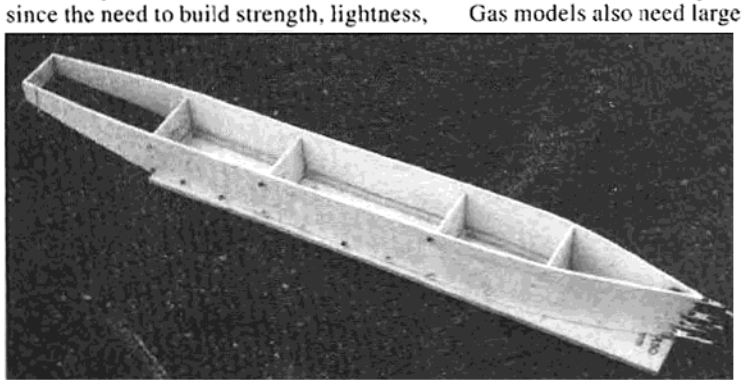
Compared to an aircraft, sailing a boat model might seem rather tame. Admittedly, if you just settled for sailing a sedate scale-type model in aimless circles, this would be true, but few people do this for long. Many boat modelers enter steering competitions where the model must be sailed around a complex course, often including a docking maneuver. It is quite a challenge to sail a clear round against the effects of any wind and waves. If speed is required, then gas powered models can always be tried. These tend to use fiberglass hulls for strength and can start to swallow huge amounts of cash. Gas models also need large areas to safely operate in and can fall foul of noise restrictions. This has lead to the development of fast electric racing models. The sight of several such models racing around a tight course is very exciting.

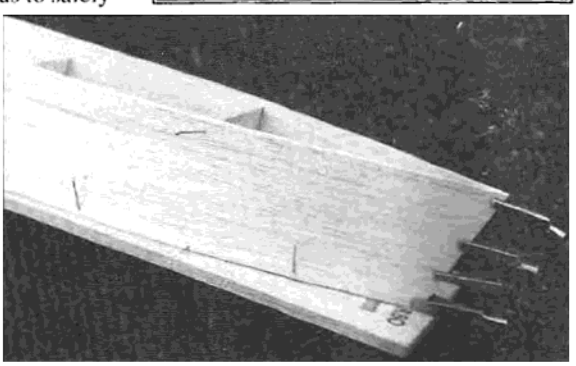
Scale

By chance, the need to keep the first

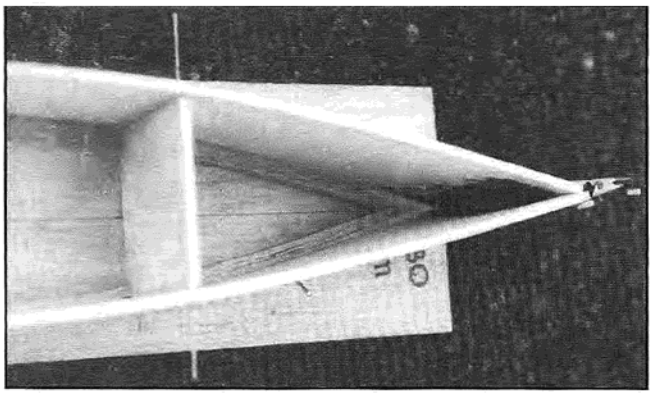
DESTROYER USS "HANLEY"

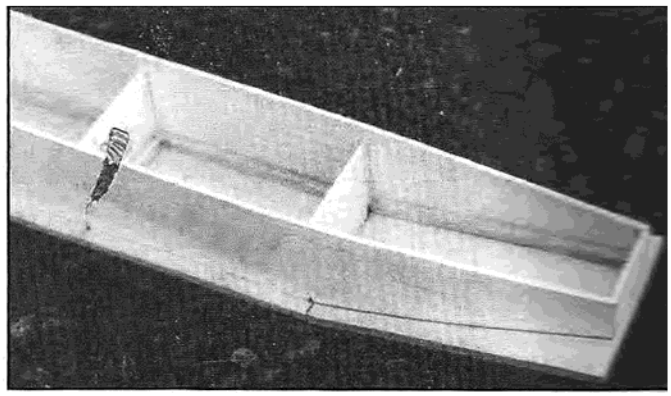
Designed by:
Glynn Guest
TYPE
Sport Scale Gearing Class Destroyer
LENGTH
32-1/2 Inches
BEAM
3-1/4 Inches (Max.)
WEIGHT
3-1/2 to 4 pounds
POWER
Electric (6-9 watts)
R/C
2 Channels (Rudder-Motor)
BASIC MATERIALS USED IN CONSTRUCTION
Balsa & Card Stock



