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BOATBUILDER

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The magazine for those working in design, construction, and repair

NUMBER 152
DECEMBER/JANUARY
2015
\$5.95 U.S.

CHESAPEAKE LIGHT CRAFT
WATER SYSTEMS, PART 1
ARMSTRONG MARINE
SYSTEMS ERRORS

FEATURES

24 Easy Pieces

by Steven Callaban

With roughly 2,000 boat kits sold annually, and double that in plans, Chesapeake Light Craft (CLC) is likely the largest kit-boat producer in the world.

36 The Strong Stuff

by Dan Spurr

Armstrong Marine, in Port Angeles, Washington, is muscling its way into the global aluminum-workboat market.

48 Fresh, Clean, and Clear: Potable-Water Systems, Part 1

by Steve D'Antonio

Materials, design, and installation of plumbing, pumps, and filters for onboard freshwater systems.

58 Common Systems-Installation Errors

by Ed Sherman

Look out for poor workmanship and noncompliance with American and international standards that can pose safety hazards—even on newly built boats.

DEPARTMENTS

4 Letters

Readers comment on Alan Gurney's *Nepenthe* and *Windward Passage*; marketability of semi-planing powerboats; and crediting the builders of Oracle's lifting foils.

6 Rovings

compiled by Dan Spurr

Jim Betts resurrects a victim of bad alloy; joystick controls for sailboats; Westlawn at risk of closure; and J/70 production surpasses 500 hulls.

16 Design Brief

by Dudley Dix

The Didi 950 is a water-ballasted plywood raceboat designed to the Class 950 Rule, and built from a CNC-cut kit.

80 Parting Shot

by Jeffrey Bowles

A naval architect cautions against the rush to marine hybrid-propulsion options.

READER SERVICES

68 New Products from IBEX

73 Connections

77 Classified Advertising

79 Index to Advertisers

On the cover: Chesapeake Light Craft production manager Aaron McWain cuts scarf joints on spar stock for sailboat kits in the Maryland company's busy mill shop. Complete kits designed for simplicity of assembly have made CLC one of the most successful suppliers of kit boats in the world. Story on page 24.

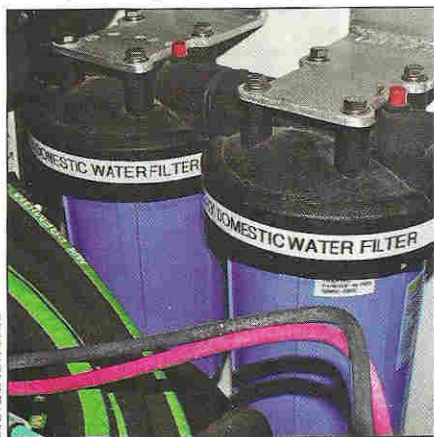
Photograph courtesy Chesapeake Light Craft.

COURTESY CHESAPEAKE LIGHT CRAFT



Chesapeake Light Craft. Page 24.

STEVE D'ANTONIO



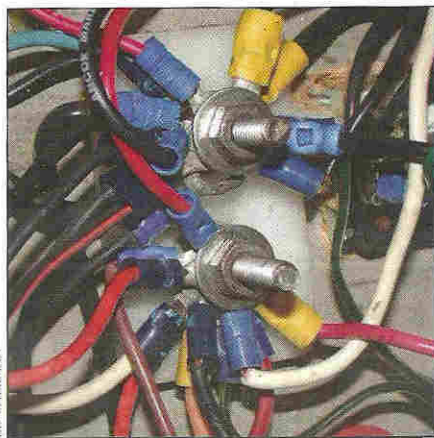
Potable-water systems. Page 48.

COURTESY ARMSTRONG MARINE



Workboats of Armstrong Marine. Page 36.

ED SHERMAN



Systems mistakes. Page 58.

IBEX
Issue

25th ANNIVERSARY!

B • PROFESSIONAL • BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 151
OCTOBER/NOVEMBER
2014
\$5.95 U.S.

TOOLING SPECIALISTS
FLEMING YACHTS
ALAN GURNEY
FOIL DESIGN

FEATURES

24 Passage Maker

by Ted Jones

Best known for drawing the iconic ocean racer *Windward Passage*, Alan P. Gurney, who died in 2012, designed numerous able offshore and coastal racing and cruising boats before he quit yacht design in the early 1970s for a second career studying polar exploration.

52 H/G-H Pilot Boats, Part 2

by Paul Lazarus

Gladding-Hearn Shipbuilding in Somerset, Massachusetts, owned and operated by the Duclos family, has built hundreds of custom and semi-custom steel and aluminum small craft and small ships since the yard's startup in 1955—including more pilot boats than any builder in the country.

68 What a Concept!

by Rob Mazza

Specializing in everything from plugs to production molds for 38 years, Florida-based Marine Concepts has spurred its recent growth by offering one-stop shopping for new-product development.

82 Order of Assembly

by John Kecsmar

To prevent distortion in aluminum hull structures, it's essential to weld the pieces in the correct sequence. But determining that sequence for any given hull requires time, planning, and experience.

96 Fleming: An Asian Pacific Venture

by Steve D'Antonio

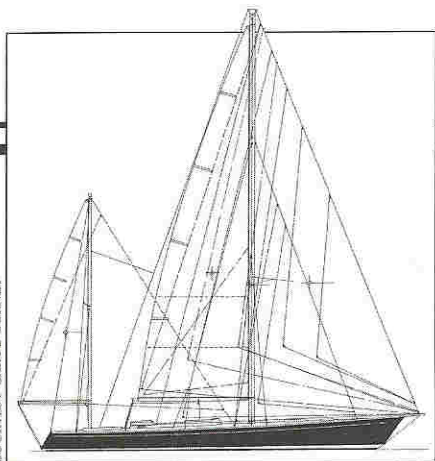
Tony Fleming has made a career of building boats in the Far East—starting at American Marine in Hong Kong in 1962 and launching the first of his Taiwanese-built Fleming yachts in 1986.

110 Flight Plans

by Steve Killing

The introduction and refinement of foils presents intriguing design challenges for the C-Class catamaran teams competing for the "Little Cup."

COURTESY CAROL GURNEY



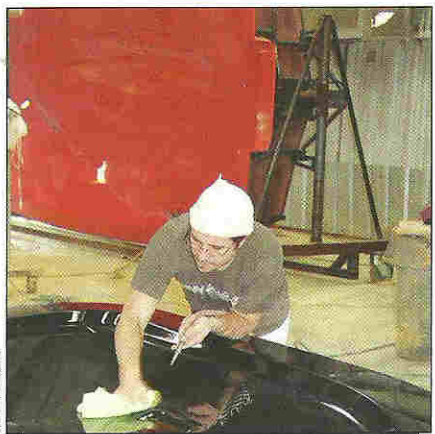
Designs of Alan Gurney. Page 24.

STEVE D'ANTONIO



Pilot boats in action. Page 52.

ROB MAZZA



Tooling production. Page 68.

JOHN KECSMAR



Aluminum build sequencing. Page 82.

DEPARTMENTS

6 Letters

Readers comment on matching engines to large props; propeller efficiency; employing experts to avoid build disasters; and more Fairey Marine history.

12 Rovings

compiled by Dan Spurr

Scott Jutson designs; Edensaw at 30; fixing a Fuji rudder; Aureus Yachts; Nest Protect smoke and CO detectors; thread-size calculator for your smartphone; and a raw-water strainer for tight places.

44 Design Brief

by Steven Weiss

The evolution of lobsterboat hullforms makes a case for the semi-planing cruising powerboat and informs the development of the Neo 41 design.

128 Parting Shot

by Steve D'Antonio

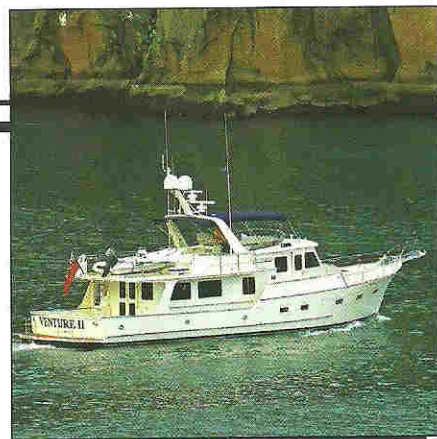
Our technical editor advocates a modern diesel outboard.

READER SERVICES

120 Connections

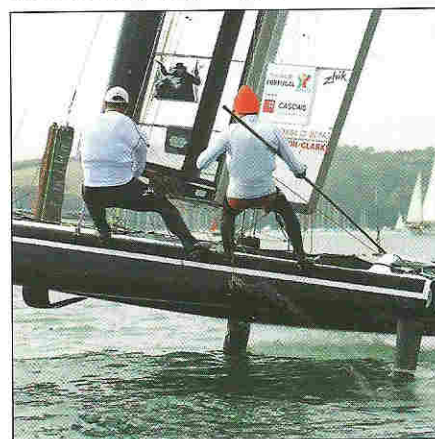
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STEVIE D'ANTONIO

The Fleming story. Page 96.



STEVE KILLING

Advances in foil design. Page 110.



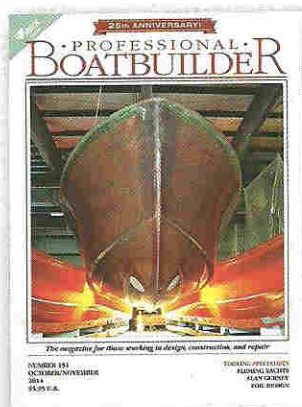
COURTESY SCOTT JUTSON

Scott Jutson powercats. Page 12.



STEVEN WEISS

A semi-planing cruiser. Page 44.



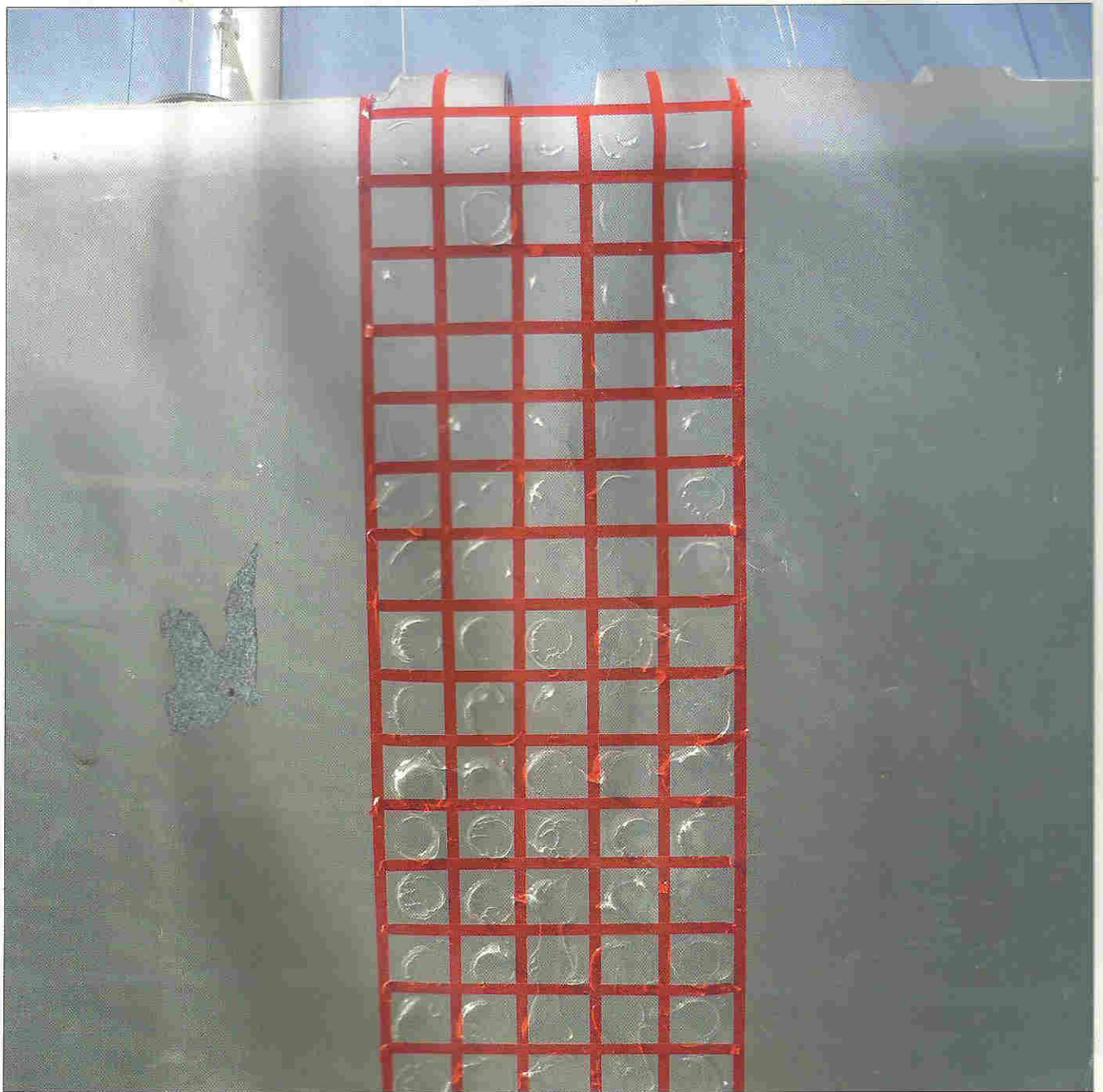
On the cover: Building high-quality tooling to tight specs for some of the best-known manufacturers of composite boats has been the core business for Florida-based Marine Concepts since 1976. As boatbuilding technologies have evolved, so have the demands on this mold builder, which has expanded facilities and hired and trained staff to meet the changing needs of clients. Here, an infused Hinckley T34 (10.4m) hull just sprung from a robustly built Marine Concepts mold hangs between its halves. Story on page 68.

Photo courtesy Marine Concepts and The Hinckley Company

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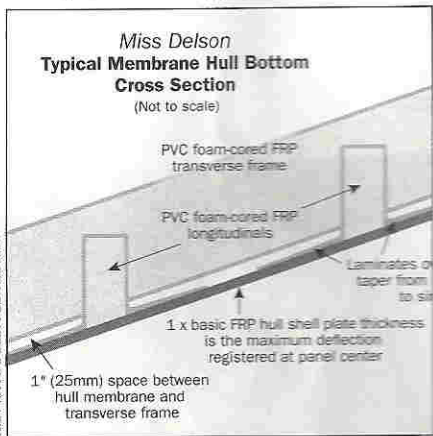
The magazine for those working in design, construction, and repair

NUMBER 150
AUGUST/SEPTEMBER
2014
\$5.95 U.S.

ULTRASONIC TESTING
MEMBRANE CONCEPT
PILOT BOATS, PART 1
LARGE PROPS



Hunt pilot boats. Page 34.



An early membrane hull. Page 22.



The case for large props. Page 50.



Ultrasonic flaw detection. Page 60.

FEATURES

22 The Membrane Concept

by Ken Raybould

In 1970, a team of composites specialists worked with Fabmat to develop a membrane skin with predicted deflection on a 36' (11m) powerboat.

26 Are Your Dealers Franchisees?

by Benjamin Ford

Boatbuilders who terminate or alter dealer agreements may run afoul of franchise statutes, which differ from state to state.

34 H/G-H Pilot Boats, Part 1

by Paul Lazarus

Pilot boats produced by a design/build venture begun in the late 1970s between two venerable Massachusetts firms—C. Raymond Hunt Associates, and Gladding-Hearn Shipbuilding—now dominate the U.S. fleet.

50 Praise for Big Props

by Nigel Calder

In reevaluating the relationship between propeller size and horsepower of conventional marine diesels powering displacement hulls, for efficiency, go with the large prop.

60 The ABC's of UT

by Roby Scalvini

If you can invest in just one advanced non-destructive testing technology, it should be ultrasonic.

DEPARTMENTS

4 Letters

Readers comment on sailboats from Fairey Marine; alternative lithium-ion batteries; Hinckley's rudder plugs; identifying Hobie Alter; *Black Cat's* fire extinguisher count; and the lack of Gulf Coast coverage.

10 Rovings

compiled by Dan Spurr

Glen-L Marine; a new model from Robert Perry and Pacific Seacraft; highlights from the High Speed Boat Operations Forum; a retractable sunroof from Webasto; and concealing valuables afloat.

72 Tools of the Trade

by Dan Spurr, Steve D'Antonio, and Aaron Porter

Tools, techniques, and ideas that grabbed our editors' attention and imagination at professional shows and conferences in the past year.

88 Parting Shot

by Erik Seither

Recent regulatory changes and on-the-water failures have driven home the need for boat designers to brush up on stability calculations.

READER SERVICES

80 New Products and Processes

81 Connections

85 Classified Advertising

87 Index to Advertisers

On the cover: Ultrasonic-testing a composite hull in way of the integral chainplates can reveal potentially catastrophic delamination and bond failures without cutting into the structure or finish. Shown here are a taped-on test grid and some residual couplant—medical-grade ultrasonic gel that helps propagate sound waves. Story on page 60.

Photograph by Roby Scalvini.

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NUMBER 149
JUNE/JULY
2014
\$5.95 U.S.

SLAMMING STANDARDS
CAPSIZE: LESSONS LEARNED
DAVID JONES & ASSOCIATES
THE PROMISE OF LITHIUM ION

FEATURES

20 Capsize!

by Dudley Dix

The designer, builder, and skipper of the Didi 38 (37'9"/11.5m) *Black Cat* recounts the boat's capsize, early in the 2014 Cape to Rio Race, and the lessons he learned.

34 In the Buffer Zone

by Nigel Calder

Lithium-ion batteries offer the promise of more efficient and ultimately cheaper onboard energy and electric-propulsion systems, but with risks.

48 Slamming Standards

by Johan Ullman

Research and debate thrive in the quest for strategies to accurately measure slamming impacts in high-speed boats and for practical rules to keep boaters safe.

56 DJ&A

by Paul Lazarus

Engineer and consultant David Jones has been our go-to guy for advice about marine composites—from basic to exotic—since the earliest days of this magazine.

68 Direction Assembled

by Jean-Yves Poirier

A close look at the steps of manufacturing a modern plastic compass at Plastimo in France.

DEPARTMENTS

4 Letters

Readers' comment on wiring bilge pumps; T-values; not applying Savitsky to low-aspect-ratio planing surfaces; and praise for the Third Edition of *Principles of Yacht Design*.

10 Rovings

compiled by Dan Spurr

A 1981 Riva Offshorer reborn; remembering Paul Coble and Hobie Alter; oil analysis by Volvo Penta; readymade seacock backing plates; jet thrusters; *PlanetSolar*; and new models from Carolina Skiff.

