NEW YORK FIREBOAT - Three-Forty-Three

One of the newest fireboats is currently in use by the New York Fire Department. Two identical models were built by Eastern Shipbuilding in Panama, Florida and delivered to the NYFD in 2008 & 2009. These boats are state of the art designs by Robert Allan Ltd. using the latest technology in every aspect. They are tailored to the specific needs of the NYPD.

I was very attracted to the design which was highlighted in the September 2010 issue of Workboat magazine. My search for more information found lots of photos on the web, but no detailed drawings. Robert Allan Ltd. was consistent in its policy of not releasing drawings created a challenge to come up with hull lines for this boat. My biggest source of design information came from the Eastern Shipbuilding's web site where they had an extensive array of photos documenting each stage of building process for the 343 and the sister ship, Firefighter II. The hull components were of special interest in my initial task of modeling the hull. I decided to stay within my "one man" rule and selected a scale of 1/48 which yielded a length of 35" for this 140' boat. (Note: my "one man rule" requires my models to be launched and retrieved by one man)

I started building this boat in October of 2010. I have kept good track of my time on this project and will share some time stamps as I go through the building process.

Building of the Hull

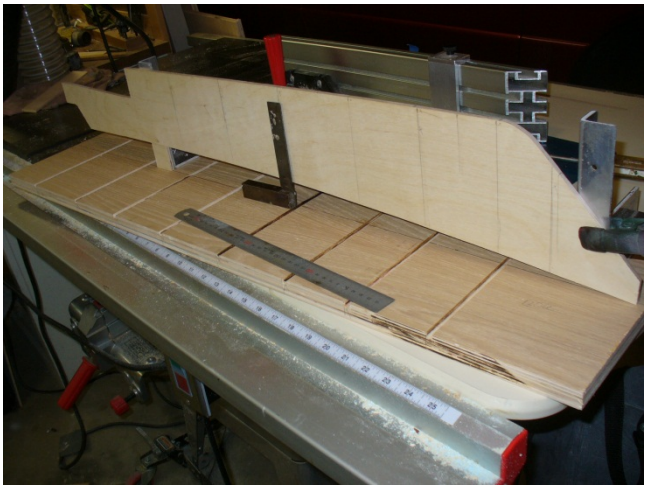


Figure 1

My greatest challenge with this boat was recreating the hull. With only photos, it took many hours of study and trial and error to come up with a suitable hull profile and then the hull shape including the spray chine incorporated in the design. While the shipbuilder photos where invaluable in the process, it was a challenge to adjust for the camera perspective.

I decided to do a one up plank on frame hull as I saw no advantage in going the time and expense to create a fiberglass gull. I was very comfortable building the wood hull. Never having done the process of creating frames for a complex hull shape before, I decided to build a half hull from Styrofoam on a 1/8" plywood center profile piece. Once I was happy with the shape,

I would cut the foam half hull into as many sections as needed for cross sections to create the frame drawings. With the hull sections, it was an easy process to duplicate each half section and create the 9 frames I decided were necessary. This process is shown in Figures 1- 4