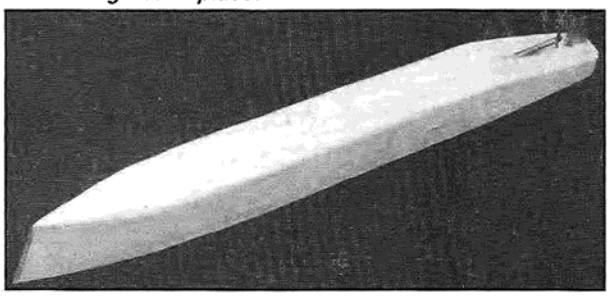


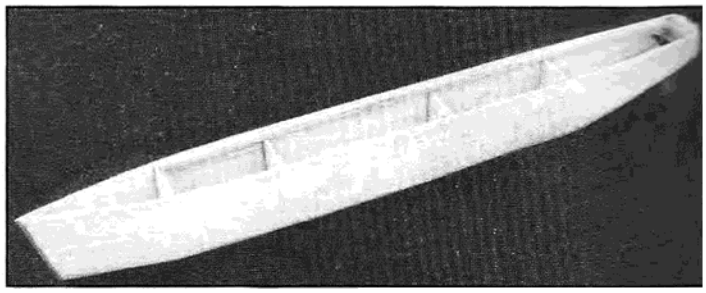
LEFT: Bow and stern now joined by pulling sides together. Note that B5 has been positioned at the stern (pins and rubber bands used at B5 to hold sides in place). RIGHT: Clips are used to hold sides in place at the bow.





LEFT: While bow sides are held together, reinforce inner bow joint with fiberglass tape and glue. RIGHT: Stern bottom sheet fitted and glued in place.





LEFT: Underside view of completed hull; quite sleek for a balsa box! RIGHT: Completed hull structure.

destroyer model's length within the standard 36" balsa sheet, forced me to use a scale around 1/144 (1 inch = 12 feet). Later on I realized that this scale had some advantages over the more common 1/96 or 1/192 (1 inch = 8 or 16 feet) scales that many model boaters use. Table 1 illustrates the size of warship models built to these scales.

It is clear that 1/96 scale produces a monstrous battleship model, not the sort of thing that most people would relish lifting in and out of the pond too many times. At 1/192 scale the battleship is no problem, but the destroyer becomes a featherweight. Such small models are possible with miniature R/C gear, but hardly practicable for everyday sailing. Only at 1/144 scale are both destroyer and battleship sensible propositions for working models.

A further bonus of 1/144 scale is in the amount of detail needed to avoid a bare unrealistic looking model. At the larger 1/96 scale, you are obliged to include extensive detail which is fine for a museum piece but not an everyday working model. Reducing the scale to 1/192 avoids the need for such detail, but tends to make any fittings rather small and hence vulnerable to damage. I have found that at 1/144 scale it is generally enough to suggest details with a basic shape which is stout enough for my clumsy hands.

TABLE 1

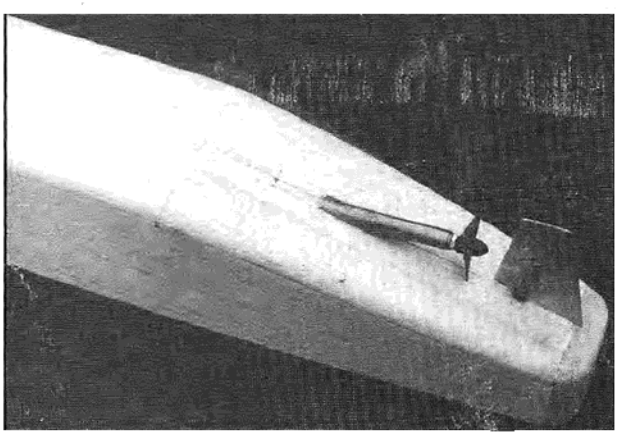
	Scale		
	1/192	1/144	1/96
Destroyer			
360 ft.	22 in.	30 in.	45 in.
2000 tons	1 lb.	2.5 lb.	8 lb.
Cruiser			
600 ft.	37 in.	50 in.	75 in.
10000 tons	5 lb.	12 lb.	40 lb.
Battleship			
720 ft.	45 in.	60 in.	90 in.
35000 tons	18 lb.	45 lb.	140 lb.