84 Parting Shot

by Neal Harrell

As the boatbuilding industry rebounds, competition for the best industry talent heats up. Employers must have a plan to attract and to keep good employees.

READER SERVICES

76 New Products and Processes

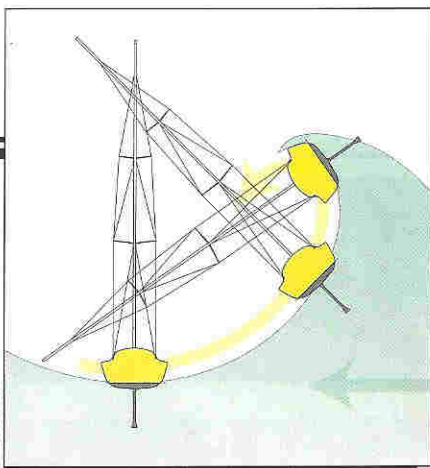
77 Connections

81 Classified Advertising

83 Index to Advertisers

On the cover: The new NH 1816 class rescue boat (63.3'/19.3m) built by Damen Shipyards (Gorinchem, The Netherlands) for the Dutch sea rescue organization KNRM buries its bow in rough seas during sea trials. Increasingly, boats intended for extreme offshore service are designed to minimize the risk of slamming impact injuries to operators and passengers. Story on page 48.

Photograph by Herman IJsseling, www.flyingfocus.nl.



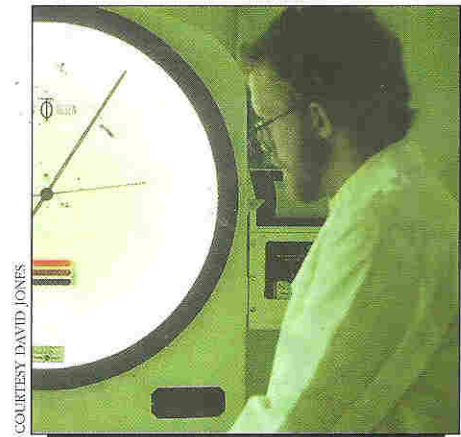
DUDLEY DIX

Lessons from a capsize. Page 20.



COURTESY HNSBO

Measuring slam impacts. Page 48.



COURTESY DAVID JONES

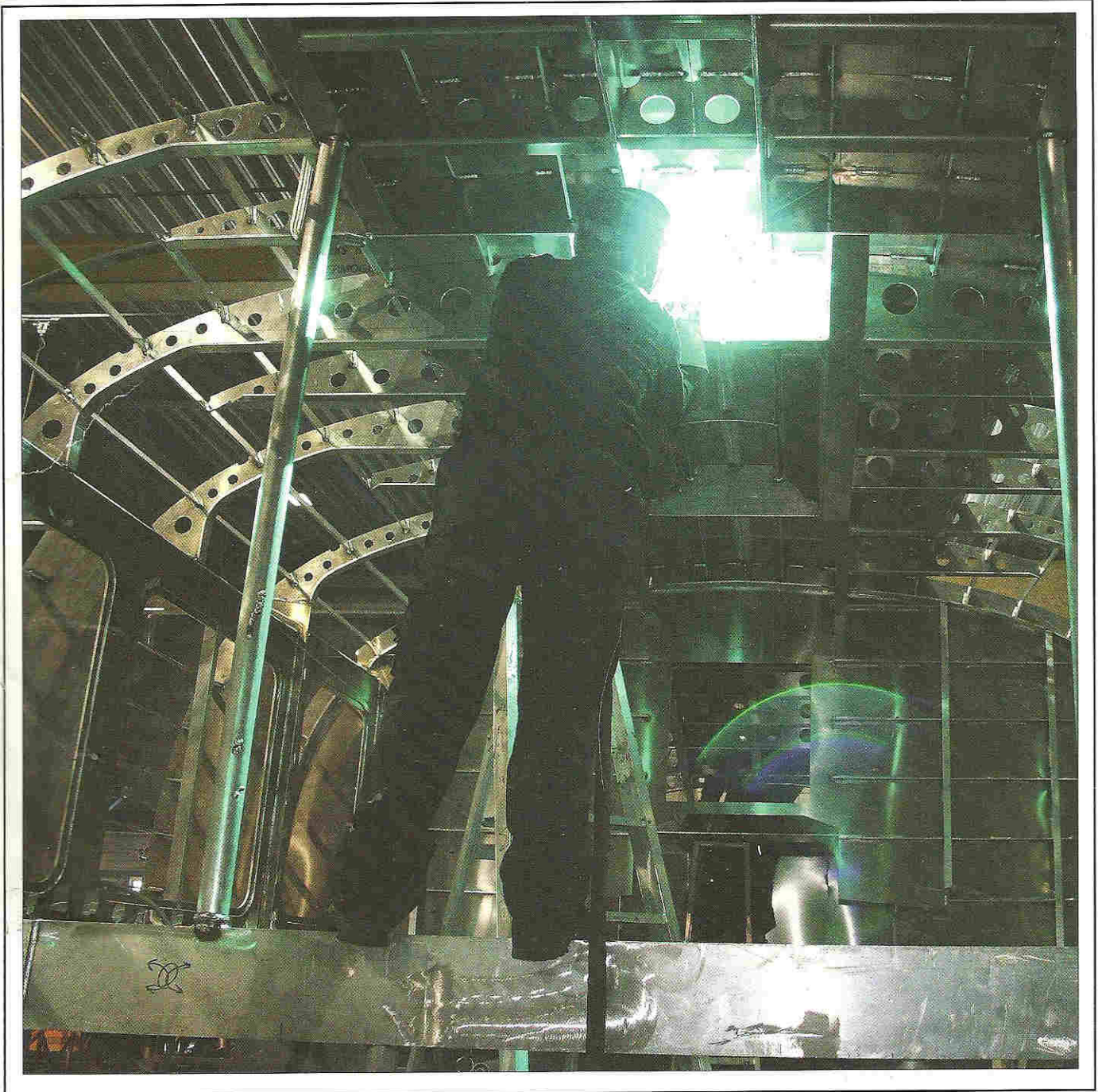
David Jones engineering. Page 56.



JEAN-YVES POIRIER

Compass manufacturing. Page 68.

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NUMBER 148
APRIL/MAY
2014
\$5.95 U.S.

CNC-CUT METAL KITS
CUSTOMER SERVICE REPS
TWO COMPOSITES TEST LABS
ONBOARD POWER EVOLUTION



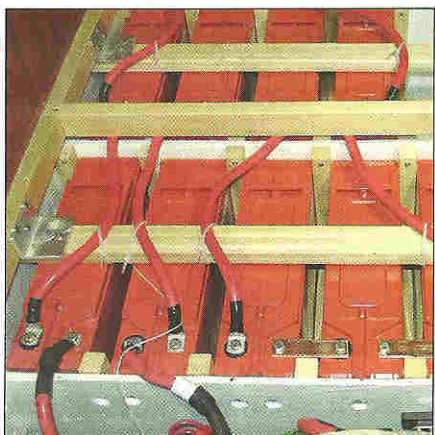
Lab-testing advanced composites. Page 26.



Investing in customer service. Page 38.



CNC-cut metal kits. Page 46.



Emerging battery technologies. Page 58.

FEATURES

- 26 Two Labs** *by Paul Lazarus*
Markedly different engineering labs do R&D in advanced composites and structures for prototype U.S. Navy high-speed combatant craft. The objectives are weight reduction, enhanced performance, damage tolerance, and shock mitigation.
- 38 The Case for the Customer Service Rep** *by John Fitzgerald*
Even when a small service yard grows up it's possible to maintain a personal touch, good customer relations, and shop-floor efficiency.
- 46 Tab A Into Slot B** *by Hans Buitelaar*
Precisely engineered CNC-cut metal kits simplify custom and production projects at aluminum sailing-yacht builder K&M and steel-motoryacht builder Jetten, both in The Netherlands.
- 58 Taking Charge** *by Nigel Calder*
Until now, batteries have been the limiting factor in all shipboard electrical systems. Emerging technologies can deliver radically more efficient energy systems, with a much lower cost of energy, than ever before.

DEPARTMENTS

- 4 Letters**
Readers comment on correct float-switch installation; a bilge pump wiring relay; apologies and corrections; deflecting or absorbing shock loads; and alloy choices and corrosion risk in stainless steel.
- 10 Rovings** *compiled by Dan Spurr*
Haber Yachts' models; composites training at North Idaho College; *Principles of Yacht Design*, fourth edition; Carderock's upgraded test tank; 2014 Chesapeake Powerboat Symposium; Dustless Blasting; and eight bells, Warren Luhrs, Guy Couch, Mack Maloney, and Jack Hornor.
- 18 Design Brief** *by John Brooks*
A plywood/epoxy-built sailing dinghy is refined for CNC-cut kit production and affordable amateur or professional construction.
- 80 Parting Shot** *by Carl Cramer*
A thoughtful look back and fond farewell from the founding publisher of *Professional BoatBuilder*.

READER SERVICES

- 72 New Products and Processes**
- 73 Connections**
- 77 Classified Advertising**
- 79 Index to Advertisers**

On the cover: A welder joins aluminum skin plating to the hull frame of a Gerard Dykstra-designed Bestevaer 53 (16.2m) at K&M Yachtbuilders (Makkum, The Netherlands). The stringers, transverse frames, and sections of hull plating were all precision engineered, and CNC-cut off-site by a subcontractor. Story on page 46.
Photograph by Hans Buitelaar.

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The magazine for those working in design, construction, and repair

NUMBER 147
FEBRUARY/MARCH
2014
\$5.95 U.S.

USWATERCRAFT
ELECTRIC BILGE PUMPS
FAIREY MARINE EVOLUTION
CHANGEABILITY OF ALUMINUM

FEATURES

24 Altered Properties

by John Kecsmar

Understanding how the structural characteristics of aluminum alloys change during the bending and welding of construction is essential for boat designers and builders.

38 On Hallowed Ground

by Dan Spurr

USWatercraft is assembling a diverse group of brands on an existing solid foundation of former Rhode Island boatbuilders, particularly the Pearson family's companies.

48 Plumbing the Depths

by Steve D'Antonio

Design, installation, and maintenance of electric bilge pump systems debunked and done right.

64 Fairey Marine

by Charles Lawrence

A warplane builder on the coast of Britain transitioned to hot-molding wood racing dinghies in the late 1940s, legendary deep-V powerboats in the late '50s, and by the early '70s to producing fiberglass boats.

DEPARTMENTS

6 Letters

Readers comment on applying the Savitsky method to the long and narrow; flaws in a wet-wiring article; backing down during sea trials; and more advantages of adhesive fasteners.

10 Rovings

compiled by Dan Spurr

The Greenline 33 Hybrid; Bruckmann's new Abaco 40; Venture Offshore Cup open to workboats; Camarc design of Scotland; a new Dutch trihull, not trimaran; spray-on sound damping; and a get-home hydraulic drive.

18 Design Brief

by Albert Abma

A Study in Slender: A Dutch designer applies the theory of low-displacement/length (LDL) powerboat hullforms to create the seakindly, fuel-efficient Ned 70 (21.5m).

80 Parting Shot

by Steve D'Antonio

The right words of apology can calm the angriest customer but only when delivered with sincerity and followed with action.

READER SERVICES

73 Connections

77 Classified Advertising

79 Index to Advertisers

On the cover: This newly tooled North Rip 29 (8.8m) model was developed by USWatercraft after the company bought the North Rip brand and its solitary 21' (6.4m) center-console sportfisherman. To be introduced at shows in 2014, the 29-footer maintains an aesthetic with pronounced flare and powder horn sheer. Story on page 38.

Photograph by Dan Spurr.



MADE REPORT

Risks of work-altered aluminum. Page 24.



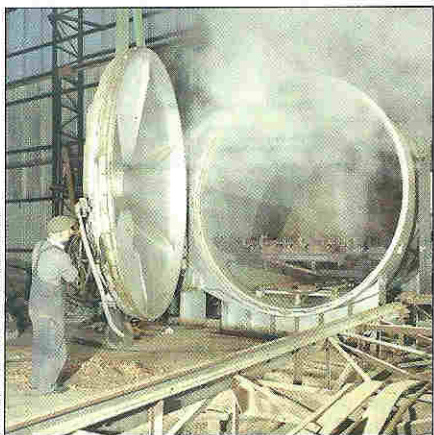
DAN SPURR

Diverse offerings at USWatercraft. Page 38.



STEVE D'ANTONIO

Bilge pump best practices. Page 48.



FAIREY OWNERS' CLUB ARCHIVES

Production at Fairey Marine. Page 64.

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The magazine for those working in design, construction, and repair

NUMBER 134
DECEMBER/JANUARY
2012
\$5.95 U.S.

ZF
OBJECT 2
FABIO BUZZI (PART 2)
COMMON ELECTRICAL ERRORS

FEATURES

18 In Gear

by Steve D'Antonio

A tradition of precision manufacturing that started in 1915 with Zeppelin Transmissions continues in ZF Marine's development of new drive systems, joystick controls, and hybrid propulsion.

32 Ingenere

by Paul Lazarus

In this second of two parts on FB Design, the Italian performance-powerboat yard run by racing legend Fabio Buzzi, we look at some innovative products from the firm's research and development program.

42 Object Lessons

by Rob Mazza

Toronto-based Object 2 Skiffworks excels in the competitive worlds of International 14 dinghy and C-class catamaran design and construction, where every fiber counts.

54 Finding Faults

by Nigel Calder

How to eliminate the most common errors when installing or repairing electrical systems on board.

DEPARTMENTS

4 Letters, Etc.

A reader comments on Forest Johnson and his Prowler boats.

6 Rovings

compiled by Dan Spurr

A new steam engine; kite assist for a motor cruiser; Salish Sea IS48; affordable wastewater treatment for service yards; Fast Displacement Hull Form; boat recycling revisited; and Dave Martin's book.

62 Wood to Glass

by Dan Spurr

The biggest changes in modern boatbuilding occurred between the years 1940 and 1970. *Professional BoatBuilder*, in partnership with several museums, announces an exhibition of pioneering designers and builders of fiberglass boats.

80 Parting Shot

by Ed Sherman

The American Boat & Yacht Council's director of education warns about the inflexibility of some standards-writing organizations and champions changes to electrical standards that would make a promising new shore-power-cord technology compliant.

READER SERVICES

72 New Products from IBEX

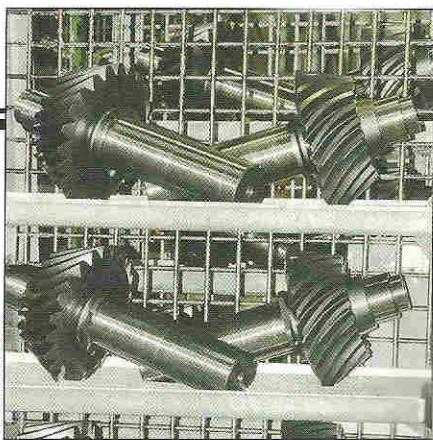
70 Services

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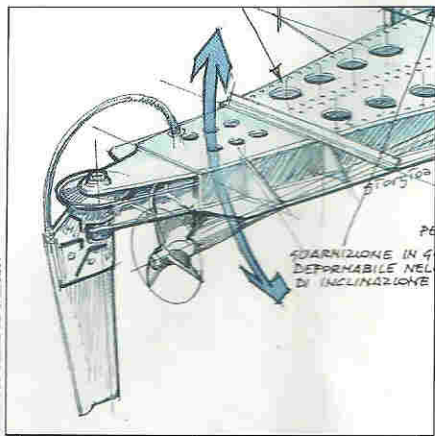
On the cover: Detail of a spiral bevel gear CNC-machined at ZF Marine's factory in Padua, Italy. ZF began by manufacturing transmissions, but its marine division now also offers everything from gears to networked electronic steering, shifting, and throttles. Story on page 18.

Photograph by Steve D'Antonio.



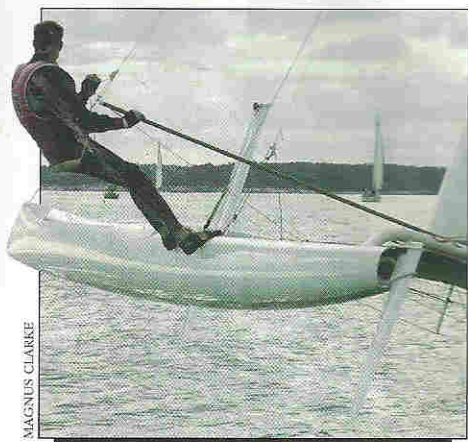
STEVE D'ANTONIO

Marine propulsion at ZF. Page 18.



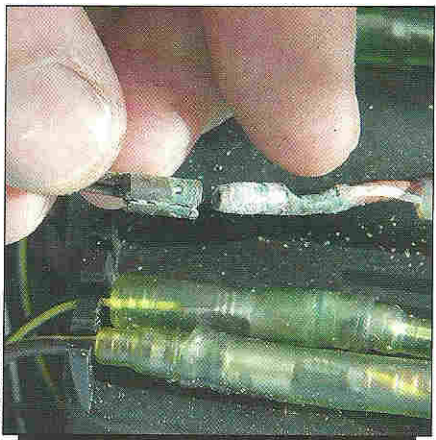
GIORGIO ALISI/FB DESIGN

Engineering from FB Design. Page 32.