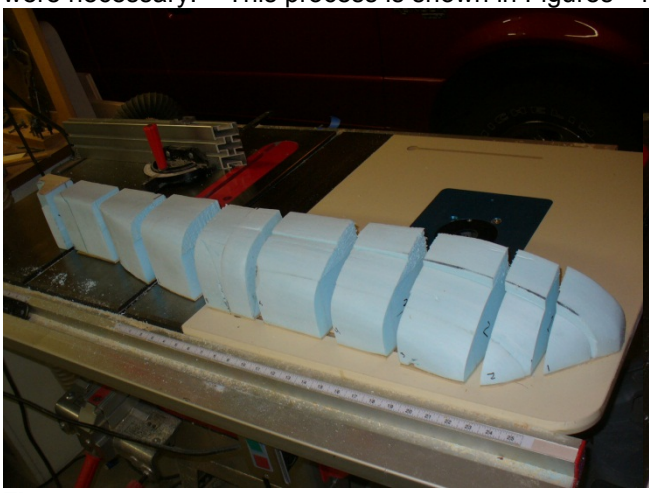


Figure 2

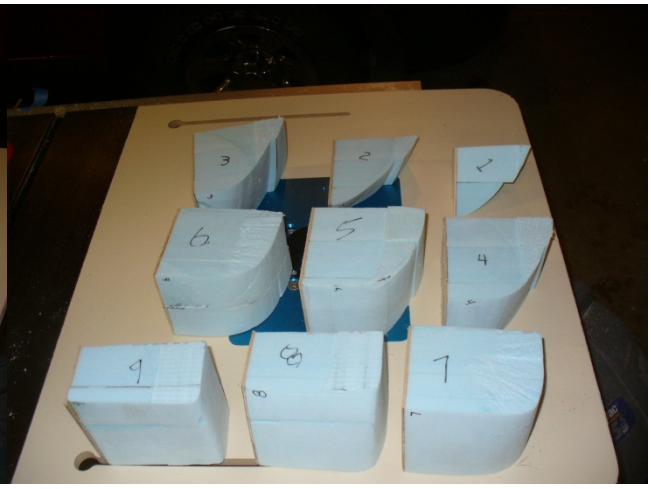


Figure3

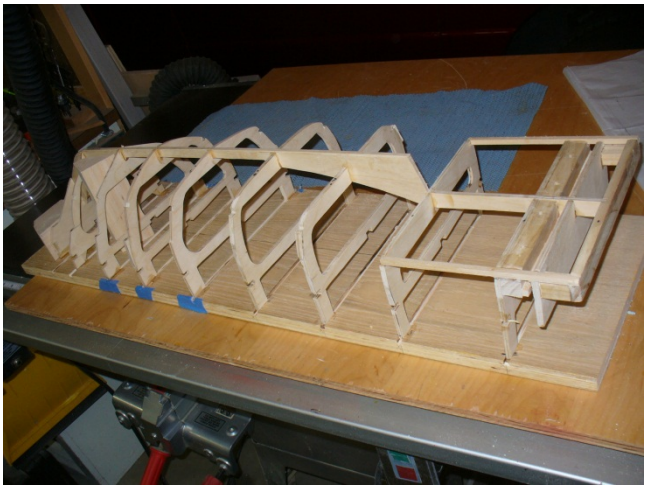


Figure 4

I left each side of the frame extended to allow the entire frame set to be mounted on a ¾" board to hold the entire array in alignment while the skin was applied

The material used for the hull skin was 1/16" birch plywood. With help of many clamps, only a few pieces required moisture to get the correct bends to conform to the frames. All frames and skin pieces were glued with epoxy. Final shaping was done using Evercoat Polyester Glazing putty.

Bow thruster and water inlets installed in hull

One I was satisfied with the hull exterior, I started to work on the interior. With the exception of the rudder and drive shafts, I installed all items that would penetrate the hull including the bow thruster housing and the water intakes for the 3 water systems planned to supply the 5 operational monitors.

Next, I glassed the hull exterior using polyester resin and 1.5oz cloth. Once the resin cured, it was time to sand and fill again using the Evercoat putty.

Fiberglass sections are fitted and ready for resin

Fiberglass is cured and ready for final smoothing using the Evercoat finish coat filler.

Next comes the installation of the rudder and shaft tubes. This design incorporates 4 shafts in order to get the needed thrust with smaller sized props. Prop size was limited due to the shallow draft requirements of the NY harbor. At 1/48th scale, the 8' draft becomes only 2". This is a significant design issue as at this scale, weight is very critical especially at the bow which has very little displacement. I soon realized that I need to make every effort to lighten anything that is positioned forward.

With the shafts in place, I chose to gang two shafts with belts and use a pair of Pittman 12v motors. They should provide plenty of power for this model. In order to make room for the rudder servo, each motor drives the outer shafts that are belt coupled to the inside shafts. This puts the motors under the deck and so mounting and alignment was all done before the deck was installed. The rudder linkage was also installed before the deck was installed while maximum access to the hull areas existed.

