

# Design of the Navy 44 STC MKII

Presented by  
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Pedrick Yacht Designs, Inc.  
Newport, Rhode Island, USA

Annapolis, MD  
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# Design of the Navy 44 STC MKII

## Sail Training Craft

“Thus, long experience at Annapolis dictated a sturdy, forgiving boat which required minimal cosmetic and material maintenance, a boat which could carry beginners to sea, allow them to make serious errors and still return them safely, and at the same time, have competitive potential under the emergent International Measurement System (IMS).”

-Capt. John Bonds (1989—CSYS)

## Command-Leadership-Teamwork

# Design of the Navy 44 STC MKII

## Design Mission

- Evolution not Revolution
- Recognizable as a Navy 44
- Remain sea-kindly and improve safety
- Lighter & stronger thru improved materials
- Faster thru weight reduction & improved design
- Remain true to the original mission statement

# Design of the Navy 44 STC MKII Partners

- Naval Academy Sailing
- Fales Committee
- NAVSEA
- USNA Student Research



# Design of the Navy 44 STC MKII

## Student Research

- Hull Design
- Performance Analysis
- Deck Layout
- Grounding Loads
- Hull Structure



# Design of the Navy 44 STC MKII

## NAVSEA



- Design Support
- Specification Development
- Contracting
- Inspection

# Design of the Navy 44 STC MKII

## Fales Committee



- Recommendations based on existing MK I design
- Reinforcement of service mission
- Specific requests about configuration
- Review of design plans at critical times

# Design of the Navy 44 STC MKII Naval Academy Sailing



## and Small Craft Repair Facility

- CAPT McCormack, CDR Vandenberg, Dan Rugg, Pete Carrico, Ralph Naranjo – Deck, Arrangement, Systems, Spec
- Paul Miller – Structural Support
- Tom Carr – Maintenance & Systems

# Design of the Navy 44 STC MKII

## The New Navy 44



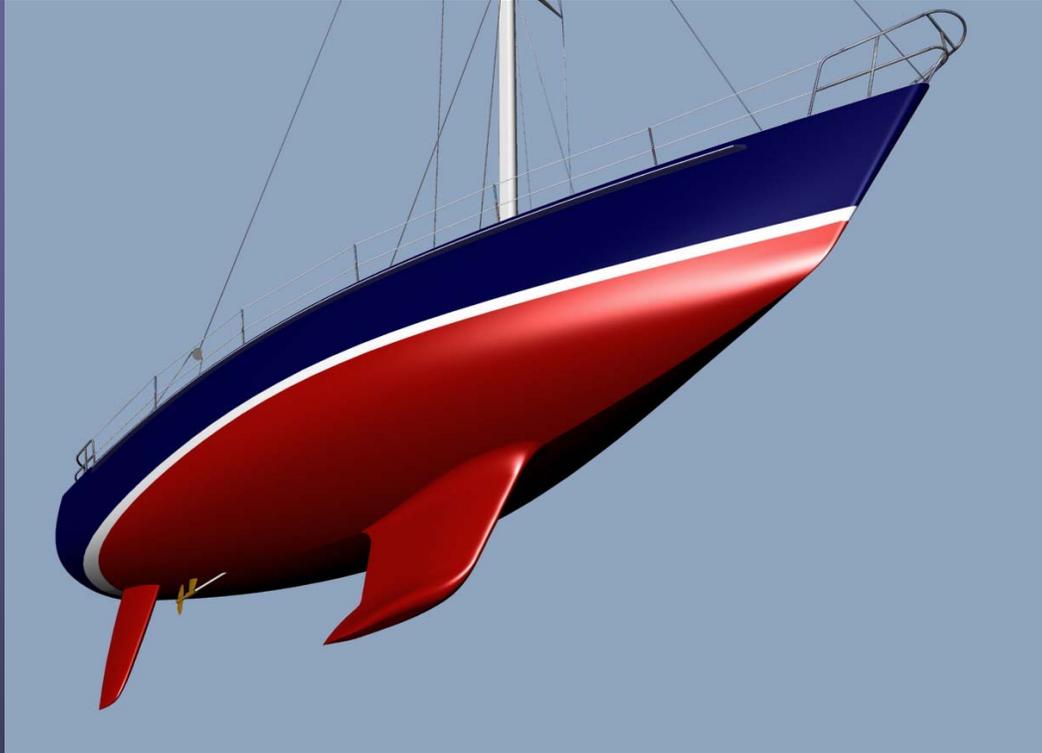
Pedrick Yacht Designs, Inc.