MAGNUS CLARKE

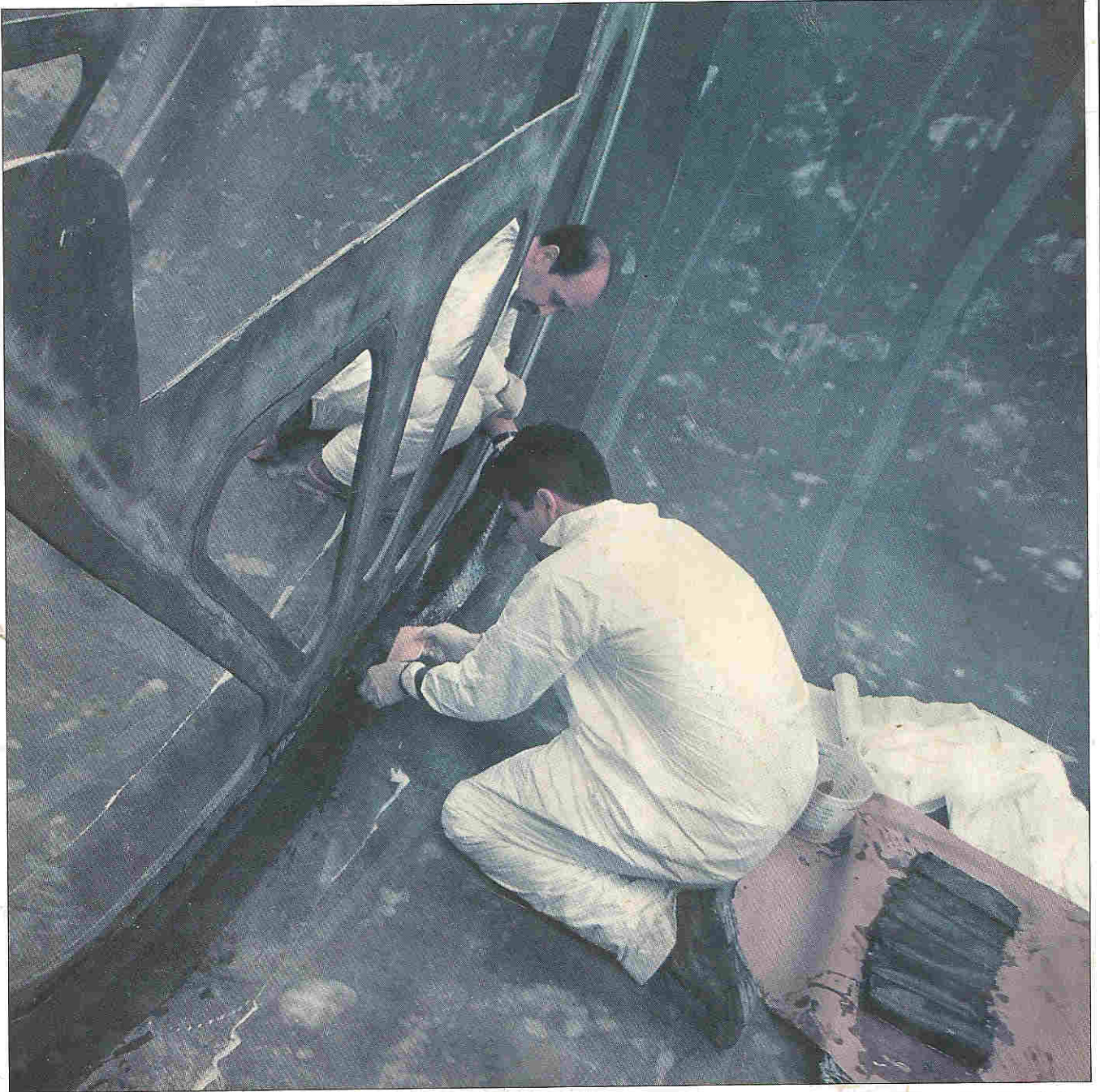
Object 2 Skiffworks. Page 42.



NIGEL CALDER

Electrical done wrong. Page 54.

• PROFESSIONAL • BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 58
APRIL/MAY
1999
\$5.95

THE NEAR FUTURE OF MARINE COMPOSITES
FUNDAMENTALS OF RESISTANCE
BUILDING STRAKES, STEPS, AND CHINES
BILL MUNSON'S STORY



DUDLEY DAWSON

Examining hull resistance. Page 26.



NSWC/CARDEROCK DIVISION

Carderock's composites lab. Page 36.



ROB MAZZA

Applying polyester putties. Page 54.



COURTESY JIM CAUDILL

Munson aluminum boats. Page 66.

FEATURES

- 26 Fundamentals of Resistance** *by Dudley Dawson*
There are many opportunities to mess things up in boat design and construction, but one area in particular is especially prone to problems.
- 36 The Near Future of Marine Composites** *by Paul Lazarus*
Technical experts Tom Juska and David Cripps discuss materials and methods that promise to change the way the industry will be building composite boats.
- 54 Pumpable Polyester Bonding Putties** *by Robert Mazza*
Putties have come a long way since the early days of fiberglass boat building.
- 66 Bill Munson's Story** *by Brooks Townes*
The rise and fall and rise again of a modern boatbuilding legend. Munson Manufacturing was ten years ahead of its time. And then the venture capitalists took over.
- 79 Building Strakes, Steps, and Chines** *by Bruce Pfund*
Hard edges, high loads, and core and laminate transitions make these areas a challenge to design and lay up.

DEPARTMENTS

- 6 Letters, Etc.**
Readers comment on tank testing, and on design and construction with Kevlar.
- 13 Rovings** *by Brooks Townes*
Building *Titanic* (the special-effects models); recent work at the Vitters yard; a mega-cat from the board of Morrelli & Melvin; the relationship of blimps to boats; and more.
- 104 Parting Shot** *by Arthur Wolfe*
The director of a leading test lab wishes some of his customers would learn more about composites.

READER SERVICES

- 96 Advertisers' Index and Reader-Service Card**
- 98 Classified Advertising**

On the cover: Members of the crew at New England Boatworks (Middletown, Rhode Island) work on a Nelson/Marek-designed 47' IMS boat built with SP carbon fiber pre-pregs and AirLite PVC foam core. Story ("The Near Future of Marine Composites") on page 36. *Photograph by Billy Black.*

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ISSUE!

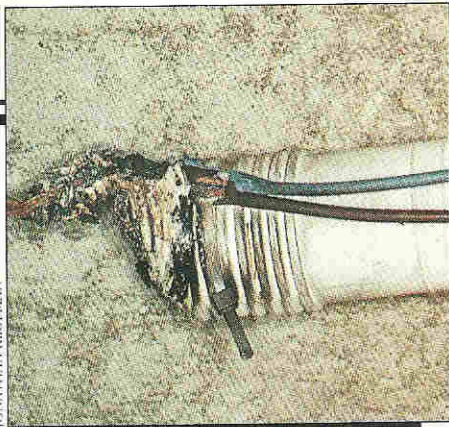
•PROFESSIONAL• BOATBUILDER



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NUMBER 57
FEBRUARY/MARCH
1999
\$5.95

MAKING OF A PASSAGEMAKER
THE RISKY BUSINESS OF MAJOR REPAIRS
BILGE PUMP INSTALLATIONS
“GALVANIC” BLISTERING IN CARBON COMPOSITES



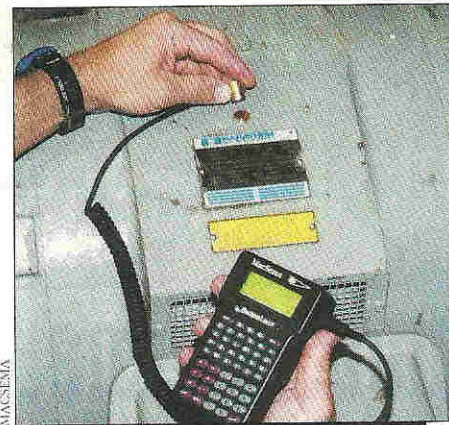
JONATHAN KLOPMAN

Wiring bilge pumps. Page 48.



SLANE MARINE

Repairing, restoring, and remodeling. Page 74.



MACREMA

Storing equipment-service records. Page 88.



NEIL RABINOWITZ

Building long-range cruisers. Page 123.

FEATURES

30 "Galvanic" Blisters in Carbon Fiber Composites

by Wayne Tucker with Richard Brown

What is this newly discovered phenomenon, and what does it mean for boatbuilders working with carbon fiber?

41 Another Look at Flotation Foams *by Richard Zemonek and Gary Larimer*

A testing program jointly sponsored by the USCG and UL turns up some new information on water absorption—and raises more questions.

48 Bilge Pump Installations *by Nigel Calder*

We take a close look at pump types, realistic flow rates, switch options, and other important design and installation issues.

74 The Risky Business of Major Repairs *by Bob Duke*

Slane Marine specializes in rebuilding FRP sportfishermen, among other projects. Here's how this shop monitors and controls costs.

88 Aircraft and Aerospace Technology in the Boatshop *by Bruce Pfund*

Boatbuilding often benefits from a trickle-down effect in terms of methods and materials that originate in the aerospace and aircraft industries. Here are some to watch.

98 Marine Systems 101 *by Paul Lazarus, Roger Hellyar-Brook, and Nigel Calder*

A well-regarded training school is preparing to produce technicians certified to handle the growing complexities of onboard systems.

DEPARTMENTS

7 Letters, Etc.

Readers comment on: the design history of the U.S. Navy's 31' PBR (Patrol Boat, River); culturing balsa-core mush; free-standing sailboat rigs; and Wyman's Formula.

15 Rovings *by Brooks Townes*

Jetsprinting around the infield of a racetrack; extreme exploring in planes without wings; photorealism in the design studio; and a wheelchair-accessible motoryacht.

110 Recent Works *by Christiaan van Heerden & Brooks Townes*

Notable projects from shops on Mt. Desert Island ("Three From Southwest"); and the long-range cruisers built by Northern Marine ("Making of a Passagemaker").

133 Tools of the Trade *by Stephen Olson*

It's hard now to imagine a time when the marine industry functioned without Travelifts.

152 Parting Shot *by Paul Lazarus*

We revisit the Miami Boat Show, circa 1953, to see where we've been so as to better understand where we're going.

READER SERVICES

73 Advertisers' Index and Reader-Service Card

75 Classified Advertising

On the cover: An employee at Northern Marine in Anacortes, Washington, works on the bow of one of the company's long-range cruisers. Story ("Making of a Passagemaker") on page 123. *Photograph by Neil Rabinowitz.*

•PROFESSIONAL• BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 56
DECEMBER/JANUARY
1999
\$5.95

RON JONES' UNLIMITED HYDROPLANES
DESIGNING AND BUILDING WITH KEVLAR
MORE ON LICENSURE FOR NAVAL ARCHITECTS
BRINGING A NEW MARINE PRODUCT TO MARKET

FEATURES

18 Bringing a New Product to the Marine Market

by Nigel Calder

In this case history, one company finds out the hard way what it means to “marinize” a piece of equipment.

26 Model Testing—Part Two

by Richard Akers

A comprehensive testing program at a commercial tank can be expensive. Just what will the data tell you?

40 A Ron Jones Retrospective

by Henry Elliot

The dean of modern hydroplanes discusses the technology that underlies their design and construction.

53 More on Licensure

by Bruce Marek

A Professional Engineer and veteran yacht designer describes the new licensing exam for naval architects.

61 Designing and Building with Kevlar

by Bruce Pfund

Although this material is no longer just for raceboats, many shops still do not understand how to work with it.

DEPARTMENTS

5 Letters, Etc.

We revisit the “Cored Bottoms Controversy” (PBB No. 51) with three vendors’ views of structural-core failure.

10 Rovings

by Brooks Townes

Recycling DUKWs for the tourist trade; recyclable plastic outboard boats from Logic Marine; and a new-old Nigel Irens design.

READER SERVICES

73 Advertisers’ Index and Reader-Service Card

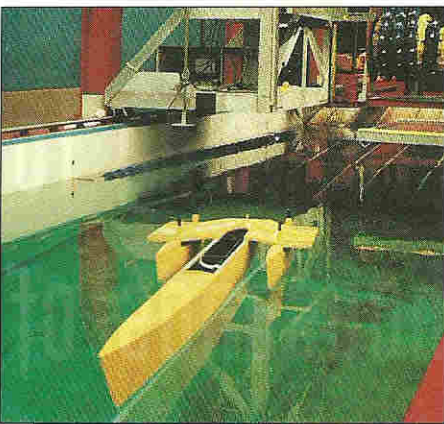
75 Classified Advertising

On the cover: By definition, the Ron Jones-designed and -built Unlimited hydroplane *Miss Circus Circus* is part boat, part plane. And pure speed. Story on page 40. *Photograph by Jim Dunn.*



NIGEL CALDER

Marinizing equipment. Page 18.



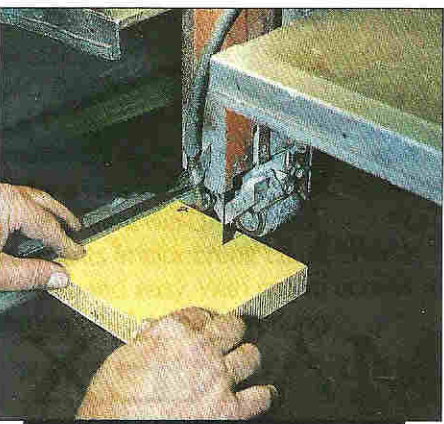
RICHARD AKERS

Testing at commercial tanks. Page 26.



JIM DUNN

Racing hydroplanes. Page 40.



DERNIS SKIRVIN

Machining Kevlar. Page 61.

PROFESSIONAL BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 55
OCTOBER/NOVEMBER
1998
\$5.95

NEW CONSTRUCTION IN NEW ZEALAND—II
MODEL TESTING
PROJECT AMAZON & THE UNSTAYED RIG
ISO EXPLAINED



JOHN KILLEY

Learning from models. Page 32.



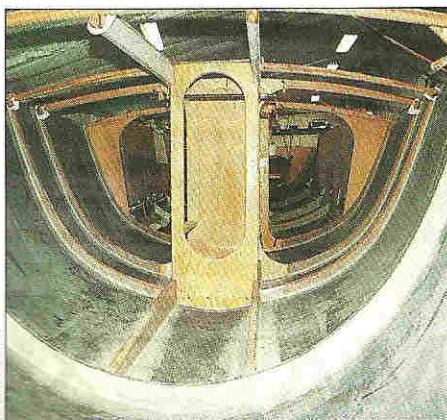
DAN NERNEY

Sailing unstayed. Page 44.



BRUCE PFUND

Wet-pregging in New Zealand. Page 58.



PETER MARSH

Building in wood-foam sandwich. Page 79.

FEATURES

- 26 Quantifying FRP Production Waste** *by Paul Lazarus*
 Before you can improve production efficiency in an open-molding manufacturing operation, you need to understand exactly where and how material—and labor—are being wasted on the shop floor.
- 32 Model Testing** *by Richard Akers*
 What exactly can you learn from a scale model of a new hullform? And can you accurately test the little boat somewhere other than in a controlled environment?
- 44 Project Amazon** *by Eric W. Sponberg*
 An atypical Open 60-class aluminum cat-ketch designed for the grueling Around Alone race is fitted with an unstayed rig. And proponents of wingmast setups are watching closely.
- 58 New Construction in New Zealand** *by Bruce Pfund*
 Yards and shops here handle big projects with: apparent ease, advanced materials and construction techniques, and a conspicuous absence of permanent tooling.
- 71 The Pre-purchase Survey Report** *by Susan Canfield*
 Condition-and-valuation surveys are the bread-and-butter of the trade. A veteran marine surveyor argues that the organization and formatting of a C&V report are crucial to the professionalism of its content.
- 87 The ISO Process, Simply Explained** *by Dudley Dawson*
 Here's a short course on how the certification process works (and why it's important), so you can get with the program.

DEPARTMENTS

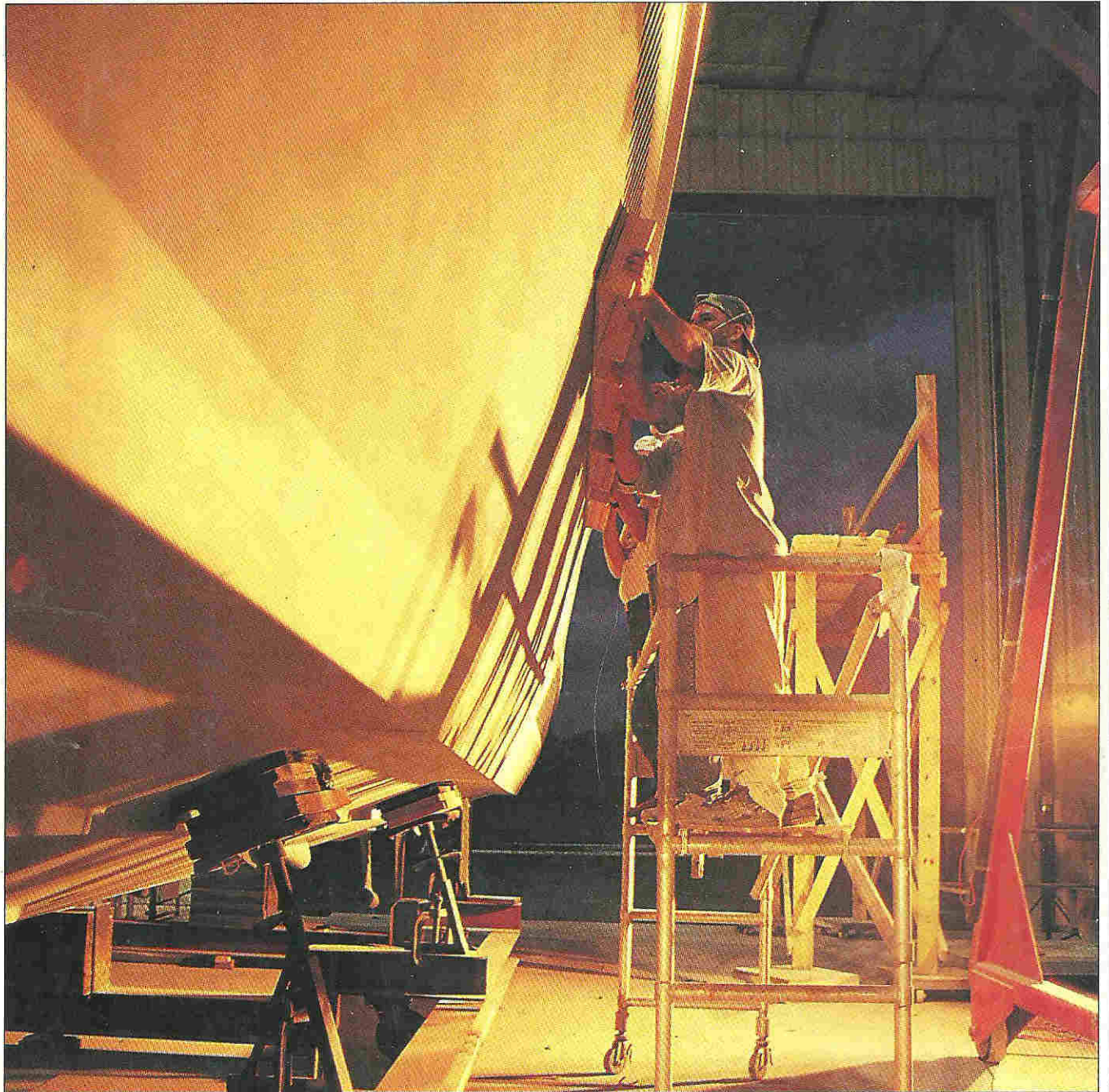
- 5 Letters, Etc.**
 Corrections to Wyman's Formula; why the Karlskrona Shipyard chose vinyl ester for its all-carbon corvette; and how to identify DCPD resin in a laminate, in the field.
- 16 Rovings** *by Brooks Townes*
 Around the world in less than 80 days; vehicles for exploring inner space; a sailor's powerboat; learning to laminate; and one more RIB.
- 79 Recent Work** *by Peter Marsh*
 Designer Tom Wylie and builder Steve Rander combined to create a super-light 77-footer using wood-foam sandwich construction.
- 99 Tools of the Trade**
 We look at a new boat cable sheathed with heat-resistant thermoset plastic; and at a new gelcoat with low VOC emissions.
- 112 Parting Shot** *by Bruce Pfund*
 The Whitbread boats devised a sail-change maneuver calling for advanced materials, traditional thinking, and, uh, guts. Especially guts.