Next the rudders and running gear were installed and tested for proper alignment and operation... The various mounts for the battery and pumps were laid out and hull modifications completed. Once these were completed and the hull again water tight (relatively so), it was time for a bathtub test to check out weight distribution and how well it sat in the water.

With the shallow draft, it is easy to fill the bathtub with enough water to float this boat. Only two inches is needed when fully ballasted.

I loaded the hull with all the parts I planned to install and put on a cabin from another model that I felt was close to the final weight of the fireboat house. As expected, the bow was low in the water the flat bottom stern was just about right and able to take more weight. I moved the battery a far aft as I could and quickly discarded my plan for a 12V 7AH gel cell in favor of the smaller and lighter 5AH version. This raised the bow to and acceptable level and should be OK depending on the final weight distribution. My ace in the hole on this issue is to install a lipo that is available in the same form factor as the 5 AH gel cell at a reasonable cost. Hopefully this will not be necessary as I like the convenience and reliability of the gel cells and especially since I use this same gel cell in the Morgan Foss and Mustang.

Now that I know this scale will float at or near the water line, (contrary to some “expert” opinions from friends to the North”) I can rest easy and sleep better at night. After several sequences of Dupli Color automotive primer, sanding and filling and 6 months and 230 hours, I can declare the hull bottom completed and can direct my attention to the top side.

In preparation for the deck panels, I installed the rudder servo mounting between the shafts, this was fairly simple and I expect a standard servo to handle the 4 ganged rudders without any problem. I connected all the linkage and tested the rudders for proper range and symmetry.

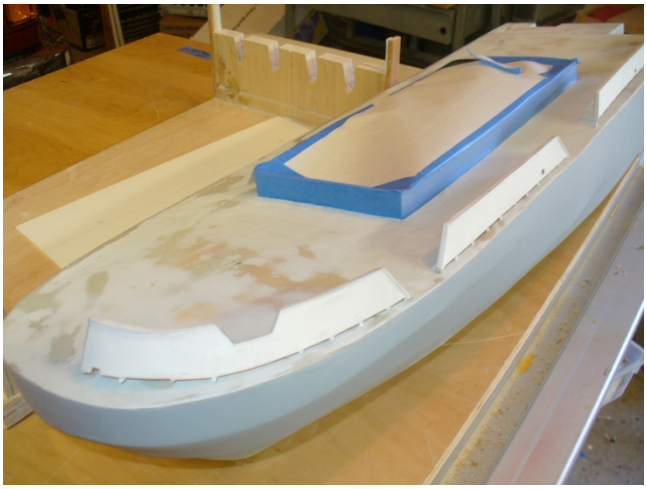
Cross bracing was added to support the deck with openings outlined for the cabin footprint and the access hatches for the rudder mechanics. I made sure the perimeter of the hull had solid wood and strong enough to hold the bulwarks and bitts firmly.

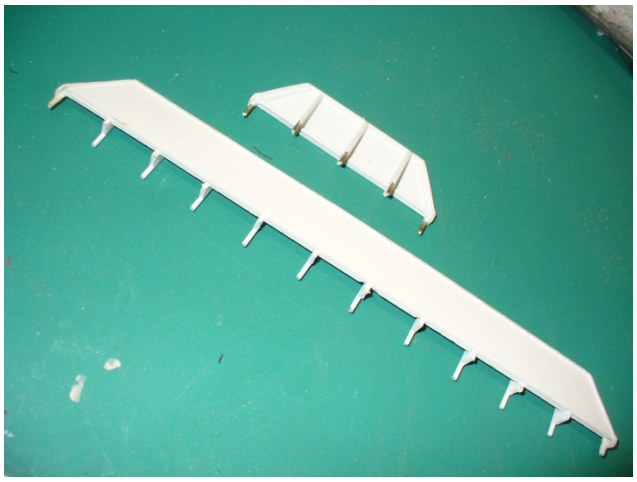
I dislike large ugly access hatches that need to be screwed down and detract from scale appearance, so I opted for two smaller hatches. One to access 3 of the rudder posts with the 4th rudder accessed from a second hatch on the rescue boat ramp. When the rescue boat is mounted, the access screws will be completely hidden. This creates tight quarters for working on the rudder. But it necessitates a more reliable design. I am a stickler for maintenance access on my boats. However, I feel there are some aspects where appearance is more important than ease of access. This is one of the design aspects that I feel only needs to be possible not necessarily easy.