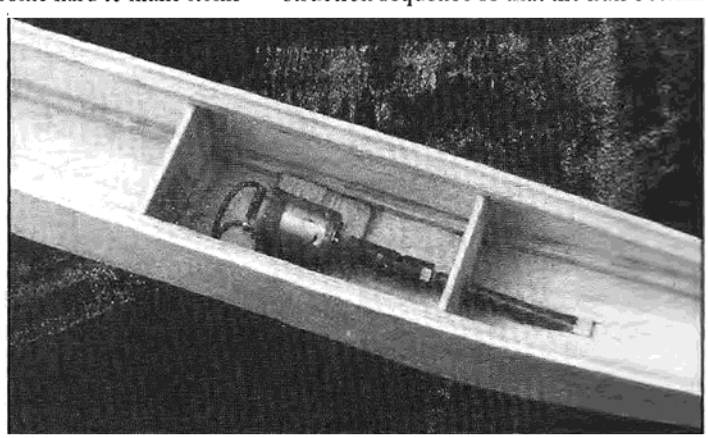
Another advantage to 1/144 scale was discovered later in that it matches with the "N" gauge model railroad scale. It is well worth browsing around this section of your local model shop, as the railroad accessories can often include some hard to make items such as ladders. A final thought is that if you fancied building a model of an aircraft carrier, then 1/144 scale could be ideal. Even a modern "super carrier" would not be too large in this scale, and a significant bonus would be the wide range of 1/144 scale plastic aircraft kits that are available.

CONSTRUCTION

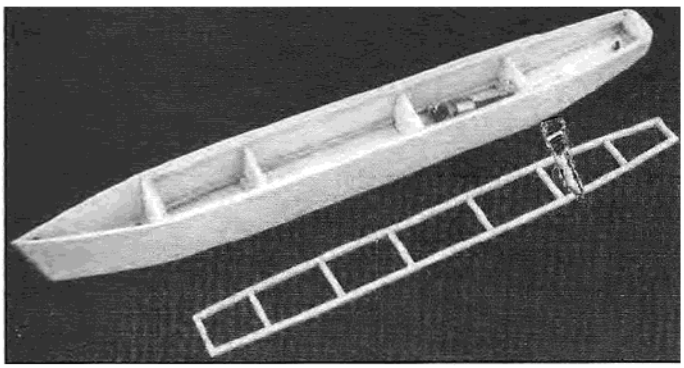
The hull of this model is basically a box section with 1/8" sheet sides on a 1/4" sheet bottom. The box "top," i.e., the deck, is made to be removable between B1 (bulkhead 1) and the stern; the deck from the bow to B1 being permanently fixed into the hull. The corners of the box are reinforced with 1/4" sq. strip along the full length of the bottom-side junction. A reinforcing strip only runs along the side-deck junction between B1 and the stern.

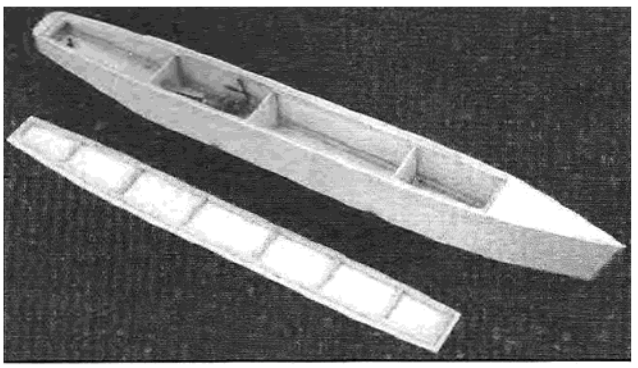
As stated earlier, my first models followed aircraft fuselage techniques. This gave a strong hull but suffered a little since model aircraft are not usually required to be watertight! This lead me to change the construction sequence so that the hull bottom