READER SERVICES

- 96 Advertisers' Index and Reader-Service Card**
106 Classified Advertising

On the cover: One of several big aluminum and composite projects abuilding in the boatshops of New Zealand, the 159' masthead sloop *Georgia* takes shape at Alloy Yachts in Auckland. Story on page 58. Photograph by Neil Rabinowitz.

•PROFESSIONAL• BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 54
AUGUST/SEPTEMBER
1998
\$5.95

HINES-FARLEY 63
NEW CONSTRUCTION IN NEW ZEALAND
STAINLESS STEEL
THE BUILDER'S MODEL



Boatbuilding in New Zealand. Page 43.



The Hines-Farley 63. Page 56.



Analyzing stainless steels. Page 70.



Herreshoff half models. Page 82.

FEATURES

- 32 Raising the Bar** *by Nigel Calder*
 ABYC has launched an ambitious series of intensive, in-service training courses for the industry. We audited one for marine electricians.
- 43 New Construction in New Zealand** *by Bruce Pfund*
 The whole country seems caught up in boats and boatbuilding. Aggressively innovative boatbuilding—among the best in the world.
- 56 Hines-Farley 63** *by Paul Lazarus, Lou Codega, and Mark Atkinson*
 Two essays and a photoessay that look at the builder, the shops, and the engineering behind one of the fastest and finest sportfishing yachts on the water.
- 70 Stainless Steel** *by Jonathan Klopman*
 More than a hundred different versions of stainless steel are available. But some are more suitable than others for marine applications.
- 82 The Builder's Model** *by Eric Sponberg*
 Designer-builder N.G. Herreshoff was a master of the half model, and his techniques have much to tell us in an age enamored with computers.
- 98 Small-Craft Stability** *by Dudley Dawson*
 The art of building an upright boat begins with a back-to-basics understanding of the physics of stability.

DEPARTMENTS

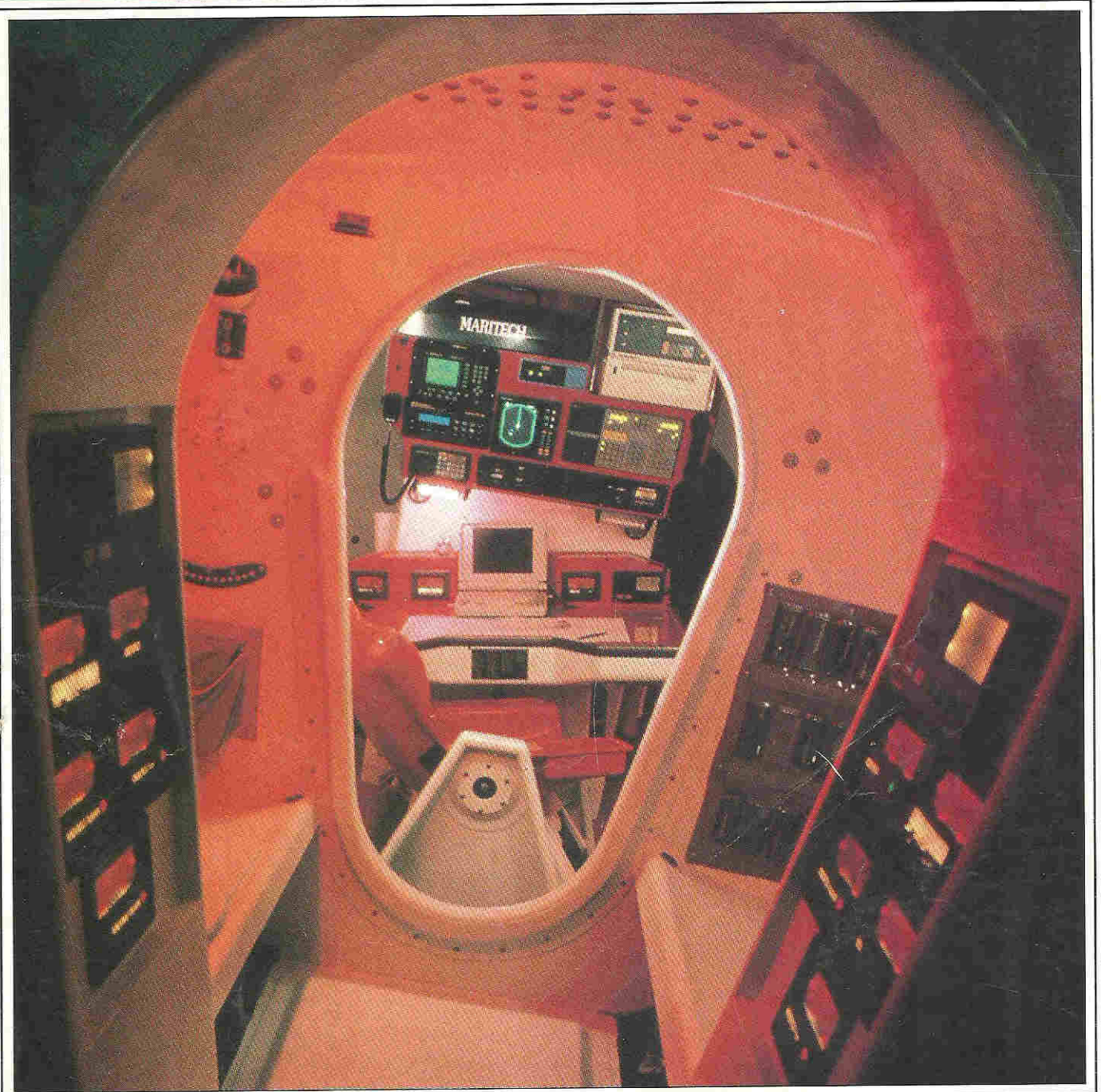
- 5 Letters, Etc.**
 Readers respond about gobbledygook in acronymland, subcontractors in the boatyard, selecting structural cores, and power-racing around the world.
- 18 Rovings** *by Brooks Townes*
 Designing a 31' PBR over the weekend; salvaging teak and rosewood; a tough new ceramic-epoxy coating; and a remote-controlled, unmanned circumnavigation.
- 96 Practical Solutions** *by David Wyman*
 One man's method for determining the relationship between speed, power, weight, and length for a variety of boat types and sizes.
- 112 Parting Shot** *by Martin Grimnes*
 A leading manufacturer of fabric reinforcement anticipates the near future of construction in marine composites—and suggests we embrace it.

READER SERVICES

- 104 Advertisers' Index and Reader-Service Card**
107 Classified Advertising

On the cover: A longboard crew at Hines-Farley Offshore Yachts (Suffolk, Virginia) sands the epoxy primer coat on the hull of a new 63' composite sportfisherman. Story on page 56. Photograph by Mark Atkinson.

•PROFESSIONAL• BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 53
JUNE/JULY
1998
\$5.95

THE CHILD SERIES
BUILDING BIG IN ADVANCED COMPOSITES
BUNGEE-MOORING A MARINA
THE STYRENE EMISSIONS STORY

FEATURES

- 20 Re-engineering Laminates** *by John Fox*
Switching from open-molding with polyester resins to vacuum-bagging with epoxy or vinyl ester calls for a different approach to the way you design or build boats.
- 28 PJ!** *by Stephen Olson*
Seventy years from startup, Palmer Johnson has become one of the world's great names in large-yacht construction. And make that aluminum.
- 40 Building Big in Advanced Composites** *by Bruce Pfund*
With military stealth technology as the driver, Sweden's Karlskrona Shipyard has arrived at cost-effective, large-scale, cored carbon-fiber construction.
- 50 The Child Series** *by Robby Robinson*
Warren Luhrs' successful, shorthanded, offshore raceboats featured innovative technology that has transferred to fast cruisers for consumers.
- 64 Bungee-Mooring a Marina** *by Nigel Calder*
An experimental marina-mooring system is put to the test in a region of radical tides and wild weather.
- 73 The Styrene Emissions Story** *by Thomas John*
Many boatbuilders may not realize how seriously they will be affected by new federal guidelines for calculating and reporting styrene emissions.

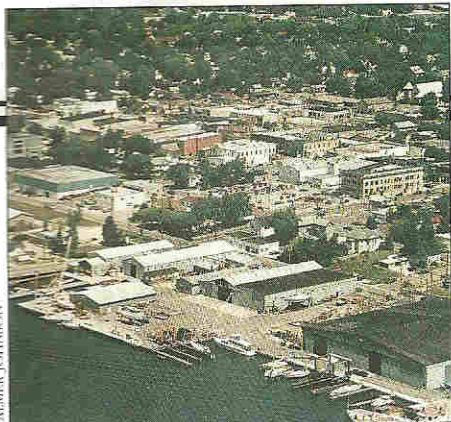
DEPARTMENTS

- 4 Letters, Etc.**
We revisit the cored-bottoms controversy, and bring you an important announcement regarding the U.S. Coast Guard's admeasurement rules.
- 12 Rovings** *by Brooks Townes*
An airboat for the Far North; miniature subs in the Second World War; stretching a brigantine; the comeback of builder Bill Munson; and other items along the waterfront.
- 89 Tools of the Trade**
A long-lasting neoprene impeller for raw-water pumps, and a clever product that simplifies impeller replacement.
- 96 Parting Shot** *by Bruce Pfund*
Beware the "money men" who are running (or is it *ruining?*) more than a few boatbuilding companies these days, now that business is good again.

READER SERVICES

- 80 Advertisers' Index and Reader-Service Card**
- 90 Classified Advertising**

On the cover: The gimballed nav station aboard *Hunter's Child*—one of numerous technical innovations in the offshore raceboats that comprise the *Child* series. Story on page 50. *Photograph by Onne van der Wal.*



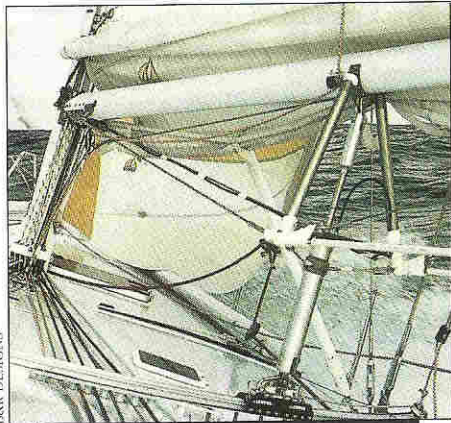
PALMER JOHNSON

A visit to Palmer Johnson. Page 28.



KARLSKRONA SHIPYARD

Large-scale carbon fiber. Page 40.



BSH DESIGNS

Racing technology for cruisers. Page 50.



STEPHEN LEICHT

A mooring-system experiment. Page 64.

B • PROFESSIONAL • R BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 52
APRIL/MAY
1998
\$5.95

DEFENSIVE PAINTING
CARDEROCK'S COMBATANT CRAFT DEPARTMENT
SELECTING STRUCTURAL CORES
TANK CHOICES

FEATURES

- 18 Tank Choices** *by Nigel Calder*
What type of tank is best suited for a cruising boat—a built-in or an “independent”? And which material works best?
- 30 Selecting Structural Core Material** *by John Fox*
No one core type is right for every application. The challenge is to know which product to use, where.
- 42 A Day in the Life** *by Paul Lazarus*
We visit the Combatant Craft Department, the technical resource for the U.S. military’s thousands of boats and miscellaneous watercraft.
- 54 Defensive Painting** *by Douglas Templin*
Tips for avoiding costly fairing and coating mistakes.
- 67 Repairing DCPD Laminates** *by Bruce Pfund*
You’ll want to review your secondary-bonding techniques before tackling a DCPD repair job.

DEPARTMENTS

- 4 Letters, Etc.**
Comments about hauling and launching boats, and holding-tank design. And a note on the recent passing of two fine naval architects.
- 12 Rovings** *by Brooks Townes*
Designing a rigid-hull-not-inflatable; noteworthy restorations in Europe; a SAFE Boat for Great Salt Lake; and an easy-to-sail, entry-level multihull.
- 81 Practical Solutions** *by Paul Lazarus*
We report on two production boatbuilding shops that adapted pastry bags and a waterbed heater, respectively, to their operations. Hey, whatever works.
- 88 Parting Shot** *by Jonathan Klopman*
Subcontractors in the boatyard have become a fact of business life. What should yard policy be toward these “outsiders”?

READER SERVICES

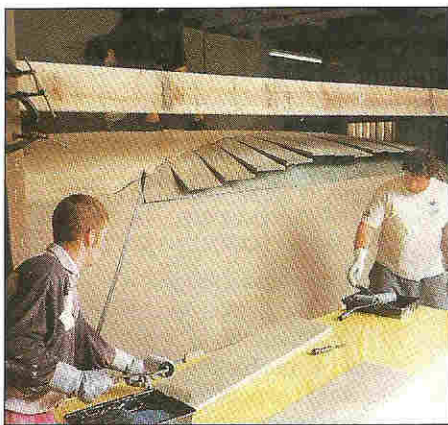
- 80 Advertisers’ Index and Reader-Service Card**
- 83 Classified Advertising**

On the cover: A worker at a south Florida yard pulls off the masking tape and checks out a fresh, beautifully done, topsides paint job. Story on page 54. Photograph by Billy Black.



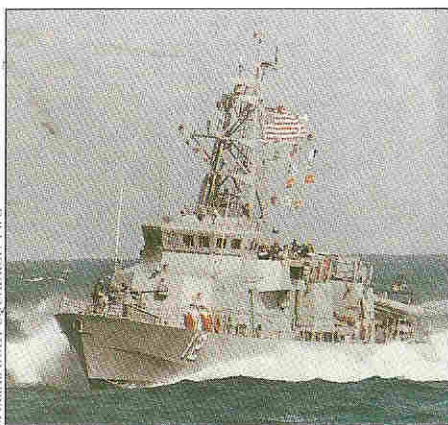
KUACOR

Fuel- and water-tank installations. Page 18.



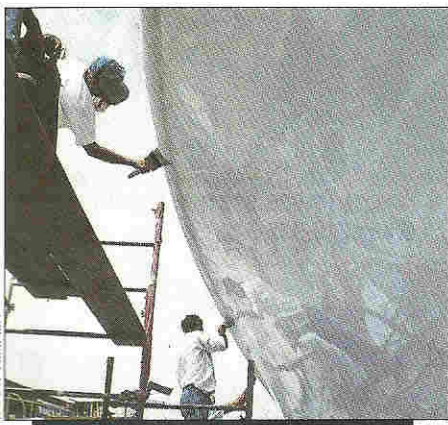
ELIO

The right core for the job. Page 30.



SPECIAL BOAT SQUADRON TWO

Special operations craft. Page 42.



DOUG TEMPLIN

Fairing and coating techniques. Page 54.

IBEX
ISSUE!

• PROFESSIONAL • BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 51
FEBRUARY/MARCH
1998
\$5.95

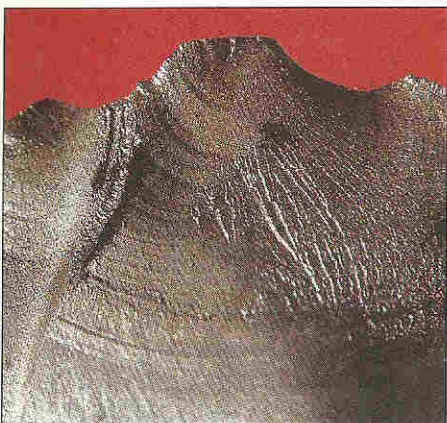
LARGE-SCALE COLD-MOLDING
THE CORED-BOTTOMS CONTROVERSY
ANALYZING FAILED METAL PARTS
WHAT MAKES GOOD BOAT CABLE

STEPHEN RUBICAM



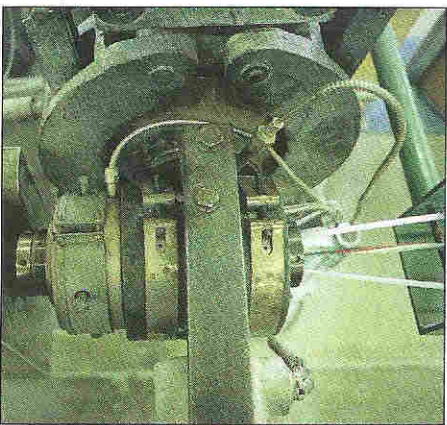
Cold-molded construction. Page 36.

JONATHAN KLOPMAN



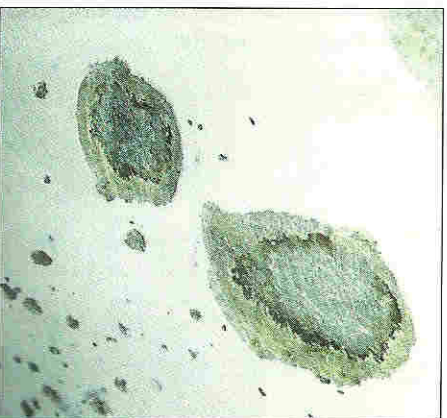
Broken parts. Page 56.

NIGEL CALDER



Marine-grade wire. Page 69.

BRUCE PFUND



Blisters report. Page 108.

FEATURES

- 22 The Cored-Bottoms Controversy** *by Rob Mazza & Lou Codega*
- Many builders of custom sportfishermen core their hull bottoms. Why haven't production builders done likewise?
- 36 LARGE-SCALE COLD-MOLDING:**
- **Engineering the Structure** *by Bruce King*
 - **Building the Boat** *by Bill Mayher*
- 56 Analyzing Failed Metal Parts** *by Jonathan Klopman*
It takes a trained eye to tell why rigging hardware, propulsion components, and underwater gear break in service.
- 69 Boat Cable** *by Nigel Calder*
Not all marine wiring is made alike—even if it conforms to the industry's basic standard.
- 85 Thickness in Single-Skin Laminates** *by Rob Schofield*
When building with lightweight high-performance laminates, be aware of the critical structural role of thickness.
- 108 Osmotic-Blister Update** *by Bruce Pfund*
A new look at a chronic problem, and an old theory explored.