# Design of the Navy 44 STC MKII

## Principal Characteristics

- LOA: 44'-4"
- LWL: 36'-9"
- Beam: 12'-8"
- Draft: 7'-5"
- Disp: 25,750 lbs.  
IMS Measurement
- SA: 1035 sq. ft.
- Fuel: 65 gal
- Water: 195 gal
- Waste: 50 gal
- Elec: 840Ah @ 12V
- D/L: 270
- SA/ $\Delta$ : 17.3

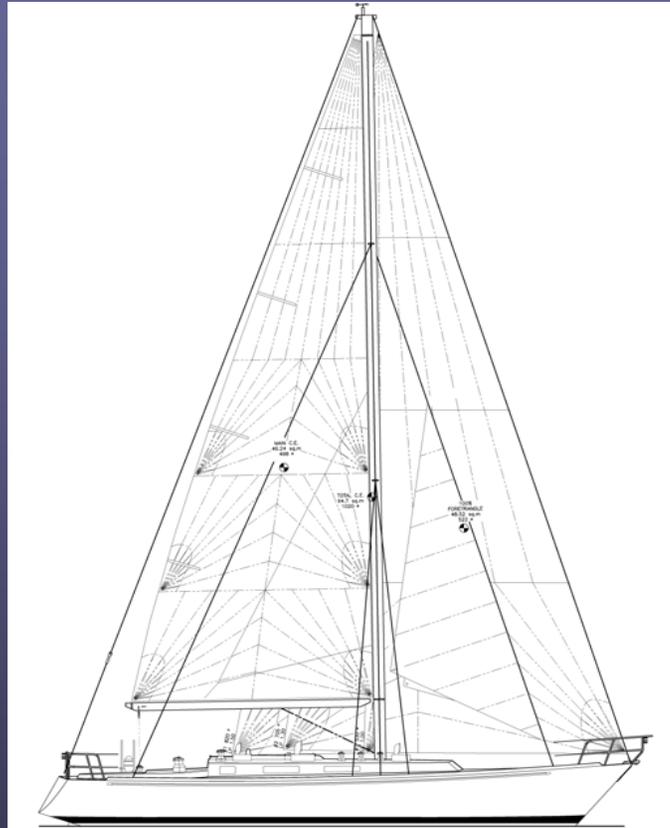
# Design of the Navy 44 STC MKII Hull, Keel, & Rudder