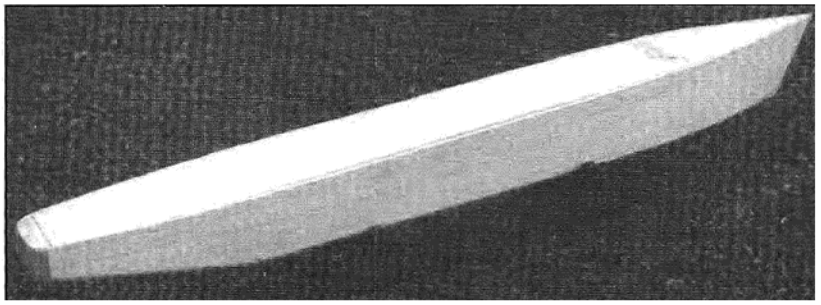


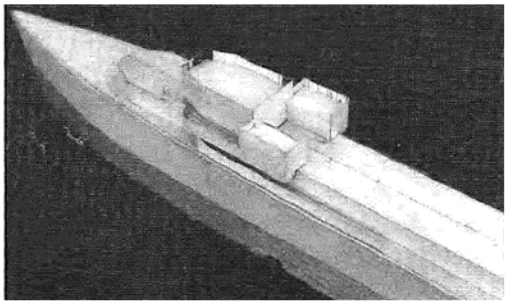
LEFT: Prop shaft and rudder fitted in place. RIGHT: Motor installation; balsa block used to make a wedge to align the motor and prop shaft.





LEFT: Deck frame removed from hull after assembly. RIGHT: Deck frame is glued to deck sheeting, then sheeting is trimmed to match hull opening.





LEFT: Hull and deck ready for superstructure. RIGHT: Balsa and card stock is used for the bridge and gun positions.

was made first, then the bulkheads and sides added. The deck was another challenge since I wanted to make most of it removable for ease of access. Simple aircraft-style hatches were at best splash resistant, and allowed water to enter the hull in all but the calmest conditions. Eventually, the idea came to set the top reinforcing strips below the top edge of the hull sides, this allowing the deck to fit within the hull sides. A water resistant hatch was made by building a frame from 1/4" sq. inside the hull edging strips. This frame is removed and stuck to the underside of the deck; thus, the deck firmly plugs into the hull opening and makes a surprisingly water resistant joint. The cross section on the plans illustrates this method of construction.

Balsa

In a model boat, weight is perhaps less critical than for a model aircraft. I tend to pick the medium grades of balsa out of the model shop's stock. The model's strength lies in its design, so there is no need to struggle with hard grades of balsa. Likewise, saving a few ounces is not required, so the light and potentially vulnerable grades can be avoided. It is more important that the balsa sheets and strip have a uniform grain and squarely cut edges. One sheet of 1/4" x 4" x 36" is needed for the hull bottom. The sides, deck, and superstructure can be cut from four sheets of 1/8" x 3" x 36" balsa. Six strips of 1/4" x 1/4" x 36" are used for the hull corner reinforcement and deck frame.

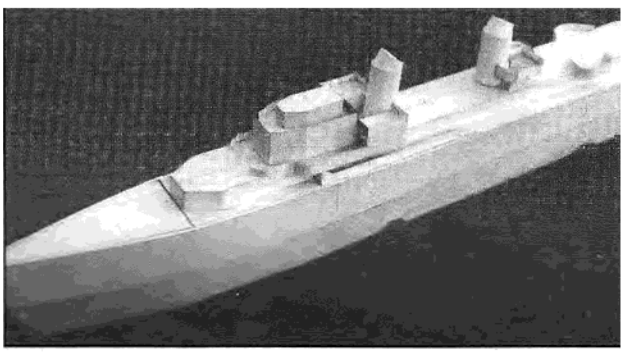
You can build this model using any of your favorite adhesives. I tend to use one of the rapid setting white wood glues for balsa joints. These allow some 15 to 30 minutes before hardening, which is long enough for the most complex parts. Wherever possible, a finger-smoothed fillet of glue is run along all accessible joints. This is probably unnecessary, but none of my models have suffered a broken glued joint despite the accidental rough handling they inevitably receive.