DEPARTMENTS

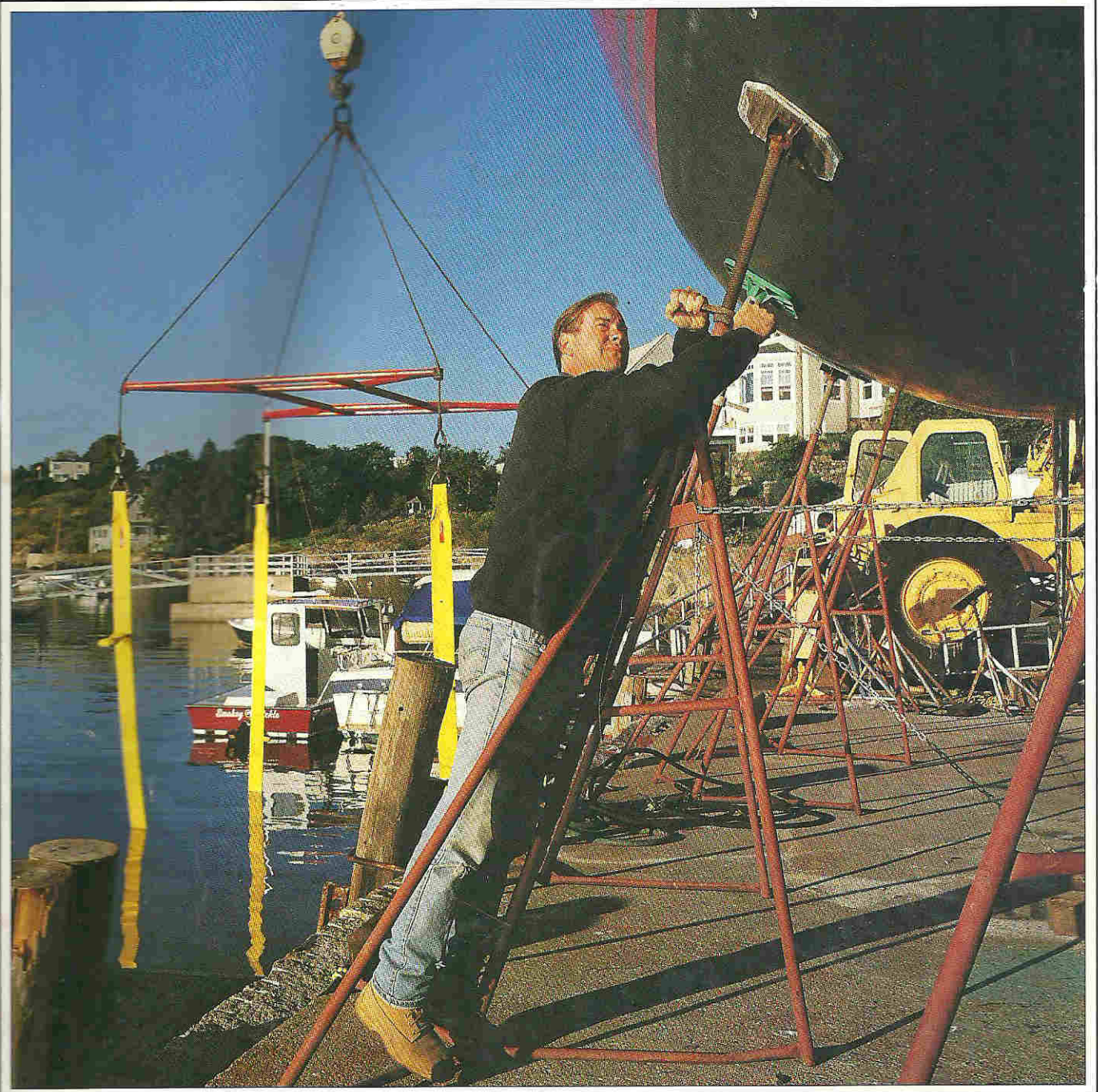
- 6 Letters**
Structural foam core is not necessarily PVC; speed-estimating formulas; and more on marine hose.
- 11 Rovings** *by Brooks Townes*
The biggest yacht-refit job in the U.S.; a racy aluminum powerboat; Admiral builds for Boeing; and varnishing naked.
- 96 Recent Work** *by Mark Fitzgerald & Mary Sullivan*
We look at the striking Adams 36 powerboat, and the ultraclean decks of Wally Yachts.
- 114 Tools of the Trade** *by Paul Lazarus*
Teakdecking Systems goes where the boat is; and DuPont issues a handy manual for building with its Nomex Decore.
- 128 Parting Shot** *by Norm DePlume*
A veteran designer describes the subtle warnings that signal your job at a production company is about to end.

READER SERVICES

- 113 Advertisers' Index and Reader-Service Card**
- 123 Classified Advertising**

On the cover: The crew at Hodgdon Yachts (East Boothbay, Maine) cold-molds the upside-down hull of *Antonisa*, a custom 124' sloop designed by Bruce King Yacht Design (Newcastle, Maine). Two stories, beginning on page 36. *Photograph by Robert Mitchell.*

B • PROFESSIONAL • B BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 50
DECEMBER/JANUARY
1998
\$5.95

IN-YARD BOAT HANDLING & STORAGE
TRACKING PRODUCTION AND LABOR
REAL-WORLD RESIN PROPERTIES
FORENSIC ENGINEERING

FEATURES

18 Forensic Engineering and Expert Witnessing *by Eric Sponberg*

Several case studies help illustrate what happens when boatbuilding meets litigation.

32 The Natural *by Paul Lazarus*

A recent rendezvous and retrospective demonstrate the design genius of the late Ray Hunt.

38 Hauling and Launching, Blocking and Cradling *by Jonathan Klopman*

The ABYC is now developing guidelines where none previously existed: for in-yard boat handling and storage.

46 Test Lab vs. Shop Floor *by Bruce Pfund*

Resin in the real world may not behave the way your manufacturer's product data sheet says it will.

59 Tracking Production and Labor by Computer *by John Fox*

Customizing a relational database to your shop's requirements is not easy. But the effort is worth it.

DEPARTMENTS

5 Letters

Readers comment on floating-frame aluminum construction, and on competing composite systems for the U.S. Navy.

11 Rovings *by Carl Cramer*

PBB's new column looks at unusual building projects, Toolympics, and other marine items of trade interest.

69 Practical Solutions *by Stephen Olson*

Here's a simple holding-tank plumbing design particularly well-suited to cruising sailboats of moderate size.

73 Tools of the Trade

Nigel Calder tests a hand-held digital multimeter that can measure high DC amperages.

80 Parting Shot *by George Stafford*

A veteran marine surveyor describes the dangers inherent in cases where insurance claims get out of control.

READER SERVICES

64 Advertisers' Index and Reader-Service Card

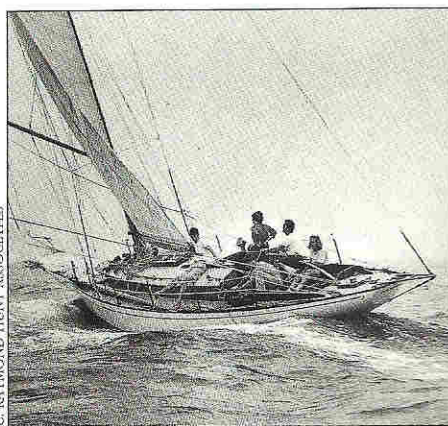
75 Classified Advertising

On the cover: A member of the crew at Marblehead (Massachusetts) Trading Company adjusts the stands for a keel sailboat. This and other routine yard practices have come under the scrutiny of ABYC. Story on page 38. *Photograph by Jonathan Klopman.*



ERIC SPONBERG

Detective work. Page 18.



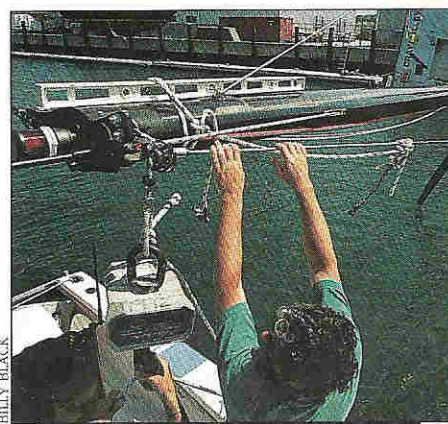
C. RAYMOND HUNT ASSOCIATES

Hunt retrospective. Page 32.



BRUCE PFUND

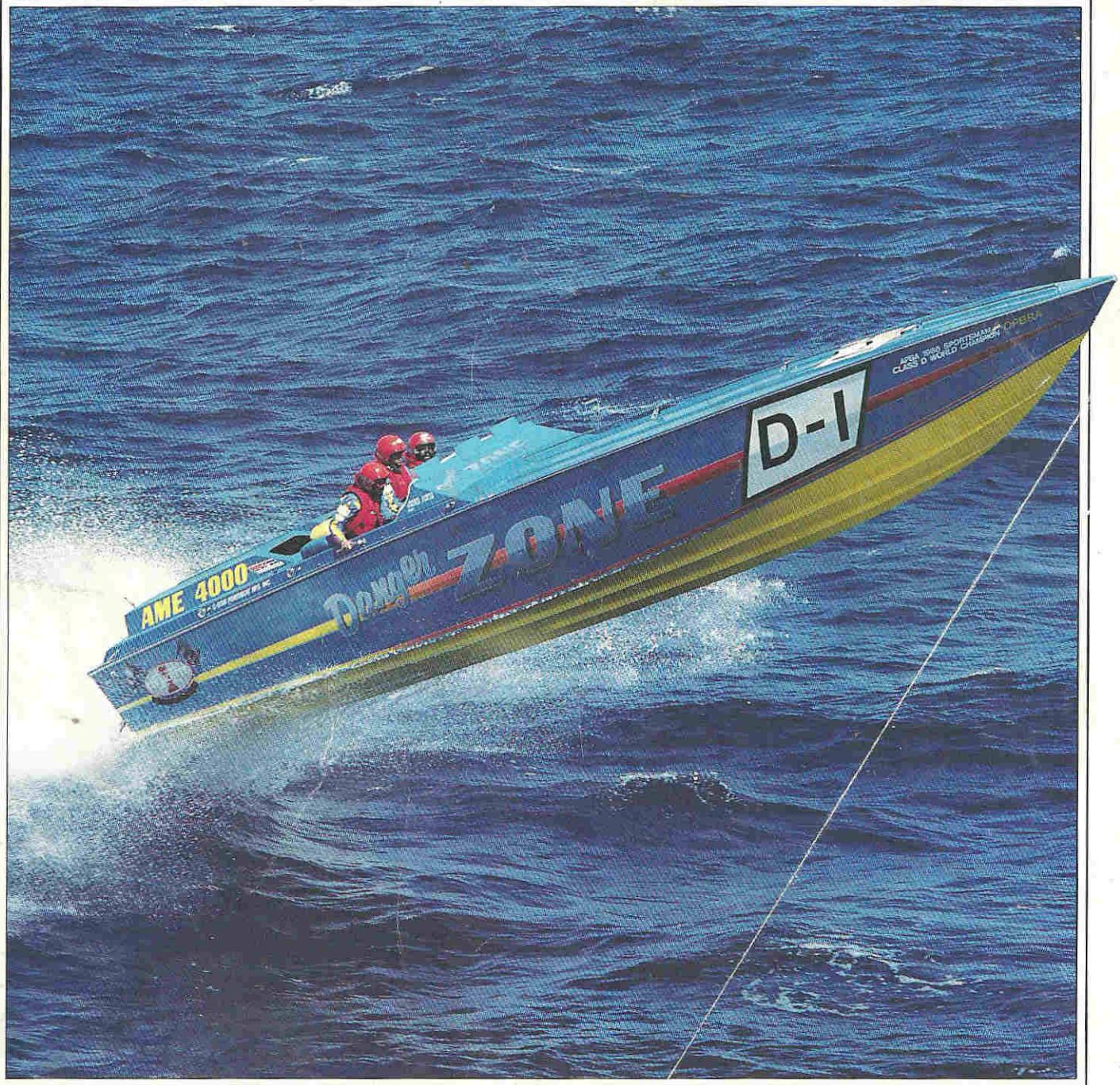
Resin properties on the shop floor. Page 46.



BILLY BLACK

Righting-moment test. Page 11.

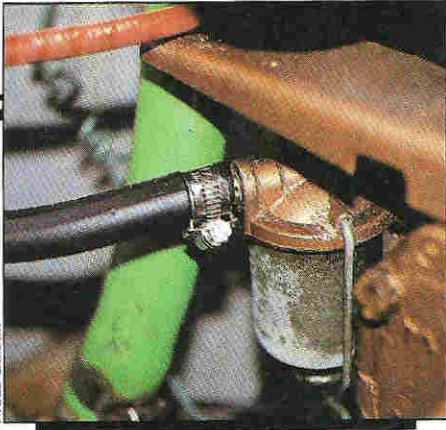
• PROFESSIONAL • BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 49
OCTOBER/NOVEMBER
1997
\$5.95

BUILDING FAST BOATS
MARINE HOSE
NEW AND UNUSUAL HULL FORMS
IN-MOLD COATINGS FOR EPOXY LAYUPS



NIGEL CALDER

Purpose-built hose. Page 16.



WE•NO•NAH CANOE INC.

Lightweight canoes. Page 36.



CARDEROCK DIVISION, NSWG

Innovative hull forms. Page 42.



DAGGER COMPOSITES

Coatings for epoxy laminates. Page 60.

FEATURES

- 8 Once Around the Design Spiral** *by Dudley Dawson*
A proven system for organizing data and constructing a solid set of preliminary powerboat design charts.
- 16 Marine Hose** *by Nigel Calder*
Poor-quality hose can sink a boat. So it pays to install a good product, designed for a specific purpose.
- 24 Tips for Cutting Clean Holes in Composites** *by Bruce Pfund*
Some specialized tools—and the right techniques—simplify the job of getting clean cutouts and laminate samples.
- 36 Inside: We•no•nah Canoe Inc.** *by Barbara Jean Walsh*
This Midwest manufacturer is now a national presence in the growing paddle-sports market.
- 42 Redefining the Ride** *by Richard Akers*
Two highly efficient hullforms—Stolkraft and HYSWAS—deliver a much smoother ride than conventional monohulls.
- 54 Building Fast Boats That Don't Break** *by Valentine Jenkins*
A veteran builder describes his approach to producing durable, high-performance, offshore powerboats.
- 59 In-Mold Coatings for Epoxy Laminates** *by Joseph Parker*
Some new products—and still others soon to come—make epoxy layup more practical for the production line.

DEPARTMENTS

- 4 Letters, Etc.**
Readers comment on the licensing of naval architects, and on the issue of interface data from component manufacturers.
- 74 Recent Work** *by Robby Robinson*
The newest Olympic sailing class—the “49er”—is a variant of the famed and very fast 18' Australian skiffs.
- 79 Tools of the Trade**
The ABYC issues a handy CD-ROM of its hefty standards; and American Tool adds to its collection of clamps.
- 96 Parting Shot** *by Mark Fitzgerald*
The single best reason for classifying and standardizing marine product information? It can improve your bottom line.

READER SERVICES

- 64 Advertisers' Index and Reader-Service Card**
- 91 Classified Advertising**

On the cover: Built for speed more than a decade ago, two-time world champion *Danger Zone*—a 38' Cigarette—was also built to last. She's still racing. Story on page 54. Photograph by Forest Johnson.

PROFESSIONAL BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 48
AUGUST/SEPTEMBER
1997
\$5.95

A WELL-DESIGNED WHEELHOUSE
LOW-COST LAMINATE TESTING
SETTING UP A SMALL MACHINE SHOP
INFUSION AND PRE-PREGS FOR THE NAVY



G. ALTADIL/PPF

Classing Offshore Racing Yachts. Page 8.



BRUCE PFUND

Buying Used Machine Tools. Page 56.



NEIL RABINOWITZ

Building Rugged RIBs. Page 50.



DAN NERNEY

Designing an Efficient Helm. Page 66.

FEATURES

- 8 Classed Yachts and Raceboats** *by Eric Sponberg*
The American Bureau of Shipping no longer classifies yachts under 79'. How will the new ISO standards work?
- 16 Low-Cost, In-House Laminate Testing** *by Robert Schofield*
This fairly simple shop-made fixture can confirm a laminate's strength and stiffness.
- 35 Competing Composites** *by Paul Lazarus*
Infusion? Pre-pregs? Or both? The U.S. Navy takes a long, hard look at emerging fabrication technologies.
- 50 Inside: Zodiac-Hurricane Technologies** *by Sven Donaldson*
RIBs are now a major part of the commercial, military, and recreational small-craft markets. And ZHT is a major player.
- 56 A Machine Shop for the Boatshop** *by Bruce Pfund*
Setting up a metal lathe and milling machinery in your boat plant or yard can save you time and money.
- 66 The Well-Tempered Wheelhouse** *by David Shepard*
Builders of recreational powerboats would be wise to emulate the control station design of the U.S. Coast Guard's new 47'.
- 79 A Veteran Driver's Thoughts on Helm Design** *by Dag Pike*
Experience counts for everything in laying out a functional helm for a fast powerboat.