- Modernized hull
- More effective keel
- Spade rudder

# Design of the Navy 44 STC MKII

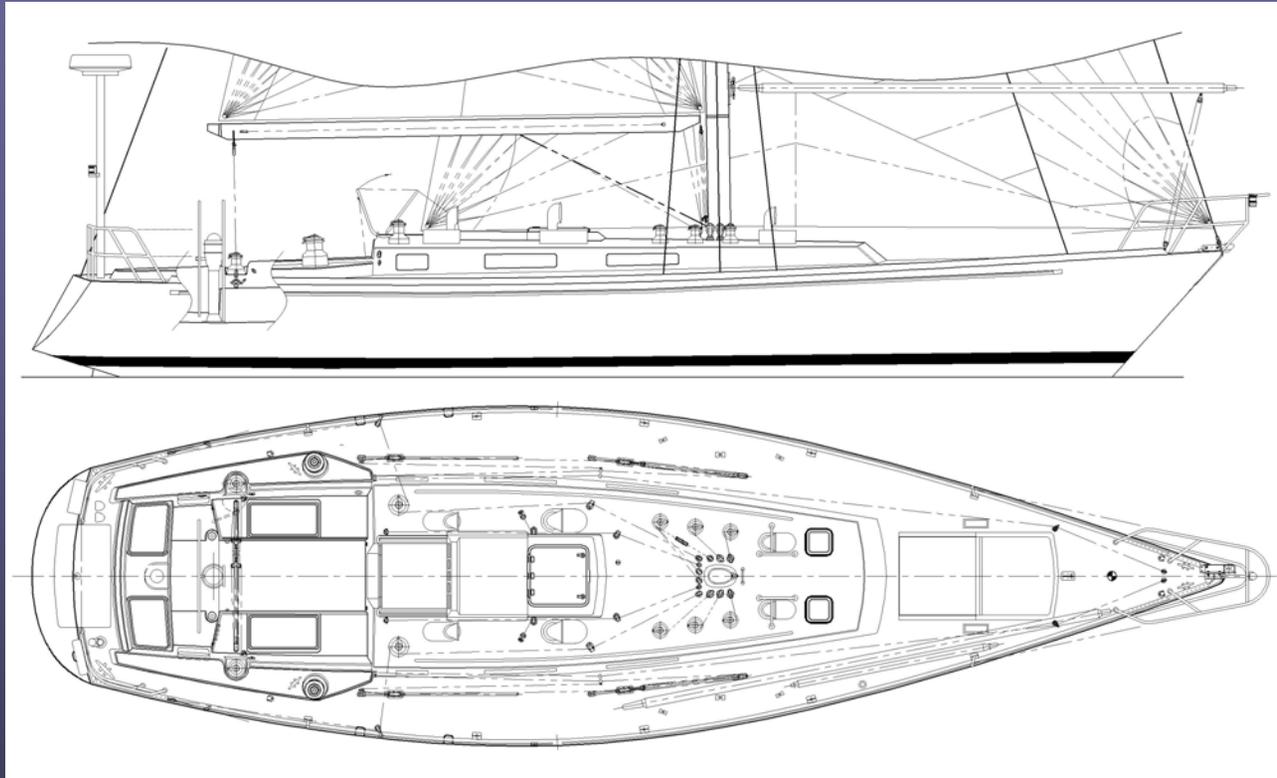
## Sail Plan



- Interchangeable headsails
- Similar, conservatively spec'd rig
- Longer boom

# Design of the Navy 44 STC MKII

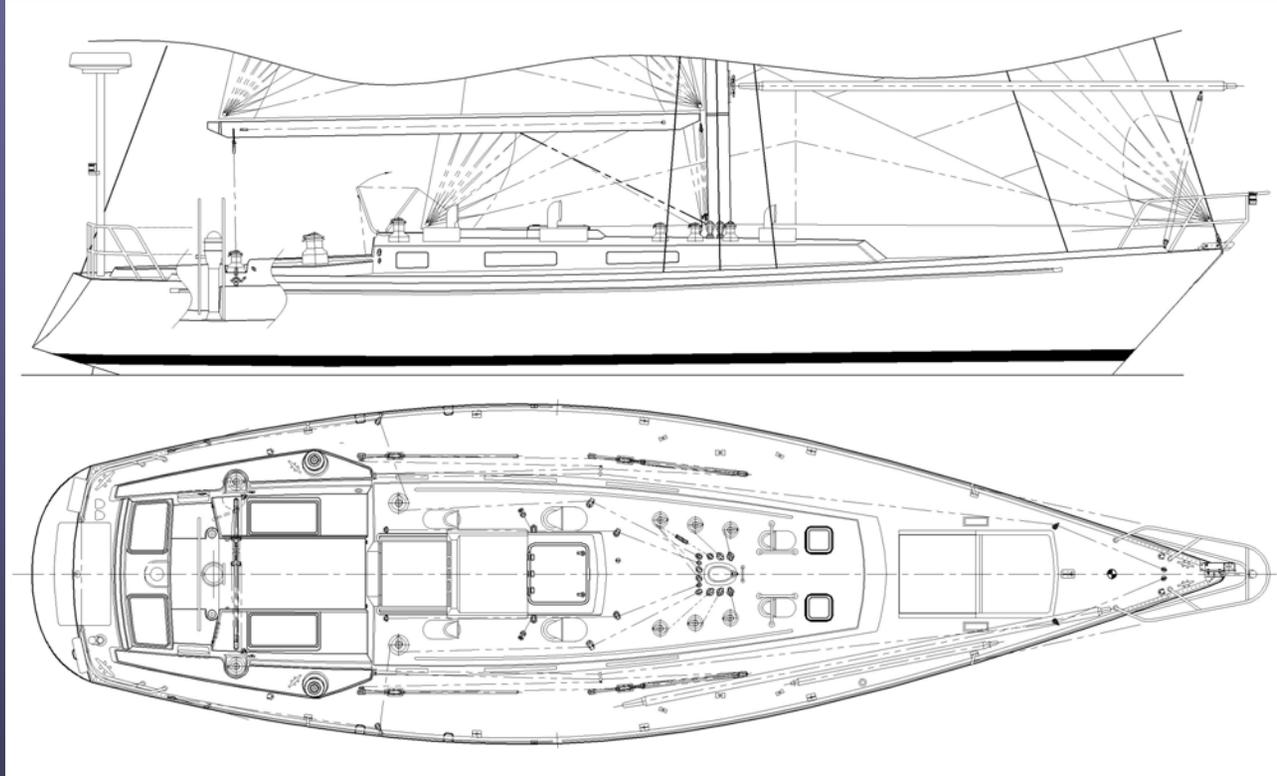
## Deck Plan



- Moved traveler aft
- Improved winch layout & eliminated footblocks
- Increased cockpit sole space and improved companionway access with dedicated liferaft locker