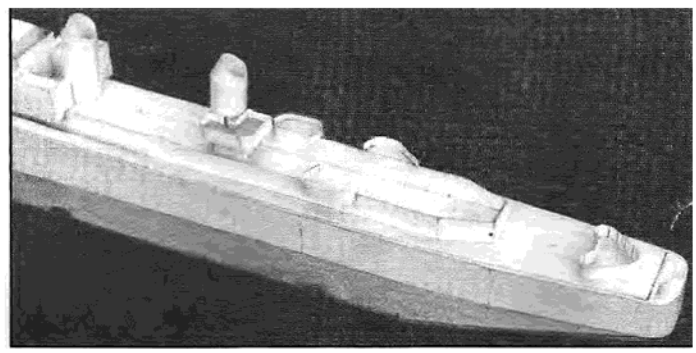
Hull

This starts with the hull base, but it is best to first cut out the two side sheets and bulkheads — this allows the accuracy of the base to be checked while building it. The dimensions of the side sheets can be taken directly from the plan. To ensure these sides are identical, I usually pin two sheets together then cut both out together. The bulkheads are simple rectangles with cut-outs in the lower corners for the reinforcing strips; note that the grain is horizontal not vertical. The bulkheads ought to be checked against the hull sides for accuracy. B5 is the full depth of the side sheet, while B1 is 1/8" shorter, this is to allow for the deck. The other three bulkheads accommodate the edging strips by being a further 1/4" shorter.

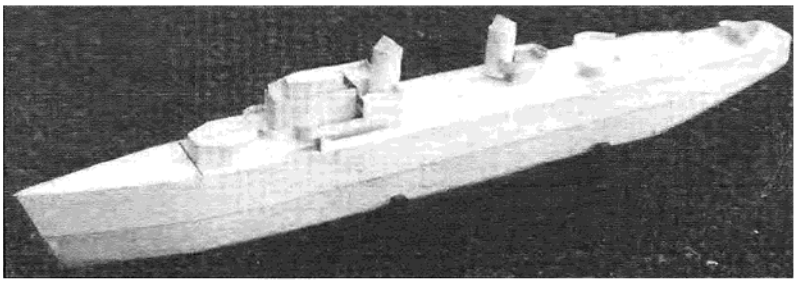
The hull base is a simple frame of strips on the 1/4" bottom sheet. Care must be taken or the bulkheads and sides will not fit together. The longitudinal base strips must be 24" long to match with the hull sides from the bow to B4. These strips are parallel between B2 and B4 but come together in a scarf joint at the bow.

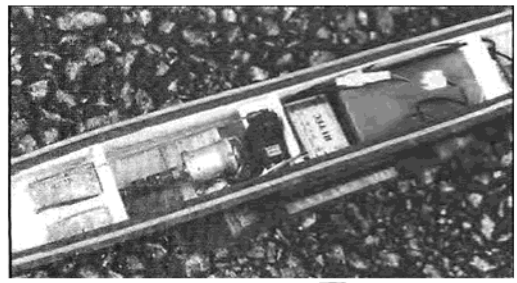
Only when you are happy with the fit of base, bulkheads, and sides, should assembly commence. The first step is to glue bulkheads B1-4 to the base and leave until set. The sides are added in three stages, initially to the parallel portion between B2 and B4. Glue is applied to these bulkheads and the base/strip between them. Care is needed to ensure that the two sides are square and aligned; drawing the bulkhead position on the inside of the sheets can aid this. The next