DEPARTMENTS

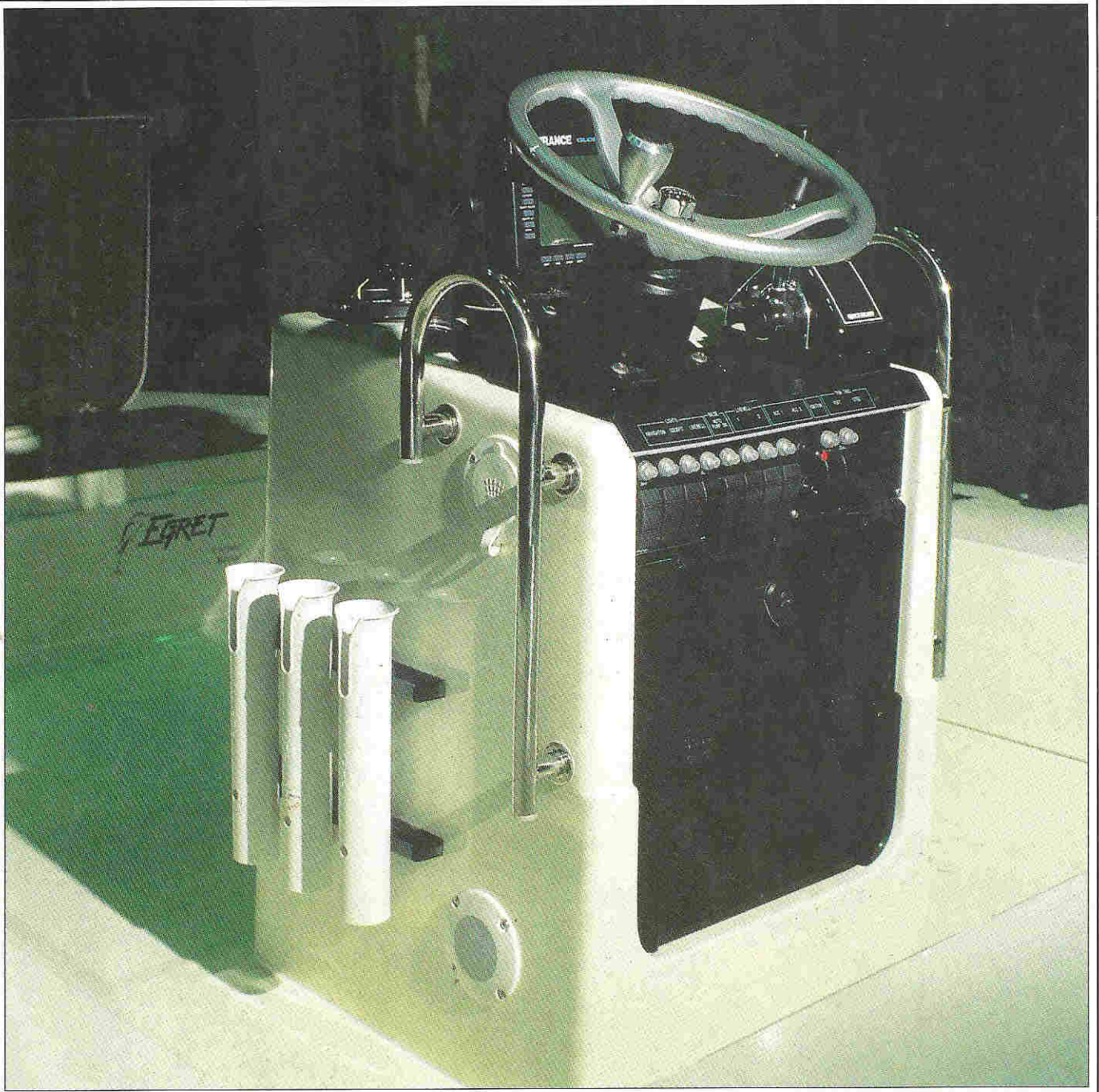
- 4 Letters, Etc.**
Readers comment on flat-panel fabrication and molded grid systems. ABYC introduces a new technician-training program.
- 6 Recent Work** *by Dag Pike*
Sportfishing in an SES? Two 50-footers being built in Florida may change our perception of this type of hullform.
- 86 Tools of the Trade**
We look at some well-made products that simplify removal of Cutless bearings, shafts, and propellers.
- 104 Parting Shot** *by Bruce Pfund*
The fleet of FRP boats is aging, along with its builders. Be kind to your body.

READER SERVICES

- 72 Advertisers' Index and Reader-Service Card**
- 100 Classified Advertising**

On the cover: A view of the ergonomically designed enclosed bridge of the U.S. Coast Guard's new 47' Motor Lifeboat. Story on page 66. Photograph by Dan Nerney.

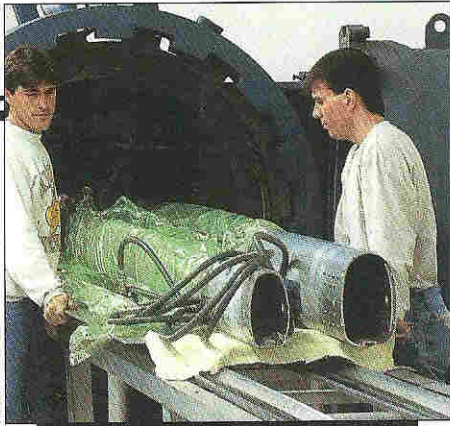
PROFESSIONAL BOATBUILDER



The magazine for those working in design, construction, and repair

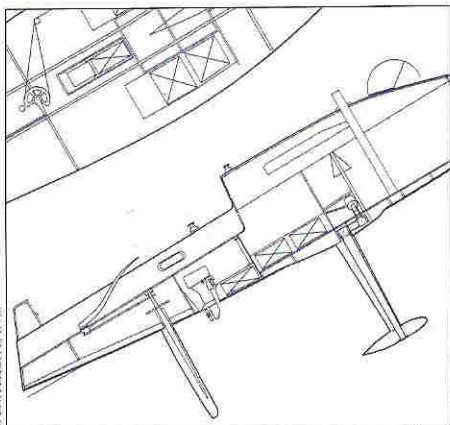
NUMBER 47
JUNE/JULY
1997
\$5.95

INSIDE CONSOLIDATED YACHT
LICENSING NAVAL ARCHITECTS
CARBON FIBER SPARS
ADVANCED-COMPOSITES TRAINING



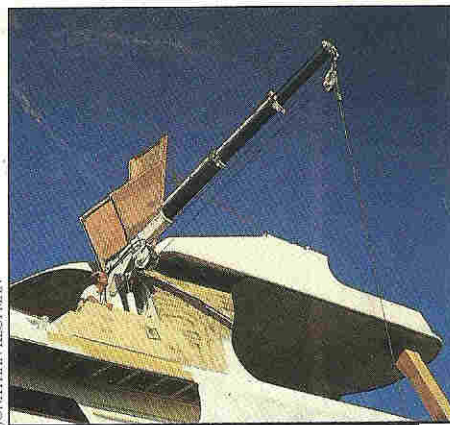
HEAL SPARS

Making carbon fiber spars. Page 44.



DENAYACHT, INC.

Eyeing recent work. Page 16.



JONATHAN KLOPMAN

Visiting Consolidated Yacht. Page 34.



JIM SULLIVAN

Examining naval architects. Page 24.

FEATURES

- 24 Licensure** *by Paul Lazarus*
Naval architects nationwide will soon need a license to practice.
- 34 Hot Shop** *by Jonathan Klopman*
Consolidated Yacht Corporation concentrates on special composites projects for the marine trades.
- 44 Carbon Fiber Spars** *by Nigel Calder*
They're much lighter than equivalent aluminum spars—but only if properly engineered and built.
- 57 Advanced-Composites Training** *by Mary Sullivan*
How do you know which opinions to follow on the best ways to work with advanced composites?

DEPARTMENTS

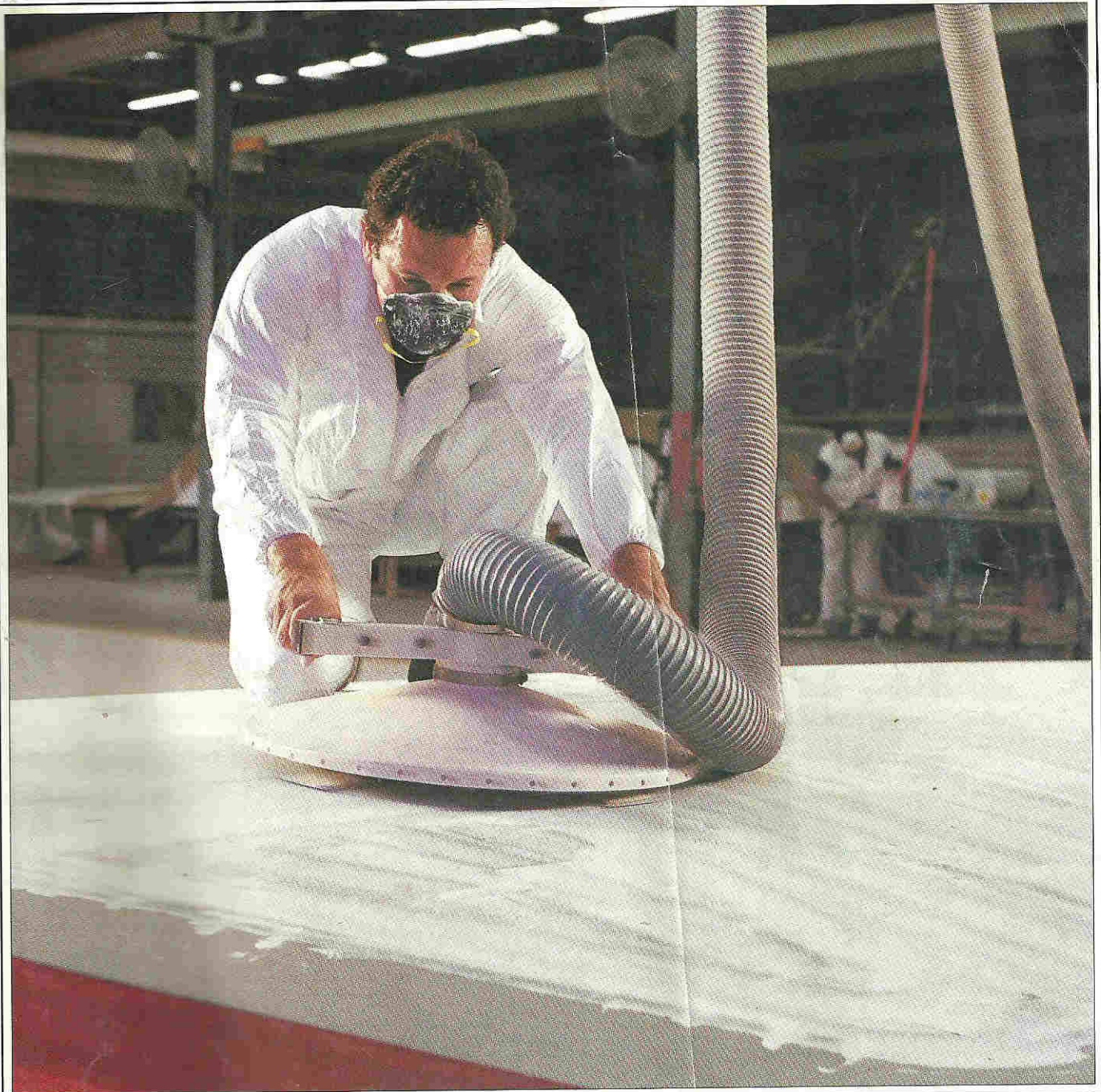
- 5 Letters to the Editor**
Readers comment on power cats, salvaging a drowned diesel engine, and tuning twin-screw rudders.
- 16 Recent Work** *by Eric Sorensen and Mary Sullivan*
John Kiley's planing power catamaran designs, and DynaYacht's unusual racing/cruising sloop.
- 63 Practical Solutions** *by Dudley Dawson*
Here's another take on conducting stability tests in the field.
- 66 Tools of the Trade** *by Bruce Pfund*
Understanding the basic engineering of composite boats, and evaluating a high-end bottom paint.
- 80 Parting Shot** *by Christopher Barry*
If you make components for the marine industry, they won't sell well without good interface data.

READER SERVICES

- 64 Advertisers' Index and Reader-Service Card**
- 75 Classified Advertising**

On the cover: The elegant center console of an Egret flats boat, built by Consolidated Yacht Corporation (Dania, Florida). Story on page 34. Photograph by Jonathan Klopman.

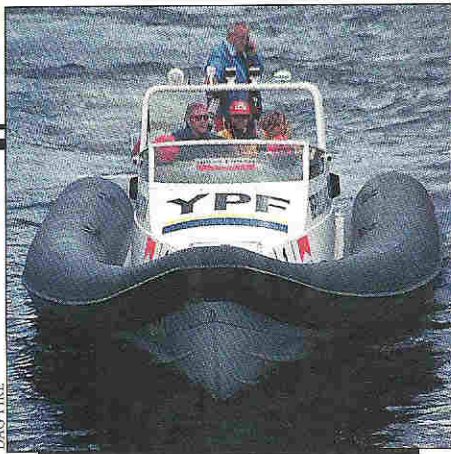
PROFESSIONAL BOATBUILDER



The magazine for those working in design, construction, and repair

NUMBER 46
APRIL/MAY
1997
\$5.95

A VISIT TO VIKING YACHT
THE TECNO 40
MOLDED STRUCTURAL GRIDS
PROPELLER MATCHING



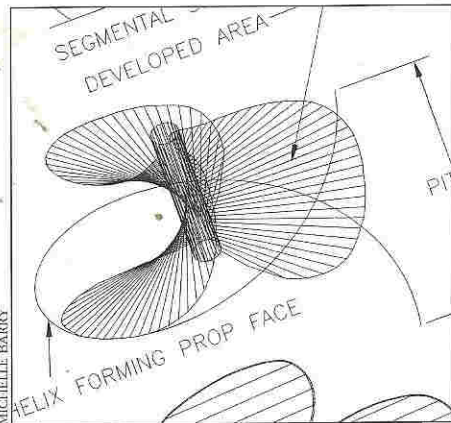
DAG PIKE

Appreciating the Tecno 40. Page 38.



MICHAEL BERMAN

Touring the Viking Yacht plant. Page 16.



MICHELLE BARRY

Matching propellers. Page 52.



DOUG LAYTON

Sampling "smart" technology. Page 45.

FEATURES

- 16 **Field Notes from New Gretna** *by Eric Sorensen*
We visit Viking Yacht Company, and discuss building and design with co-founder Bill Healey.
- 28 **Molded Integral Grid Systems** *by Robert Mazza*
The origins of, and reasons for, tooling and installing an integral FRP grid/liner.
- 38 **The Tecno 40** *by Dag Pike*
Crossing a high-performance monohull with a RIB created a new breed of boat. Fast and seaworthy.
- 45 **"Smart" Composites Technology** *by Bruce Pfund*
Skins and structures capable of sensing changed loads and conditions. And responding accordingly.
- 52 **Propeller Matching** *by Christopher Barry*
To match a prop to the engine and boat, you must understand the principles. Your PC can do the math.

DEPARTMENTS

- 5 **Letters to the Editor**
Readers comment about propulsion efficiency, lightning protection, and wet exhausts.
- 10 **Shop Talk** *by Barbara Jean Walsh*
IBEX '97, Sebago's boat-shoe boat, the rising PWC accident rate, and a new address for ABBRA.
- 65 **Tools of the Trade**
We look at a slick new system for strip-planking, and an extractor for broken bolts and studs.
- 72 **Parting Shot** *by Ian Nicolson*
The senior partner of one the world's oldest marine firms has a formula for economic survival.

READER SERVICES

- 49 **Advertisers' Index and Reader-Service Card**
- 67 **Classified Advertising**

On the cover: Geraldo Martinez prepares a mold at Viking Yacht Company's New Gretna, New Jersey, production plant. Story on page 16. *Photograph by Michael Berman.*

**IBEX
ISSUE!**

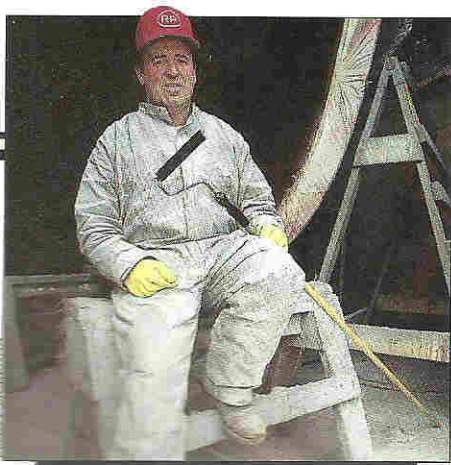
PROFESSIONAL BOATBUILDER



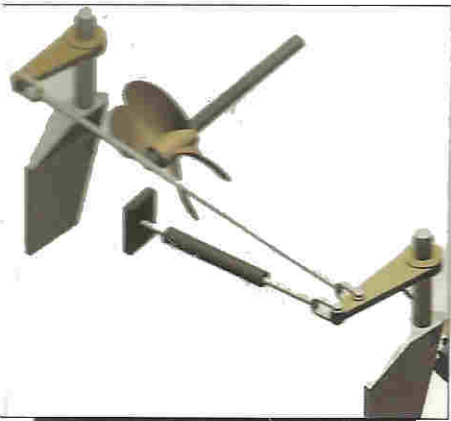
The magazine for those working in design, construction, and repair

**NUMBER 45
FEBRUARY/MARCH
1997
\$5.95**

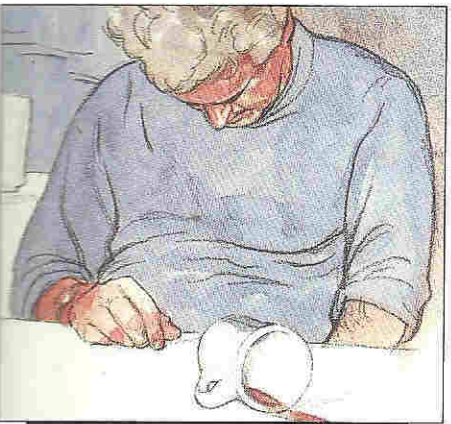
**THE ROYAL HUISMAN SHIPYARD
BUILDING WITH FLAT COMPOSITE PANELS
CASE STUDIES IN REDESIGN
TUNING TWIN-SCREW RUDDERS**



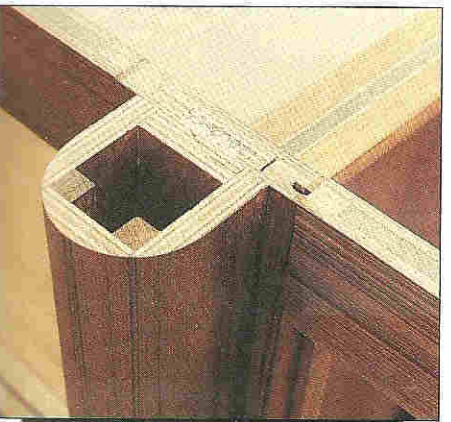
Working with bucket and roller. Page 76.



Fine-tuning rudders. Page 96.



Detecting carbon monoxide. Page 32.



Constructing a superyacht. Page 47.

FEATURES

- 32 Carbon Monoxide Poisoning** *by Nigel Calder*
Boat builders and yards can reduce the risks onboard, but only if the causes are understood—and the gas detected.
- 47 Production Thinking, Custom Building** *by Paul Lazarus*
Royal Huisman Shipyard's operations are a model of efficiency—even when applied to a one-of-a-kind yacht.
- 54 Boatbuilding with Flat Composite Panels:**
- **Methods and Materials—West Coast** *by Charles Summers*
 - **A Fast, Lightweight, Custom Cruiser** *by Ginger Gupton*
 - **Notes on Flat-Panel Fabrication** *by Bruce Pfund*
- 76 Wayne's World** *by Stephen Olson*
Boatbuilder Wayne Canning practices the fine art of bucket-and-roller laminating.
- 86 Designer's Notebook: Case Studies in Redesign** *by Eric Sponberg*
Solving performance problems caused by modifications to a production model may require major alterations to the hull.
- 96 Tuning Twin-Screw Rudders** *by Donald Blount*
Subtle changes in the setup can make significant differences in how a fast powerboat handles and performs.