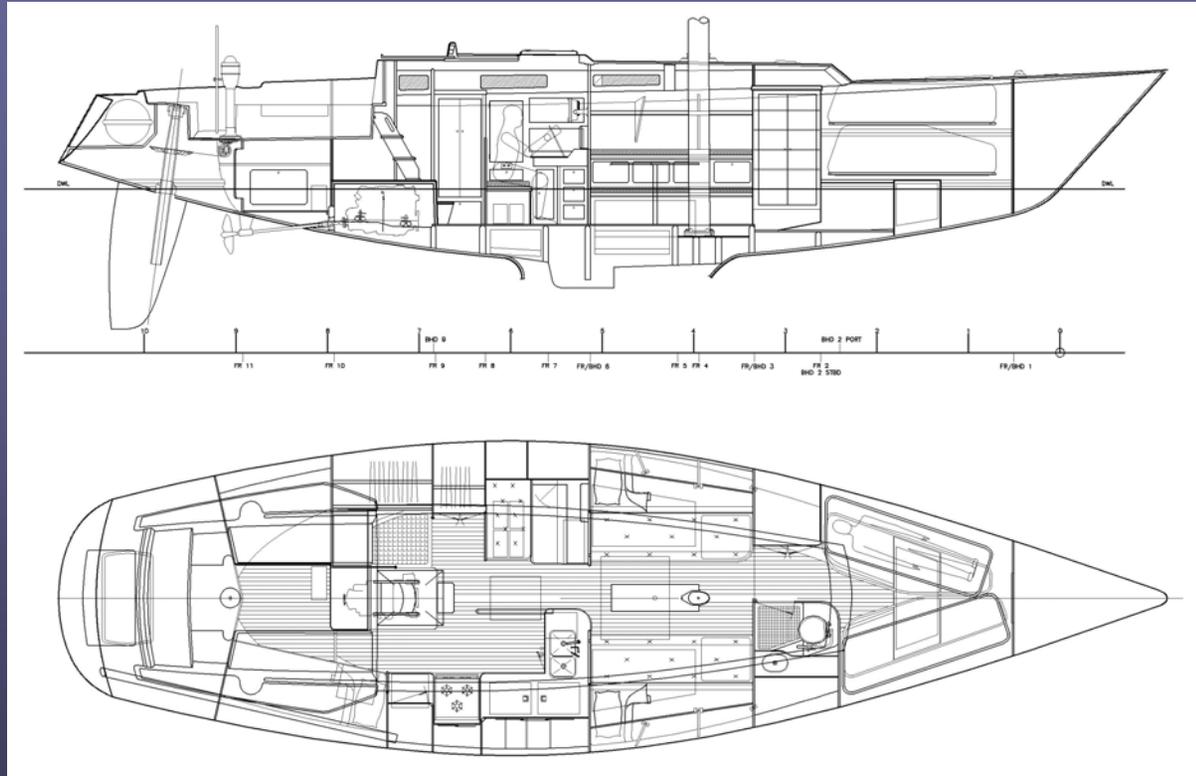
# Design of the Navy 44 STC MKII

## Deck Plan



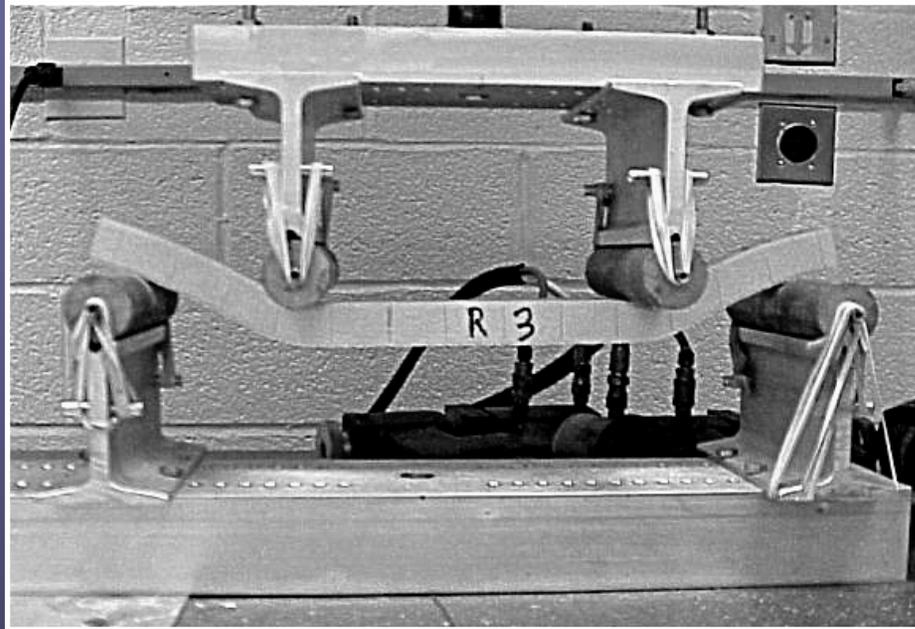
- Adjustable jib leads
- Retained halyard winches at mast
- Moved midship hatch to clear boom vang
- Changed to sliding foredeck hatch