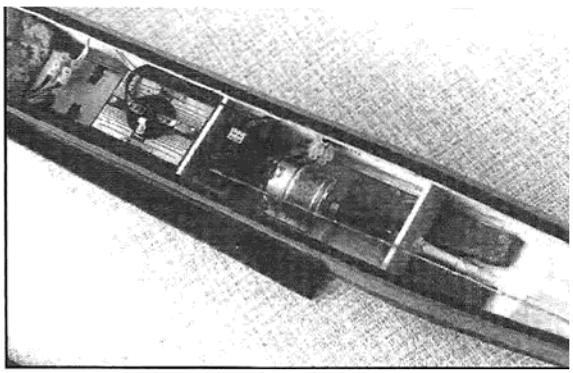


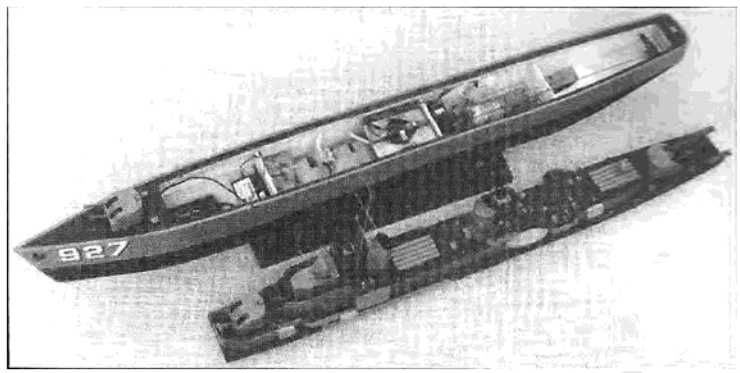
LEFT: Forward superstructure before painting. Note that author glues card stock to hull sides above waterline. See text for more info. RIGHT: Aft superstructure before painting. Card stock also used around gun positions.





LEFT: Completed structure ready for painting. RIGHT: Original installation with electronic speed controller. The coupling between the motor and prop shaft is a commercial type unit, but rubber tubing can be used just as well for this application.





LEFT: Close-up showing variable resistance-type speed controller in place. Note lead ballast weights glued in place. RIGHT: Apart from the bow, all of the deck is removable to allow for easy access to the radio and running gear.

stages require the glue to be fully hardened; with white glue I usually leave it overnight.

The bow is formed by pulling the sides inwards and gluing to B1, the base/strip, and each other. I find pegs or clips handy to keep the bow together at this stage. The stern is formed in a similar fashion, but with B5 glued between the side sheets. An extra precaution is to apply a glue soaked strip of thin cloth or fiberglass tape to the inside of the bow joint. This reinforces what might be a vulnerable area in the event of a high speed collision. I always do this and even some almighty thumps have never broken the bow joint.

The hull bottom from B4 to B5 is added next from 1/4" sheet. The edge that butts up against the base needs chamfering to make a neat joint. After this has dried, the side/bottom junction between B4 and B5 is reinforced with two strips of 1/4" square. The ends of these strips need angling to match the two bulkheads. The stern block, from two laminations of 1/4" sheet, could be added now or later; it is not critical so the choice is yours.

The 1/4" sq. edging strip is glued around the hull access opening from B1 to B6. With this strip positioned on B2-4, it should be a uniform 1/8" from the top of the hull sides to allow for the deck. Pegs are again a very handy means of holding the strip to the side sheets while the glue sets. Two pieces of strip also need gluing across B1 and B5 so as to produce continuous edging around this opening.

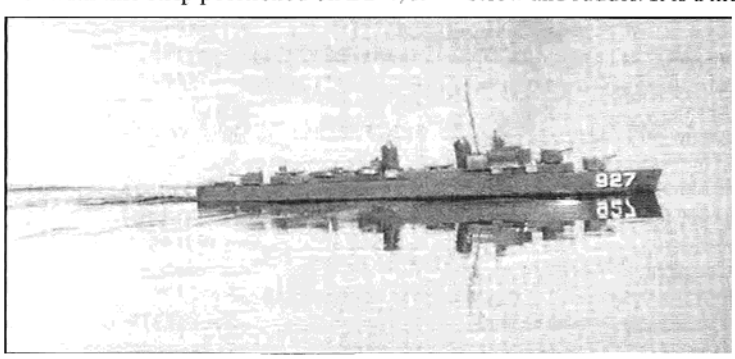
The shaping of the hull is next, starting with the removal of the excess 1/4" sheet from the base. I use a knife to cut away the bulk, then finish with a razor plane. The corner of the hull bottom sheet needs shaping to produce the bilge curve. Do not overdo this and weaken the hull; the section on the plan indicates what to aim for. The bow joint should be sanded flat and a hardwood strip stuck in place. When dry, this strip and the stern block can be sanded to blend into the hull. At this stage, my hull weighed in at about 4 oz., not amazing by aircraft standards but less than 10% of the final model's weight.