A considerable time was spent building the swim step on the stern, the stairway and rescue boat ramp. I took the time to model the section of the ramp that swings down to provide access to the water by the rescue boat during launch and retrieval processes. Prior to putting the decking on, I coated the entire inside of the hull with epoxy.

Covering the deck was relatively simple process. I used a good grade of 1/8” plywood cut to fit the bow, sides and aft deck panels. I sealed the underside of the deck at the same time as I glued them to the hull frames by coating the entire deck panel with slow curing epoxy glue and then clamped them in place. The hull was inverted until the epoxy cured.

With the decking completed, I could begin building and mounting the bulwark sections. These are a little different for most workboats that have the bulwarks as an integral part of the hull. The 343 bulwarks are essentially 10 separate “fences” that are mounted around the deck perimeter. I decided to build these sections using plywood with 1/16” brass stanchions epoxied to the gussets spaced about 20mm along each bulwark section. The brass pins extend into holes drilled in the deck.





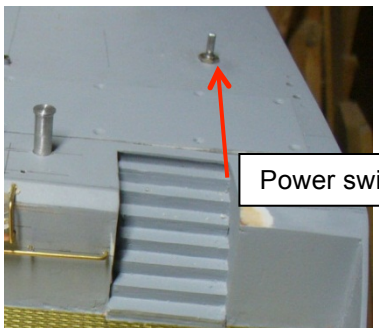
Next, came the installation of the cabin combing, bow monitor mount, and lots of filling, sanding and multiple primer coats of the entire hull.

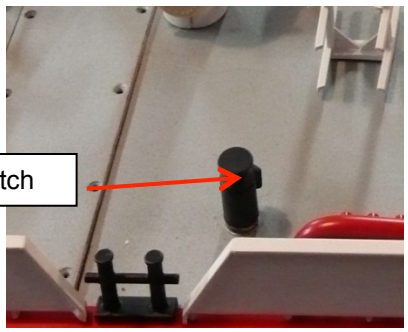
Now that the hull structure is basically completed, I could see if I can make room for all the equipment necessary to make the boat operational. I soon realized that it was going to be very full and I needed to make sure I had maximum flexibility to position as much as possible as aft as possible to keep the bow higher in the water.

I decided to make 5 monitors operational. Two aimed aft and two aimed forward and the huge monitor on the forward deck area. Monitors are fun to play with. Steerable monitors are even more fun, so I decided to make the largest monitor on the bow squirt water a scale distance of 15-20’ and swing at least 180 degrees.

In addition to the normal gear to drive and control a twin screw boat, I needed 3 pumps and control relays for each. In order to control the pumps and lights I use a MCD Switch 8. This takes a proportional channel, but offers 8 on/off functions that are great for controlling many functions. Having only 3 proportional channels, 2 ESCs, rudder, bow thruster AND the monitor steering servo meant I was one channel short.

To get around this, I get dual use of the rudder channel by using a relay to switch the rudder receiver channel from the rudder servo to the monitor steering servo when the water pump is turned on for the bow monitor. Each of the water pumps are controlled by a Switch 8 channel. My rudder doesn’t work when the monitor is on, but I usually am not moving when I fire this monitor anyway. (Can’t chew gum and walk either)





Design of the electrical system layout, starts with selecting a convenient location for a hidden external power switch. I usually find a hatch or deck fitting to serve as a knob or control to a main power switch to avoid having to remove the cabin to turn things on or off. In this model, I chose to make a capstan on the aft deck as a knob for a small switch under the deck. This small switch controls a 30 amp automotive relay to switch the main battery power. Next comes the design and building of the control sytems to make everything work. So far 7 months have passed and I have spent 300 hrs on this project