# Design of the Navy 44 STC MKII Interior Arrangement



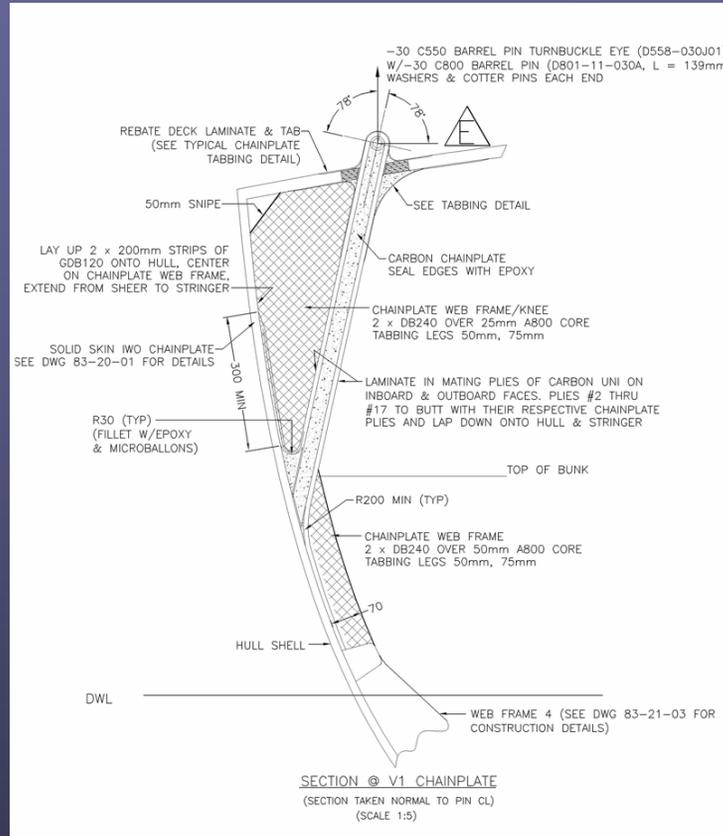
- 8 midshipmen + 1 or 2 officers
- Moved head forward
- Added large wet locker aft
- Similar nav station with updated electronics

# Design of the Navy 44 STC MKII Structure



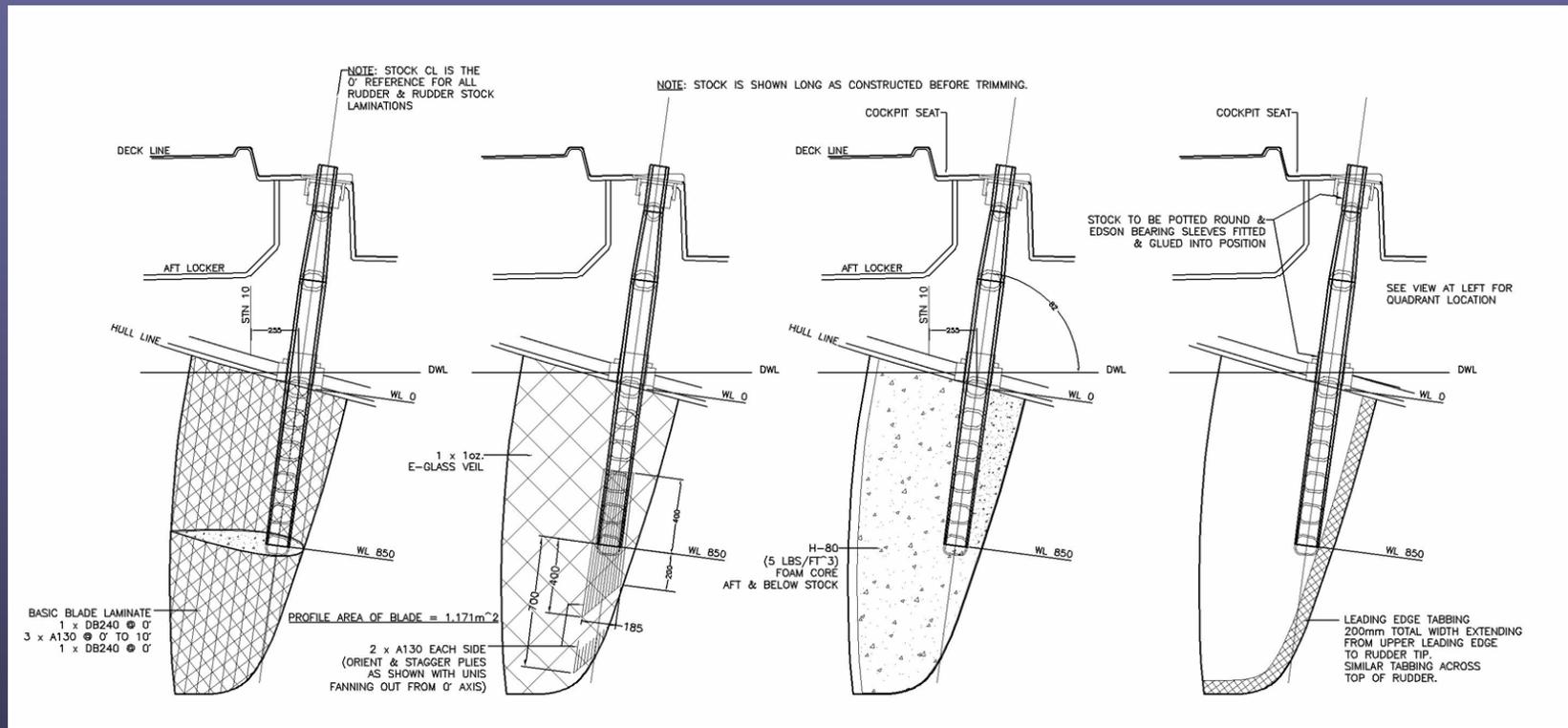
- Student research & Paul Miller
- Significant solid reinforcement at keel for grounding
- CF in floor grid and deck beam for improved stiffness
- Carbon fiber chainplates
- Rubrail added for piling protection