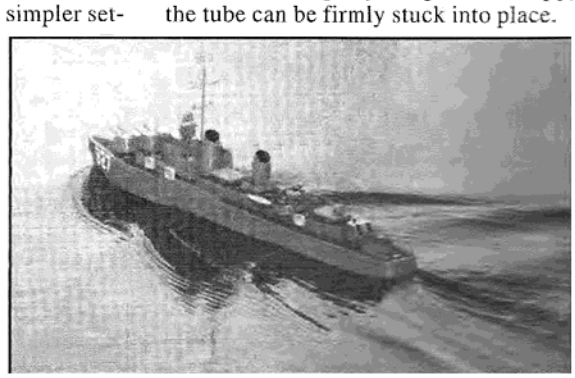
Prop And Rudder Tubes

This is the best stage to install these items; leave it until later and you will probably cause more damage than good. Despite the full-size vessel using twin screws and rudders, I nearly always settle for a single screw and rudder. It is a much simpler setup and should give good performance, often better than the scale arrangement would.

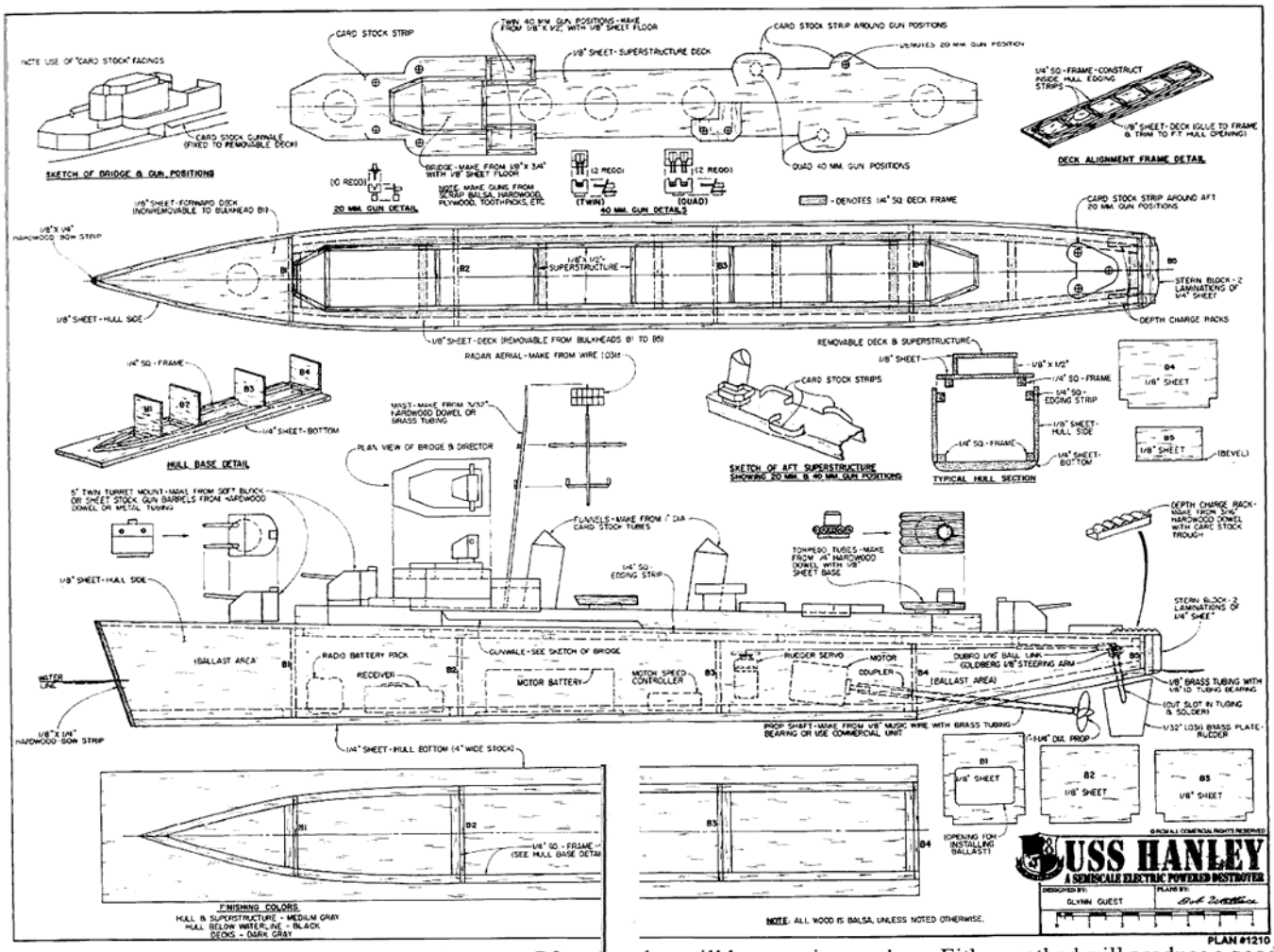
I used a commercial prop shaft and matching tube about 5" long. To be honest, you can achieve good results if you prefer to make your own from a steel shaft and close-fitting brass tube. The extra friction associated with a homemade system can be minimized with the regular application of oil. The rudder assembly could also be a commercial item, but the prototypes were scratch-built. The rudder blade was cut from aluminum sheet about 1/16" thick which was then epoxied into a slot cut in the steel shaft.