DEPARTMENTS

- 5 Letters to the Editor**
Wet exhausts, laminate repairs, and vacuum-bagging.
- 14 Legal Advocate** *by John Sear*
How to develop a strategy for posting product warnings.
- 21 Shop Talk** *by Barbara Jean Walsh*
Challenging EPA's numbers; stopping illicit splashing.
- 29 Practical Solutions** *by Bruce Pfund*
Installing a transducer inside the hull eliminates drag and facilitates maintenance.
- 105 Tools of the Trade**
We look at a well-designed marine isolation transformer.
- 120 Parting Shot** *by Dean Travis Clarke*
Why aren't more manufacturers building power cats?

READER SERVICES

- 112 Advertisers' Index and Reader-Service Card**
- 116 Classified Advertising**

On the cover: A welder at the Royal Huisman Shipyard in Vollenhove, Holland, works inside the inverted aluminum hull of *Anakena*, a 132' sailing yacht. **Story** on page 47. **Photograph** by Roy Roberts.

B • P R O F E S S I O N A L • B B O A T B U I L D E R



The Magazine for Those Working in Design, Construction, and Repair

NUMBER 44
DECEMBER/JANUARY
1997
\$5.95

OPTIMIZING PROPULSION
NORTH END INFUSES A 90-FOOTER
BILGE PUMP RIGGING PROBLEMS
FIRE-PROTECTION STANDARDS REVISED

FEATURES

- 18 Staying Current with the Standards** *by Barbara Jean Walsh*
Sensible fire protection for your boatyard or marina begins with a newly revised manual.
- 26 Bilge Pump Rigging Problems** *by Bruce Pfund*
A plea for product development that eliminates some awkward features.
- 30 Reporting from the Resin Infusion Front** *by Paul Lazarus*
Q: How did North End Composites mold a 90' powerboat hull? A: In one shot.
- 38 Faster, Farther, and More Fuel-Efficient** *by Dudley Dawson*
Cost-effective design-and-engineering solutions for optimizing propulsion.

DEPARTMENTS

- 5 Letters**
Readers respond to "Changing Over to High-Performance Resins" and "Weight Estimating and the Stability Test."
- 13 Legal Advocate** *by Marcia Kul*
Our legal columnist comments on product warnings and the law. The first of two parts.
- 49 Shop Talk** *by Barbara Jean Walsh*
IBEX '97 draws near; Palmer Johnson's new Brierley 30; and powerboating with compressed natural gas (CNG).
- 54 Tools of the Trade**
We look at: the ultimate multimeter; a digital knotmeter for small craft; and a great book on good design.
- 72 Parting Shot** *by Jonathan Klopman*
The marine surveyor's lot in life is to be cast into the middle of a boat purchase, repair, or appraisal.

READER SERVICES

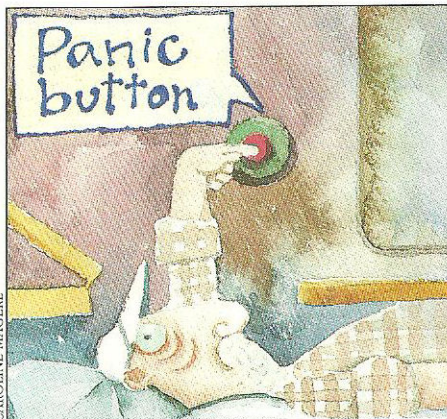
- 56 Advertisers' Index and Reader-Service Card**
- 68 Classified Advertising**

On the cover: Hull-bottom tunnels, along with custom propellers like the six-bladed, adjustable-pitch prop on this 90' Hatteras motoryacht, help reduce cavitation and vibration in highly loaded installations, and have led to remarkable speed and efficiency improvements. Story on page 38. *Photo by Ray Strawbridge.*



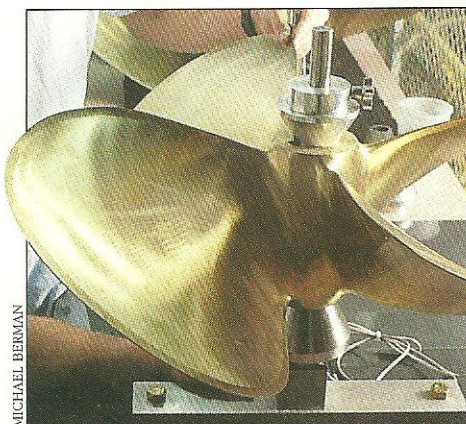
PAUL LAZARUS

Infusing a 90-footer. Page 30.



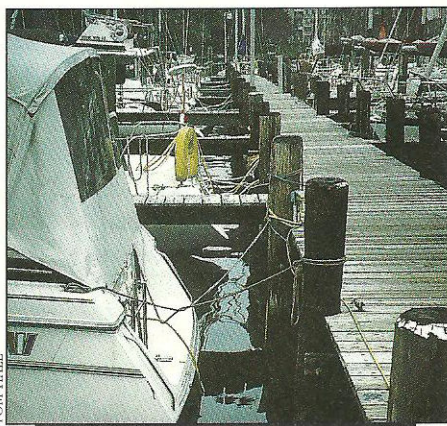
CAROLINE MAGIERL

Simplifying bilge-pump rigging. Page 26.



MICHAEL BERMAN

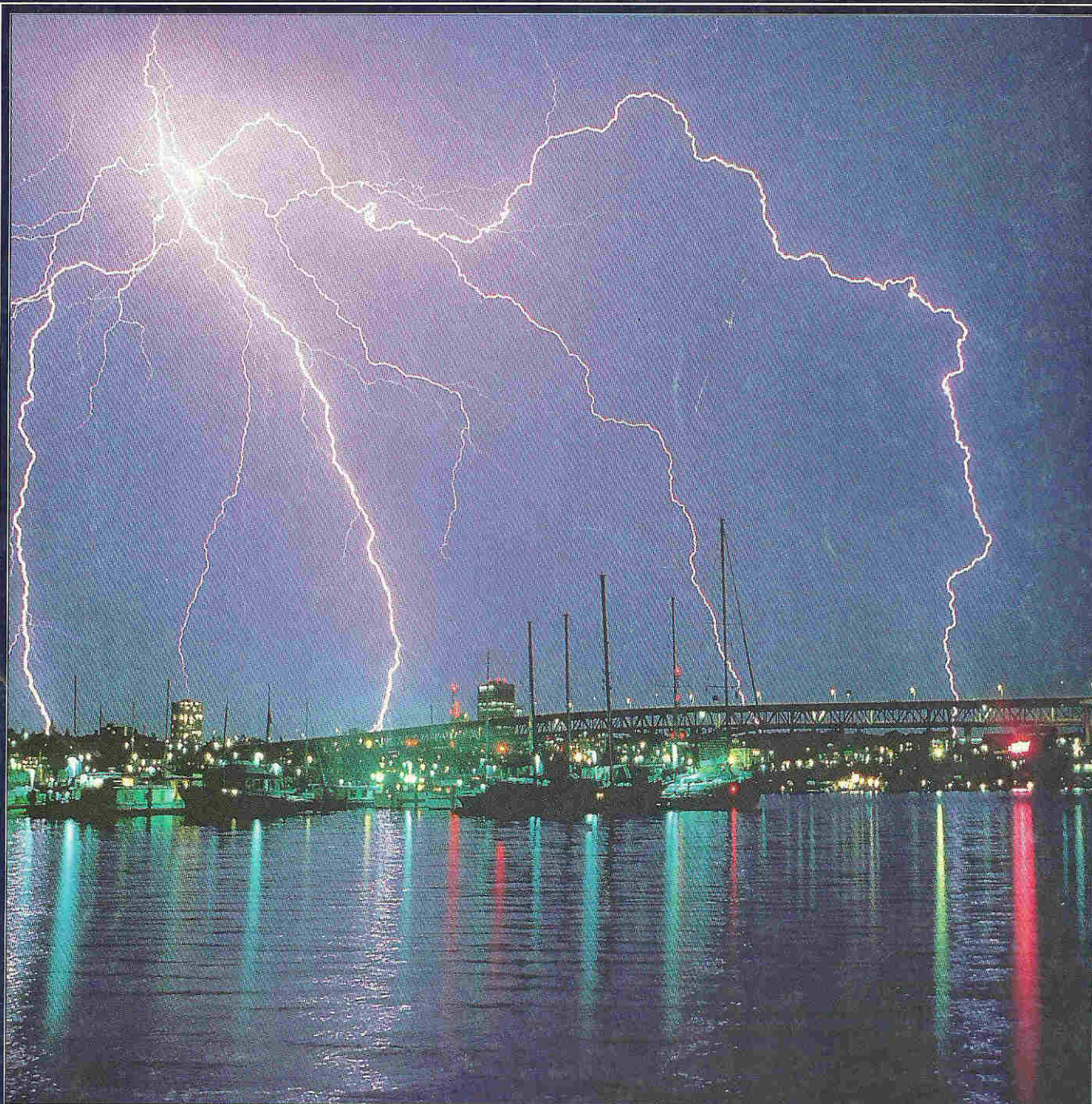
Improving propulsion efficiency. Page 38.



TOM HAILE

Updating fire-protection standards. Page 18.

B • PROFESSIONAL • R BOATBUILDER



The Magazine for Those Working in Design, Construction, and Repair

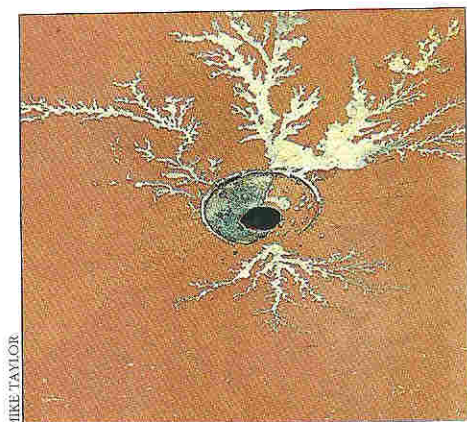
NUMBER 43
OCTOBER/NOVEMBER
1996
\$5.95

LIGHTNING PROTECTION SYSTEMS
J.B. HARGRAVE, DESIGNER
WET EXHAUSTS
REPAIRS TO ADVANCED COMPOSITES



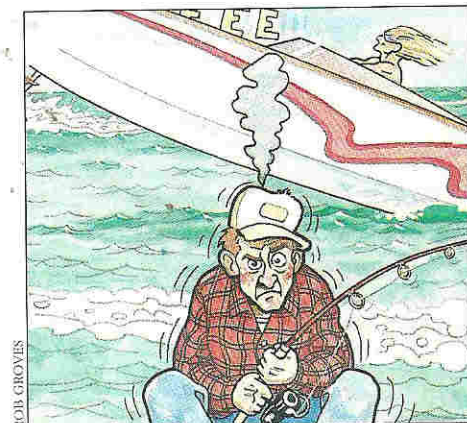
COURTESY DUDLEY DAWSON

Reviewing Hargrave's work. Page 36.



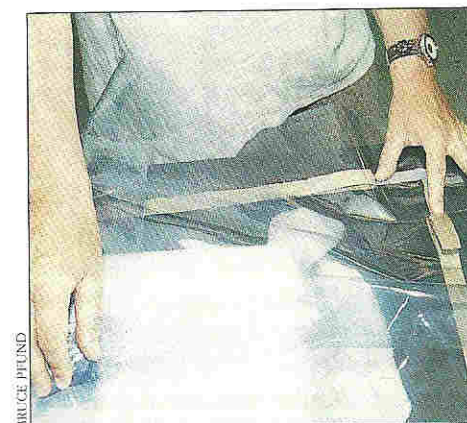
MIKE TAYLOR

Avoiding lightning damage. Page 64.



BOB GROVIER

Defining boat noise levels. Page 75.



BRUCE PFUND

Vacuum-bagging efficiently. Page 24.

FEATURES

- 24 **Cost-Effective Vacuum-Bagging** *by Bruce Pfund*
The best way to avoid bagging problems is to anticipate them.
- 36 **J.B. Hargrave, Designer** *by Dudley Dawson*
A partial retrospective of his work. A personal remembrance of the man.
- 44 **Wet Exhausts** *by Nigel Calder*
A well-designed exhaust system will keep water from drowning an engine.
- 54 **Repairing Advanced-Composite Laminates** *by Michael Hoke*
When is a boat like an airplane? When it's built like one, with advanced composites—and it requires repair.
- 64 **Lightning-Protection Systems** *by Michael Taylor*
Nothing stops a lightning strike. But a good system can avert serious damage.
- 75 **The Case Against Boat Noise** *by Barbara Jean Walsh*
In judging noise and nuisance levels, are we dealing with facts or with perceptions?

DEPARTMENTS

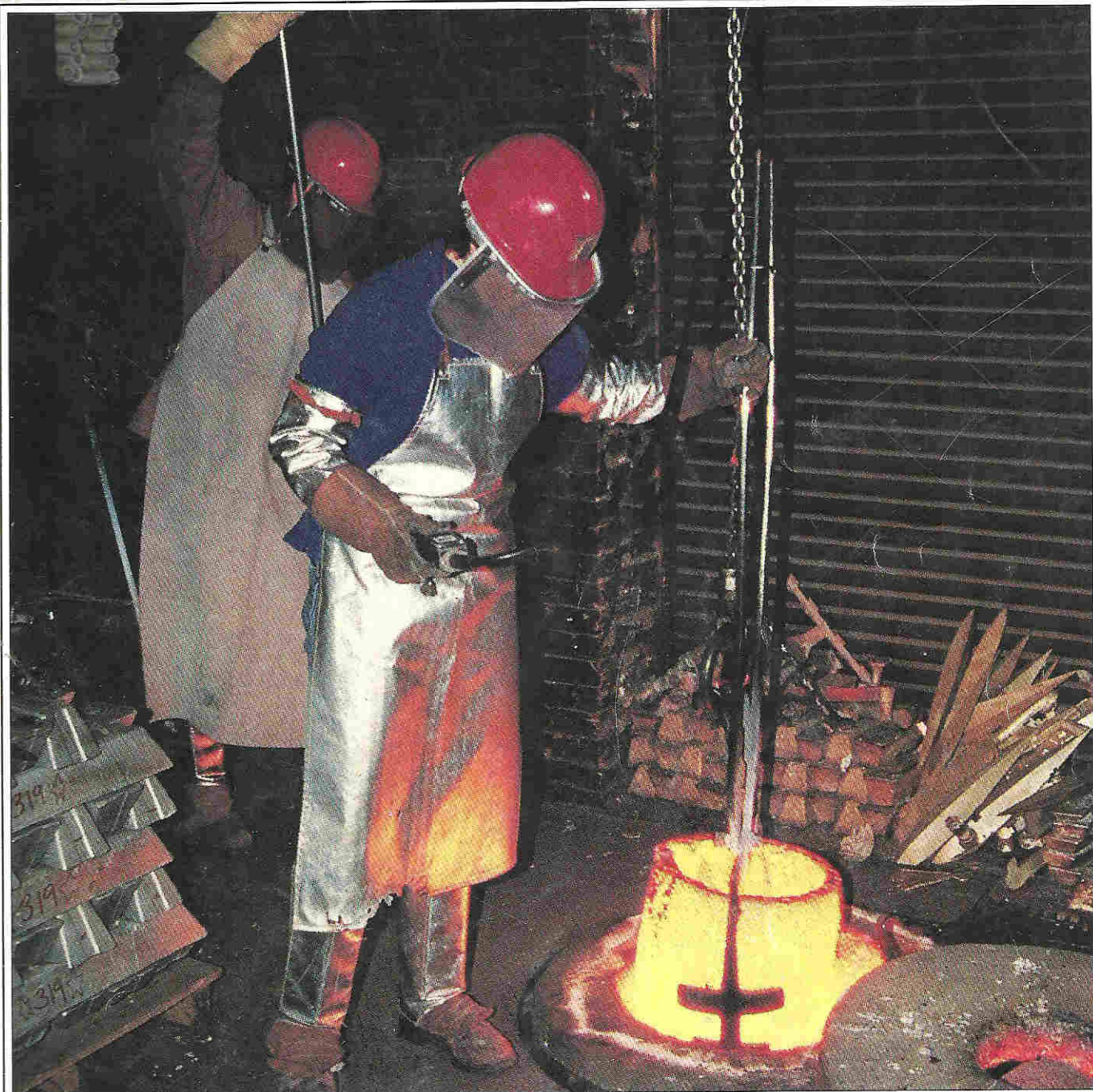
- 5 **Letters**
Readers comment about galvanic isolators; sprayable epoxy; and the Bertram experience.
- 13 **Legal Advocate** *by Marcia Kull*
Trademark laws go a long way toward protecting your product's image.
- 17 **Shop Talk** *by Barbara Jean Walsh*
Information for the international marketplace; modern electric powerboating; and traditional sail in metal.
- 83 **Tools of the Trade**
A look at a line of computer-lofted aluminum "kit boats," and the new edition of an invaluable marine-systems manual.
- 96 **Parting Shot** *by Henry Elliot*
There are lessons to be learned from a recent controversy involving failed sandwich structures in the racing fleet.

READER SERVICES

- 80 **Advertisers' Index and Reader-Service Card**
- 92 **Classified Advertising**

On the cover: A thunderstorm lashes out at Lake Union in Seattle, Washington. Only a boat equipped with a proper protection system is safe from the serious damage that a lightning strike can cause. Story on page 64. *Photograph by Jeffrey W. Myers/Uniphoto.*

•PROFESSIONAL• BOATBUILDER



The Magazine for Those Working in Design, Construction, and Repair

NUMBER 42
AUGUST/SEPTEMBER
1996
\$5.95

WORKING WITH THE FOUNDRY
WEIGHT ESTIMATES AND STABILITY TESTS
SWITCHING TO VINYL ESTER OR EPOXY
A BOAT PAINTER'S PAINT BOOTH

FEATURES

- 20 A Painter's Paint Booth** *by Mary Sullivan*
Little Harbor Marine builds a user-friendly spray booth that improves finish work and anticipates federal regulations.
- 26 Weight Estimating and the Stability Test** *by Eric Sponberg*
A naval architect details how—and why—to document boat weight and conduct a simple but efficient stability test.
- 34 Yard Boats** *by Jonathan Klopman*
The favorite vessel at a yard is often not the fanciest yacht stored there. It's the boat doing the grunt work.
- 39 Carderock** *by Paul Lazarus*
The world's finest naval research facility is ready to provide technical support to boat builders and designers.
- 46 Working with a Foundry** *by Bruce Pfund*
Custom castings are best made by small foundries who can help take you from initial drawings to finished product.
- 52 Changing Over to High-Performance Resins** *by Ted Hugger*
Three production boatbuilders discuss their experiences with vinyl ester and epoxy laminating systems.
- 62 The Fine Points of Changing Over** *by Bruce Pfund*
Shop practices and process equipment are only two of several items on this checklist for switching resin systems.