# Design of the Navy 44 STC MKII Carbon Chainplates



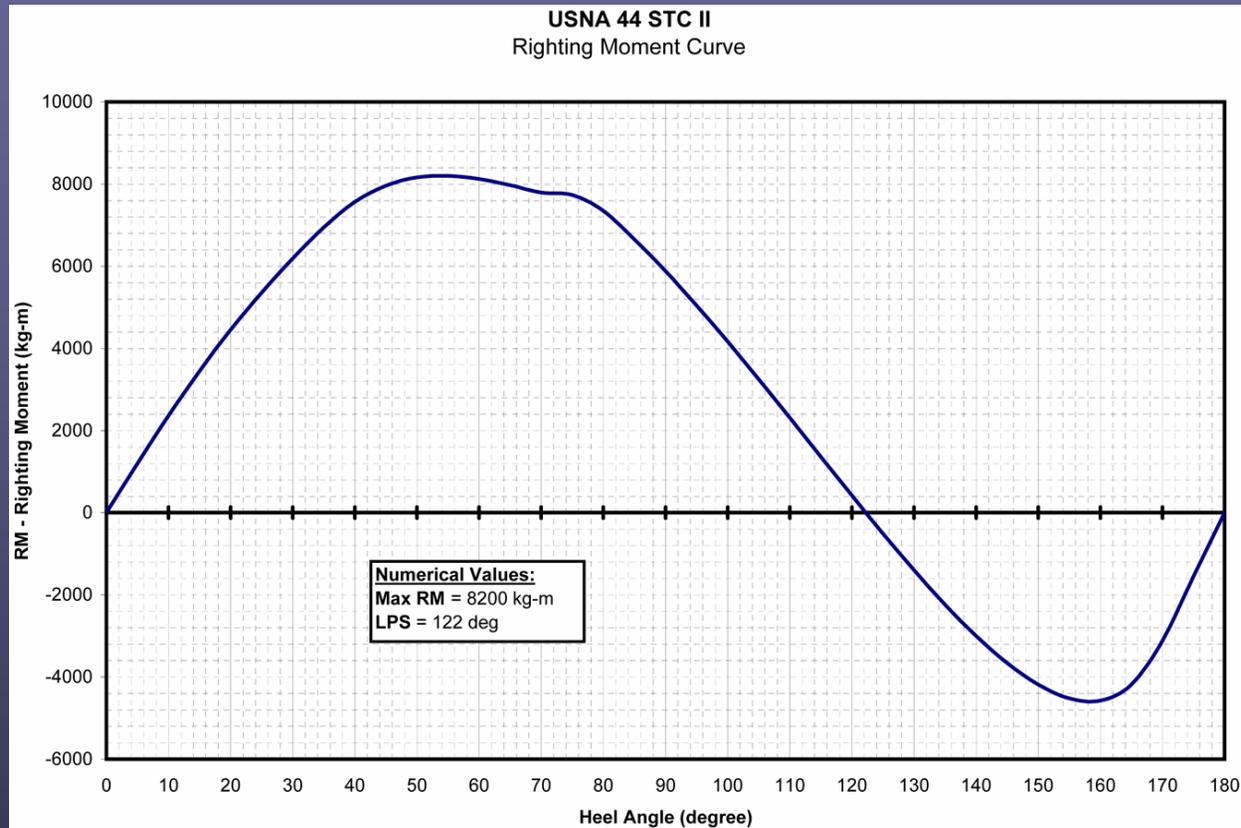
- Leaking around chainplates is a current problem
- Chainplate intrusion into pilot berths reduced
- Bench-constructed to ease production

# Design of the Navy 44 STC MKII Carbon Rudder Stock



- Allows finer foil and lower deflections
- Designed for extreme backing condition of 7 kts.