Both prop and rudder shafts need their tubes to be mounted on the centerline of the hull. I usually draw a line on the bottom sheet to guide me. The rudder tube was simply made from a length of brass tubing epoxied into a hole drilled through the bottom. The prop tube needs an angled hole in the bottom sheet as well as a hole through B4. I find it simpler to make these a little oversize, then use balsa packing to get the correct angle, checking that the propeller can rotate without fouling anything. When happy, the tube can be firmly stuck into place.





LEFT: Hanley prowling around the lake, looking for a German "U Boat." RIGHT: Fresh batteries, and it's off for another cruise.



Decks

The removable deck is begun by making the 1/4" sq. frame within the hull edging strips. A little care is needed to ensure that you make good glue joints without sticking it to the hull structure. The frame must be left until completely set, and it is a good idea to mark the top surface of this frame before removing it from the hull.

The frame is then fixed to the deck sheet, making sure that the top of the frame is glued to the underside of the deck. This is important as the frame will probably only fit into the hull one way. Likewise, the frame must be central on the sheet or may not match the hull opening. When the deck is pressed into the hull opening, it may just fit between B2 and B3 but will be oversize elsewhere. A little careful trimming is needed to remove excess deck sheet; I aim for a uniform gap of 1/32" to 1/16" between the deck and hull sides. This gap doesn't affect the water resistance of the hull, as the deck frame should plug firmly into the edging strip.

The fixed deck from the bow to B1 is best made by cutting an approximate triangular piece of 1/8" balsa sheet. This can be offered to the hull and trimmed until it fits within the hull sides. The hull can be checked for any defects at this stage, gaps and dents being filled with your favorite treatment.

Superstructure And Details

This is all built on the removable deck from 1/8" x 1/2" strip, with a 1/8" deck over. The bridge and adjacent 40mm gun positions are simple boxes made from 1/8" sheet but faced with card stock. Card was also used to make the funnels, gunwale, and around the gun positions on the superstructure and deck.

Details such as the guns, torpedo tubes, etc., are shown on the plans in a simple basic form. Any suitable scrap material can be used, provided excessive top weight is avoided.

Finishing

Those of you who favor finishing your models with one of the iron-on-films might have a problem with this model! More traditional methods seem appropriate and the obvious choices are filler/primer or cellulose dope. Either method will produce a good base for painting, provided several thinned coats, rubbing down between each, are used.

My preference is to use dope but with one difference. An early model had the hull covered with thin card to simulate the full-size steel plates. This was a tedious task but only needed a couple of coats of dope to create an excellent surface for painting. Even better was the accidental discovery that such a "plated" balsa hull was remarkably tough, as the card tended to localize any damage. Since then, all of my scale models have had their hull covered with thin card, but only above the waterline, on the basis that this is the part you see while sailing and it is a lot easier! Since the prototype for this model had a smooth, flush welded hull, I just drew the waterline along the hull sides and then glued card above it. You could try to use one long piece wrapped around the hull but this is a tricky job. It is much easier to use several smaller pieces butt-joined together with contact cement. If the cards are a little deeper than the hull sides, then the excess can be trimmed off the top edge after the adhesive has set. I also tend to cover the superstructure sides and gun turrets with thin card, partly to produce a better surface for painting, but mainly to hide any gaps in my construction.

Many modelers agonize over producing the correct scale colors. All this effort does seem wasted, as the apparent color of anything depends upon the lighting conditions.

From RCModeler Mar. 1996