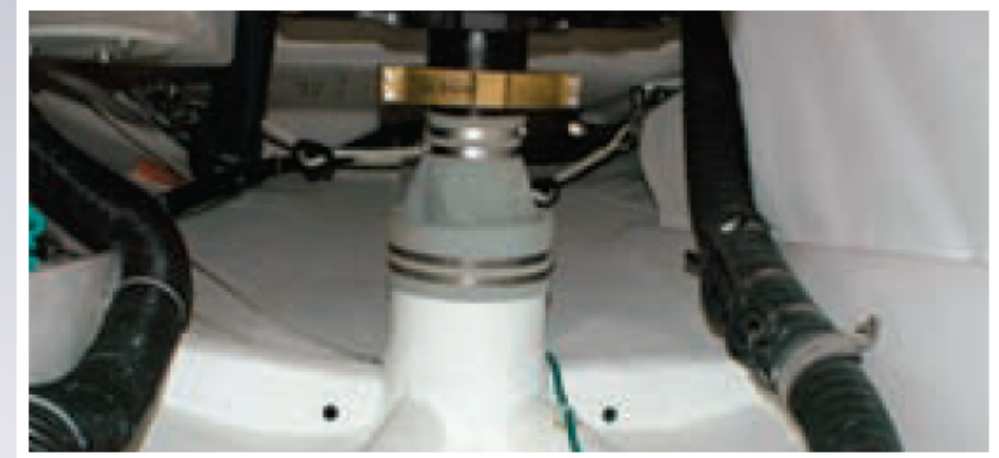




*The plug is polished before being used to make the mold (above). A rugged weldment reinforces the mast partners (top right). Rudder bearing loads (right) are transferred via a star-shaped grid.*



## U.S. Navy Contract Emphasizes Structural Integrity

**M**any builders of recreational vessels ignore or only partially comply with standards set by the American Boat and Yacht Council, International Sailing Federation, the American Bureau of Shipping and others. The build specification for the NA44 MkII sloop called for mandatory compliance to these and other important guidelines.

**HULL and DECK:** The hull layup thickens from the sheer to the garboard, and 1-inch thick, 6-pound density ATC corecell is used in the sandwich structure portion of the boat. The foam core is cut back in high-stress areas, including the centerline of the vessel, the hull-to-deck joint, and at the chainplates, rudder stock, and winch bases. There's no chop strand mat. Alternating layers of woven roving and stitched E glass were bonded using the Scrimp infusion process.

In this approach, the gelcoat is sprayed onto the female mold, and when this outer layer is cured, dry outer skin laminate, core material and the inner skin are layered in the mold. A plastic cover or "bag" is used to form a seal over the dry laminate, and a vacuum draws resin through a network of tubing into the dry, porous laminate. This combination of suction and vacuum clamping dramatically reduces voids, yielding a higher fiber-to-resin ratio than can be achieved by hand layup.

The contract did not permit pigment in the hull gelcoat, allowing quality control inspectors to see any voids in the outer hull surface which is laid up next to the mold, and is the hardest area for resin to reach. Once inspected, the topsides were sprayed with Flag Blue Awlgrip. Void elimination and strict control of resin/fiber ratios was priority for the project.

**HULL-DECK JOINT:** The hull-to-deck joint features a traditional inward-turning hull flange overlapped by the deck element itself. The core is removed in both regions, and the joint is made with 3M 5200 and mechanical fasteners. A heavy-duty extruded alloy toerail and a tough elastomer rub strake are also part of the sheer, helping protect the area from impacts.

The chainplates were one of the departures from the keep-it-simple theme of the boat. Their design called for a flawless bond between a carbon-fiber chainplate and a sizable section of hull and deck. The core in this area is removed, and the inner and outer skins are joined. The secondary bonding that attaches the carbon-fiber chainplate to the hull and deck requires careful execution.

**SPARS AND RIGGING:** The aluminum alloy box-section spar is keel-stepped. The rigging is stainless-steel rod. Lightning strikes are an issue on the Chesapeake Bay, the NA44's stomping grounds. In order to cope with the conductivity issue that the carbon chainplates raise, a special lug was designed to connect the ground system directly to the standing rigging.

**KEEL/RUDDER:** The keel has a stainless steel armature and enough pairs of keel bolts to exceed ABS guidelines. The lead foil with anvil-shaped bulb attaches to a rugged keel stub. The semi balanced spade rudder is supported by a custom carbon fiber stock and foam/FRP blade that's heavily reinforced and engineered to withstand sailing loads and then some. A rugged self aligning Jefa bearing system and an Edson rotary quadrant with a conventional wire cable drive gives both direct feedback and smooth steering in all conditions.