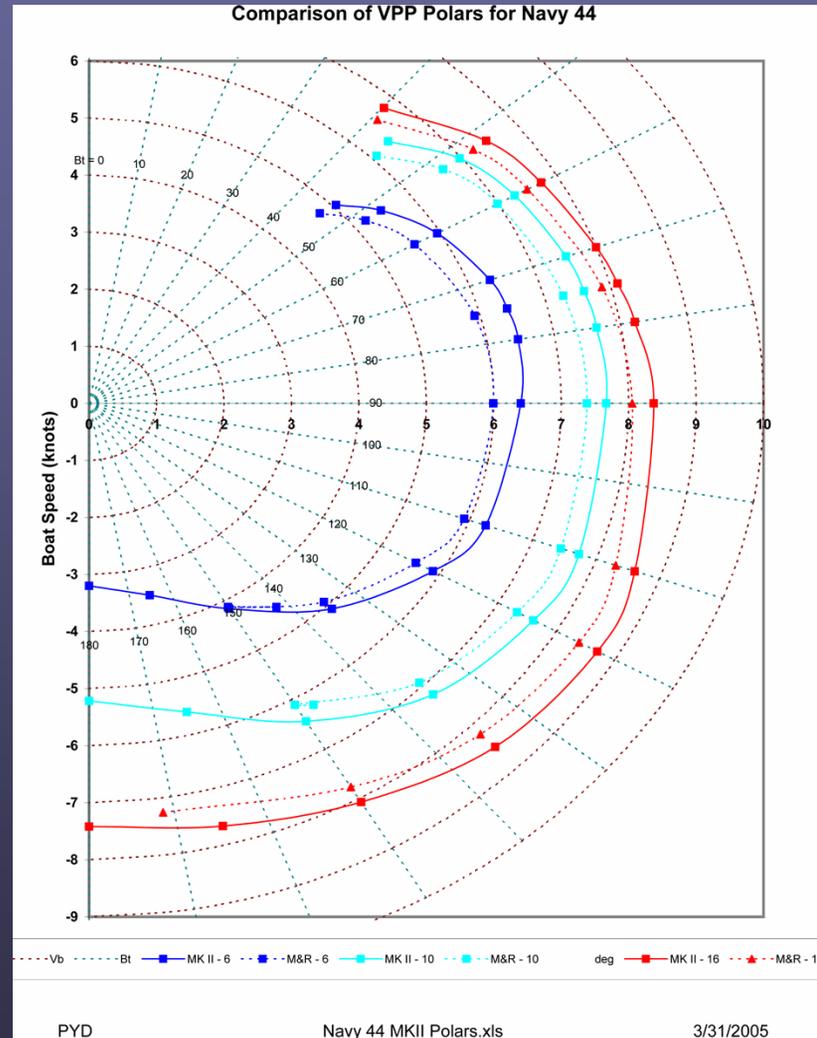
# Design of the Navy 44 STC MKII Performance -- Stability



- 122 degree Limit of Positive Stability
- 8200 kg-m max Righting Moment
- 131 IMS Stability Index

# Design of the Navy 44 STC MKII

## Performance -- Polars



- About 15% faster under Power
- Pedrick Yacht Designs, Inc.

# Design of the Navy 44 STC MKII

## Spec Development

- NAVSEA
  - Naval Academy Sailing
  - Small Craft Repair Facility
  - Pedrick Yacht Designs
- 
- Construction
  - Equipment
  - Testing
  - Trials