DEPARTMENTS

- 5 Letters**
Lots of letters about: taping and tabbing; encapsulated plywood; structural adhesives; and more.
- 16 Shop Talk** *by Barbara Jean Walsh*
SeaArk's Zach McLendon is reunited with his first plant, while Mad River's Kay Henry redefines direct marketing.
- 68 Legal Advocate** *by Marcia Kull*
How do you prevent another company from copying your product and getting away with it?
- 71 Practical Solutions** *by Gordon Reed*
How one yard completed a trunk cabin escape-hatch installation that looks like it came with the boat.
- 74 Tools of the Trade**
A software-based system for remanufacturing props. And a Seattle boatbuilder's dedicated metal-cutting facility.
- 88 Parting Shot** *by Eric Sorensen*
A powerboat test-driver argues that more designers and production builders should let form follow function.

READER SERVICES

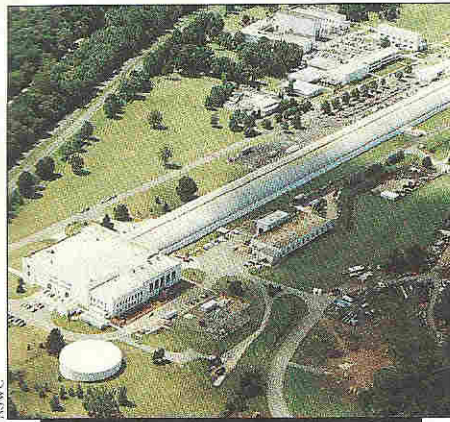
- 72 Advertisers' Index and Reader-Service Card**
84 Classified Advertising

On the cover: Mystic River Foundry molder Sharon Hertzler uses a thermocouple to check the temperature of molten metal in the crucible in preparation for a custom marine casting. Story on page 46.
Photograph by Bruce Pfund.



BILLY BLACK

High-performance resin systems. Page 52.



NSWC

The Navy's R&D center. Page 39.



LITTLE HARBOR MARINE

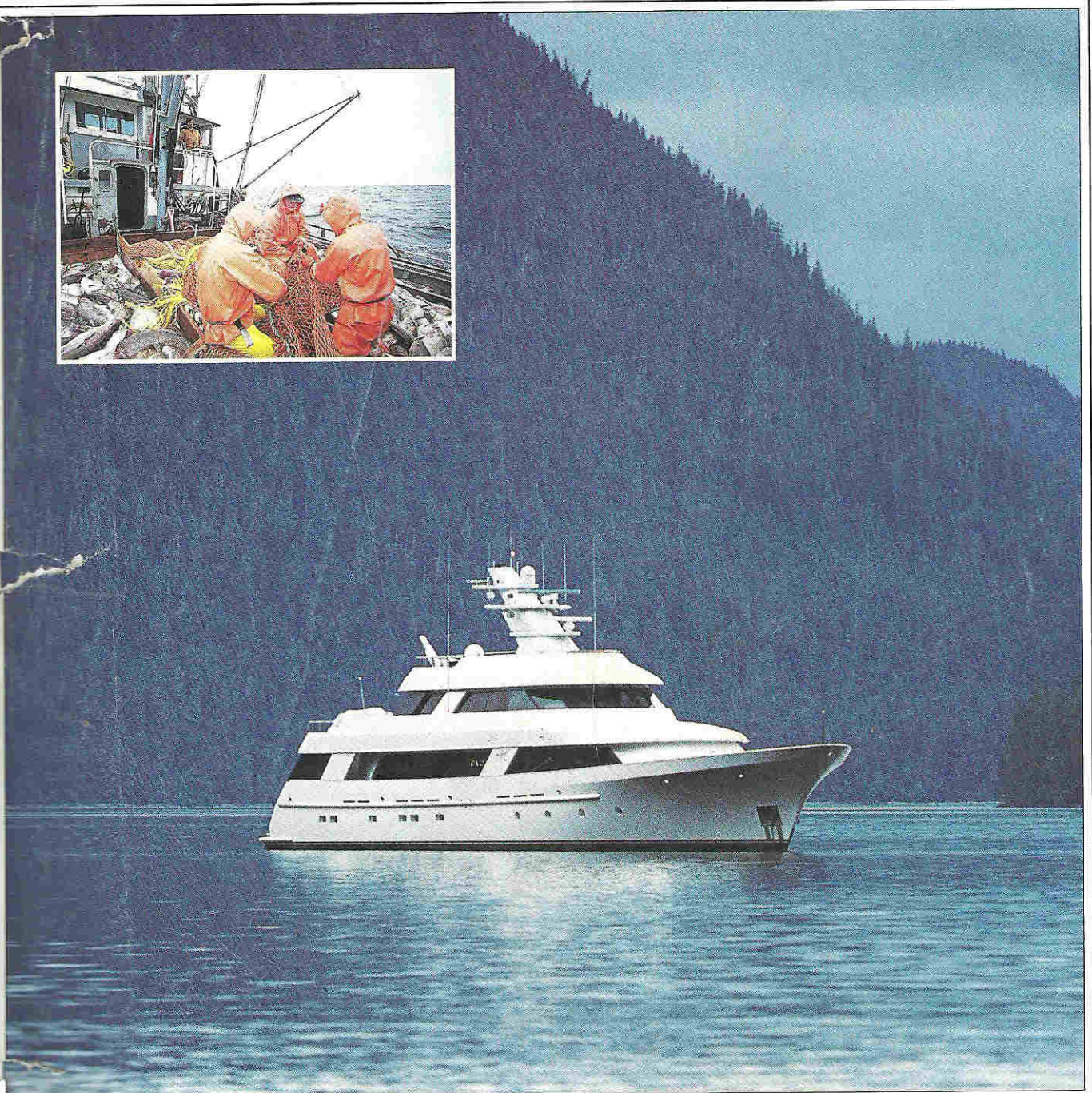
A well-engineered paint booth. Page 20.



ERIC SPONBERG

The stability test simplified. Page 26.

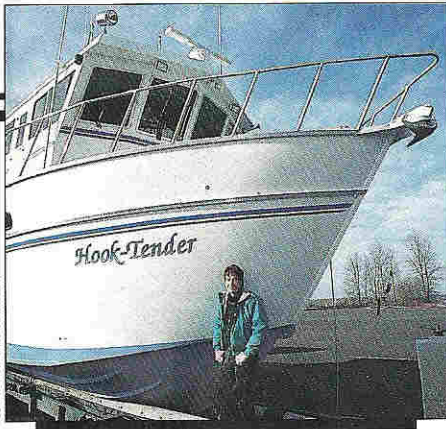
•PROFESSIONAL• BOATBUILDER



THE MAGAZINE FOR THOSE WORKING IN DESIGN, CONSTRUCTION, AND REPAIR

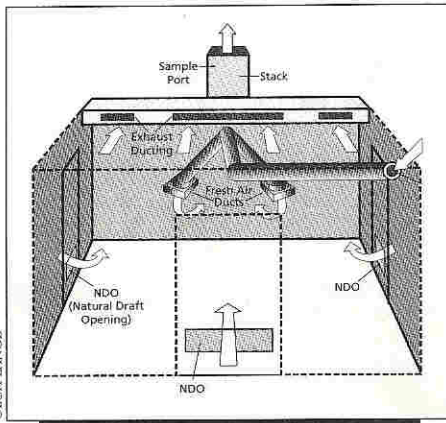
**NUMBER 40
APRIL/MAY
1996
\$5.95**

**COMMERCIAL YARDS THAT SWITCH TO YACHTS
RETHINKING PLYWOOD STRUCTURE
CAD/CAM APPLIED TO JOINERWORK
NEW DATA ON STYRENE**



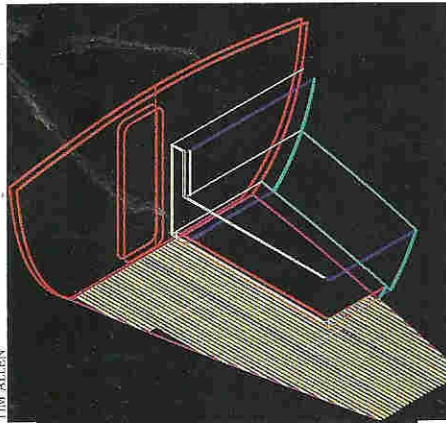
CHARLES B. SUMMERS

Making the switch to yachts. Page 24.



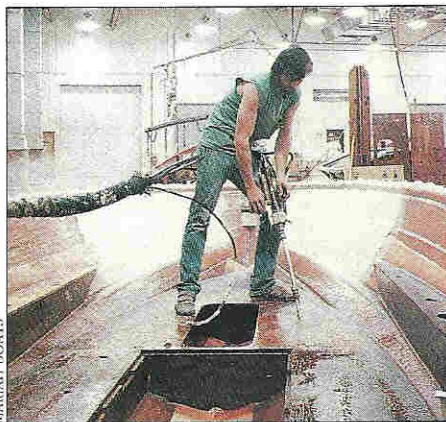
OLGA LANGE

Quantifying air quality. Page 17.



TIM ALLEN

Building interiors by computer. Page 42.



MARIAH BOATS

Production engineering with plywood. Page 54.

FEATURES

- 17 Something in the Air** *by Barbara Jean Walsh*
The most carefully controlled study to date for calculating styrene emissions yields some rather startling results.
- 24 Switching to Yachts** *by Charles Summers*
Yards in the Pacific Northwest that formerly built fishboats are now supplying the yacht market.
- 42 Implementing CAD/CAM, Part Two** *by Christopher Barry*
New computer technologies lend themselves to prefabricated joinerwork and outfitting, and to enhanced marketing.
- 52 Building from a Distance** *by Tim Allen*
A cabinetmaker in Maine constructs a custom interior for a yacht a thousand miles away.
- 54 The Case for Plywood Structure** *by Robert Schofield*
Production boatbuilders in FRP who are busy "getting the wood out" may need to re-evaluate their assumptions.

DEPARTMENTS

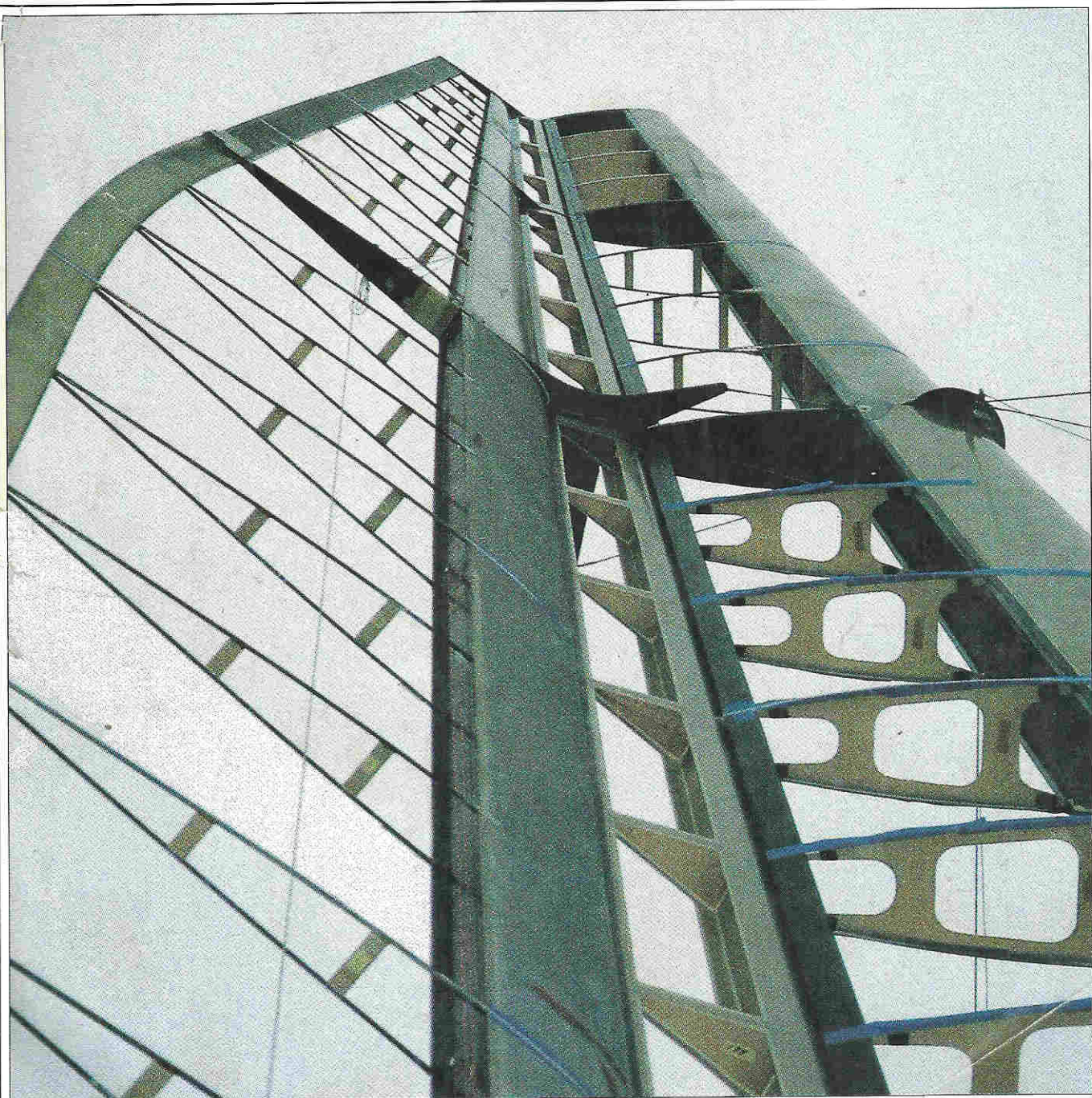
- 12 Legal Advocate** *by Marcia Kull*
What are the limits of legal liability for independent boat or yacht designers?
- 62 Shop Talk** *by Barbara Jean Walsh*
A record crowd at IBEX '96, video diagnostics, and the emerging purchasing power of women in boating.
- 66 Tools of the Trade**
We look at a powerful damage-control pump, ionomer structural foam, and a crew of engineers-for-hire.
- 80 Parting Shot** *by Barbara Jean Walsh*
Increasingly on the Internet, those who buy boats are looking for those who build them.

READER SERVICES

- 72 Advertisers' Index and Reader-Service Card**
- 76 Classified Advertising**

On the cover: Delta Marine has produced hundreds of fishboats. Today, though, the Seattle yard is a major builder of megayachts. The strong contrast between these two vessel types—and the trade that goes with it—is exemplified by the two images on our cover. Story on page 24. Photograph by Martin Fine; inset by William Maguire.

•PROFESSIONAL• BOATBUILDER



THE MAGAZINE FOR THOSE WORKING IN DESIGN, CONSTRUCTION, AND REPAIR

NUMBER 39
FEBRUARY/MARCH
1996
\$5.95

ADVANCED COMPOSITES IN A SIMPLE SHOP
HOW YACHTS ARE CLASSED
TAPING, TABBING, AND SECONDARY BONDING
LESSONS LEARNED AT BERTRAM YACHT



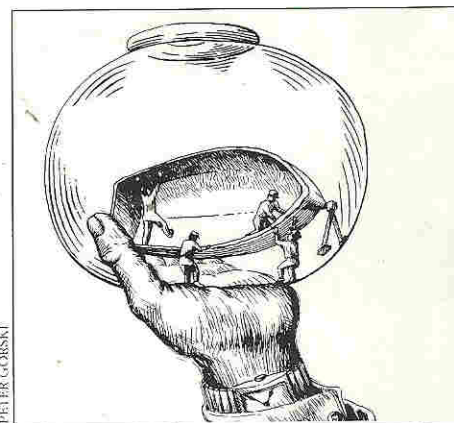
FOREST JOHNSON

Reflecting on the Bertram experience. Page 70.



HENRY ELLIOT

Building with advanced composites. Page 30.



PETER GORSKI

Reducing stress in the production shop. Page 52.



COURTESY GENE SPINAZOLA

Preparing for fire emergencies. Page 44.

FEATURES

- 19 Taping and Tabbing** *by Bruce Pfund*
This reprise of an important IBEX panel focuses on critical FRP construction procedures that are often overlooked.
- 27 Secondary Bonding Revisited** *by William Platt*
In a companion piece to the article above, the author details the differences between primary and secondary bonds.
- 30 Advanced Composites in a Simple Shop** *by Henry Elliot*
The *Cogito* team builds a Little America's Cup contender with aerospace materials in a basic barn.
- 44 Fire-Emergency Preparedness** *by Gene Spinazola*
Any boatyard or marina faces a high probability of fire. Fighting that fire effectively requires planning.
- 52 Stress in a Production Setting** *by Jeffrey Johnson*
Unempowered production workers, argues a health scientist, are at risk for heart conditions caused by stress.
- 56 Rethinking Battery Banks** *by Nigel Calder*
Conventional wisdom has it that two house banks are better than one. New technology challenges this assumption.
- 67 Beached Whales, Droop Snoots** *by Ken Hankinson*
A naval architect examines the design criteria of smaller, production-built power cruisers.
- 70 Reflecting on the Bertram Experience** *by Paul Lazarus*
Longtime Bertram Yacht engineer and executive Lee Dana speaks candidly about this brilliant but troubled company.
- 80 Classing Yachts** *by Michael Taylor*
A veteran marine surveyor explains how ABS and Lloyd's set standards for yacht construction and repair.

DEPARTMENTS

- 4 Letters to the Editor**
Readers comment on keelbolts, and early fiberglass.
- 12 Legal Advocate** *by Marcia Kull*
Defining defects under the federal Boat Safety Act.
- 90 Shop Talk** *by Barbara Jean Walsh*
A tornado at Tracker, and a styrene-emissions test report.
- 98 Tools of the Trade**
We look at battery testers, and UHMW-PE marine fittings.
- 112 Parting Shot** *by Carl Cramer*
Advertisers can't buy PBB editorial coverage. Period.

READER SERVICES

- 104 Advertisers' Index and Reader-Service Card**
- 108 Classified Advertising**

On the cover: The articulating wing of *Cogito*, a Little America's Cup contender, built with advanced composites. Story on her construction begins on page 30. *Photograph by Henry Elliot.*