

Molding process builds a better sailboat

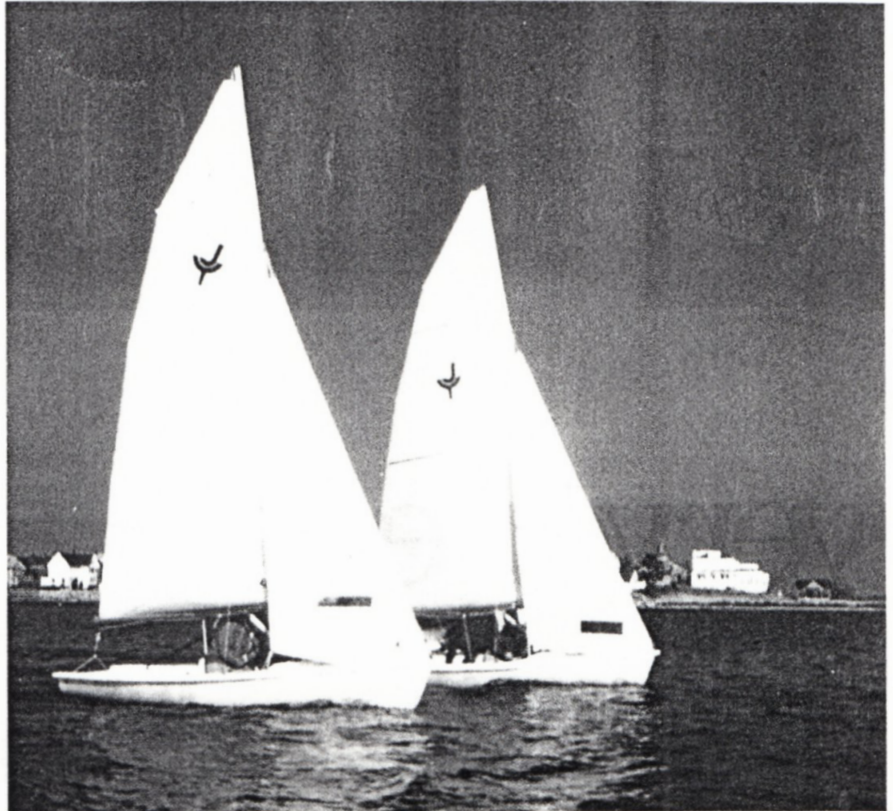
Stonington, CT—Using a new molding process, Johnstone Yachts, Inc. has developed a 15-ft-long sailboat that weighs about 20% less than similar all-fiberglass craft. The company also claims that the JY 15 sailing dinghy holds up better against impacts, abrasion, and the marine environment.

Much of the craft's increased durability results from the use of a special, triple-laminated sheet material for the composite's thermoplastic outer skin. The material, developed with the assistance of The Dow Chemical Co., Midland, MI, measures about $\frac{1}{10}$ -inch-thick and is in the form of an acrylic film-covered coextruded sheet. The other key lies with the molding process developed by Advance U.S.A., East Haddam, CT.

The sheet combines an upper layer of Dow's Rovel® weatherable resin with a lower layer of Dow's Magnum® ABS resin. The Rovel layer provides an extremely tough outer surface that not only weathers well but resists deterioration by the sun's ultraviolet rays. The ABS layer gives high impact and flexural strength at low cost.

A thin acrylic Korad® film on the outer surface, supplied by Polymer Extruded Products, Newark, NJ, provides a high gloss finish similar to that obtained with gel coats used in fiberglass construction. Laminated to the surface, it has proved tougher and more resistant to abrasion and weathering than gel coats.

The vacuum formed panel made from this laminate bears against one side of the mold used for the RIM production of the foam core. Pressure and temperature generated by the reaction between the injected liquids causes the foam core to firmly bond to the ABS lower layer.



Molding process makes possible the production of this light, durable, easy-to-handle 15-ft sailboat.

The foam core adds structural integrity to the two load bearing skins, while spacing them at a distance increases stiffness and flexural strength. The core deforms to absorb energy of high impact loads. It ranges from $\frac{3}{4}$ to 10 inches in thickness.

The polyester inner skin molded to the back of the foam core measures about $\frac{1}{10}$ -inch-thick and is reinforced by the addition of continuous strand and biaxial mat fiberglass. The placement, type, and amount of these materials permit selective, localized reinforcement of the the high stress areas. Some components also have separately molded polyester parts added as inserts in critical areas.

During the RIM process, these reinforcements, inserts, and the back surface of the foam core are wetted and securely bonded by the polyester. The process takes place

in the same composite die tooling as the RIM molding process. Placing the fiberglass and inserts in the mold at the same time as the outer skin reduces tooling costs and speeds production.

The three hull and deck components are assembled using an MMA adhesive. This chemically welds the components and other molded plastic parts into a solid, one-piece structure. The only fasteners used secure the centerboard, rudder, and a few fittings.

Michael O'Neill, president of Advance U.S.A., says the process has potential beyond the moderate load requirements of the small boat industry—trucks and recreational vehicles, drone aircraft, shipping containers, and buildings. He hopes to become involved in these areas through licensing agreements with OEMs and plastic molders. □

—E.J. Stefanides, Central States Editor