# Design of the Navy 44 STC MKII

## Final Design Package

PEDRICK YACHT DESIGNS, Inc. -- PLAN LIST

Design #83 -- USNA 44 -- 44 foot Sail Training Craft

For : United States Naval Academy

D:\Jobs\USNA 44\Dwg\83-PlanList\_040329.xls  
Updated: 29-MAR-04

83-

| TITLE                                           | DWG | SHEET | ALT | BY     | SCALE     | SIZE | Ait-0     | Ait-A     | Ait-B     | Ait-C     | Ait-D     | Ait-E     | Ait-F     | FILE-NAME                              | EXTERNAL REFERENCE |
|-------------------------------------------------|-----|-------|-----|--------|-----------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------------------------------------|--------------------|
| Hull Lofting                                    |     |       |     | RS     |           |      |           |           |           |           |           |           |           | 83-5107240_HullModel_040325.igs        | 5107240            |
| Keel Lofting                                    |     |       |     | RS     |           |      |           |           |           |           |           |           |           | 83-5107241_KeelModel_040325.igs        | 5107241            |
| Rudder Lofting                                  |     |       |     | RS     |           |      |           |           |           |           |           |           |           | 83-5107242_RudderModel_040325.igs      | 5107242            |
| Deck Lofting                                    |     |       |     | RS     |           |      |           |           |           |           |           |           |           | 83-5107243_DeckModel_040325.igs        | 5107243            |
| Hull Lines                                      | 01  | 01    | A   | GS/RS  | 1:30      | H    | 16-Jul-03 | 23-Oct-03 |           |           |           |           |           | 83-01-01-A_HullLines_031023            | 5107244            |
| Deck Lines                                      | 05  | 01    | C   | RS     | 1:15      | H    | 22-Aug-03 | 8-Oct-03  | 8-Dec-03  | 14-Jan-04 |           |           |           | 83-05-01-C_DeckLines_040114            | 5107245            |
| Arrangement Plan and Elevations                 | 10  | 01    | C   | RS     | 1:20      | H    | 24-Jun-03 | 27-Aug-03 | 28-Aug-03 | 10-Oct-03 |           |           |           | 83-10-01-C_ArgmtPlan_031010            | 5107246            |
| Arrangement Sections                            | 12  | 01    | C   | RS     | 1:10      | H    | 23-Jun-03 | 27-Aug-03 | 10-Oct-03 | 14-Dec-04 |           |           |           | 83-12-01-C_ArgmtSections_040114        | 5107247            |
| Deck Plan                                       | 15  | 01    | F   | GS     | 1:10      | H    | 22-Jul-03 | 27-Aug-03 | 29-Aug-03 | 16-Oct-03 | 8-Dec-03  | 16-Dec-03 | 19-Jan-04 | 83-15-01-F_DeckPlan_040119             | 5107248            |
| Sail Plan & Rig Layout                          | 16  | 01    | C   | GS     | 1:25      | H    | 23-Jun-03 | 27-Aug-03 | 17-Oct-03 | 3-Dec-03  |           |           |           | 83-16-01-C_SailPlan_031203             | 5107249            |
| Boot Top Plan                                   | 17  | 01    | A   | RS     | 1:10      | H    | 21-Oct-03 | 11-Nov-03 |           |           |           |           |           | 83-17-01-A_BootTopPlan_031111          | 5107250            |
| Propulsion Arrangement                          | 19  | 01    | C   | GS     | 1:5       | H    | 29-Aug-03 | 14-Oct-03 | 11-Nov-03 | 27-Jan-04 |           |           |           | 83-19-01-C_PropulsionArgmt_040127      | 5107251            |
| Exhaust and Engine Box Ventilation Arrangement  | 19  | 02    | O   | GS     | 1:5       | H    | 8-Oct-03  |           |           |           |           |           |           | 83-19-02_ExhaustArgmt_031008           | 5107252            |
| Hull Construction Laminates                     | 20  | 01    | E   | GS     | 1:100     | H    | 3-Jul-03  | 4-Aug-03  | 28-Aug-03 | 10-Oct-03 | 14-Oct-03 | 7-Nov-03  |           | 83-20-01-E_Hull_Laminate_031107        | 5107253            |
| Hull Construction Floor Grid Laminate           | 20  | 02    | B   | GS     | 1:25      | H    | 30-Jul-03 | 20-Aug-03 | 14-Oct-03 |           |           |           |           | 83-20-02-B_Floor_Grid_Laminate_031014  | 5107254            |
| Hull Construction Plan                          | 21  | 01    | C   | RS/GS  | 1:10      | H    | 3-Jul-03  | 28-Aug-03 | 15-Oct-03 | 22-Jan-04 |           |           |           | 83-21-01-C_ConstPlan_040122            | 5107255            |
| Hull Construction Profile                       | 21  | 02    | B   | GS     | 1:10      | H    | 28-Aug-03 | 15-Oct-03 | 22-Jan-04 |           |           |           |           | 83-21-02-B_ConstProfile_040122         | 5107256            |
| Hull & Deck Construction Section                | 21  | 03    | F   | GS     | 1:20      | H    | 3-Jul-03  | 30-Jul-03 | 29-Aug-03 | 6-Oct-03  | 21-Oct-03 | 5-Dec-03  | 19-Jan-04 | 83-21-03-F_ConstFrames_040119          | 5107257            |
| Head Pan Construction                           | 21  | 04    | B   | GS     | 1:10      | H    | 13-Aug-03 | 21-Nov-03 | 14-Jan-04 |           |           |           |           | 83-21-04-B_HeadPanConst_040114         | 5107258            |
| Deck Construction Laminates                     | 23  | 01    | B   | JV     | 1:30      | H    | 29-Aug-03 | 2-Oct-03  | 16-Dec-03 |           |           |           |           | 83-23-01-B_DeckConst_031216            | 5107259            |
| Deck Construction Details                       | 23  | 02    | B   | JV/GS  | Varies    | H    | 16-Sep-03 | 16-Oct-03 | 19-Jan-04 |           |           |           |           | 83-23-02-B_DeckConstDetails_040119     | 5107260            |
| Deck Hatch Construction Details                 | 23  | 03    | A   | JV/GS  | Varies    | H    | 16-Sep-03 | 6-Oct-03  |           |           |           |           |           | 83-23-03-A_DeckHatchDetails_031006     | 5107261            |
| Keel Construction Bolt Layout                   | 24  | 01    | B   | GS/GVG | 1:5       | H    | 17-Jul-03 | 6-Aug-03  | 10-Nov-03 |           |           |           |           | 83-24-01-B_KeelConstruction_031110     | 5107262            |
| Rudder Construction & Steering System Schematic | 25  | 01    | D   | GV/G/S | 1:10      | H    | 10-Jul-03 | 29-Aug-03 | 10-Oct-03 | 20-Oct-03 | 16-Dec-03 |           |           | 83-25-01-D_RudderConst_031216          | 5107263            |
| Mast Step & Heel Plate                          | 26  | 01    | C   | GS     | 1:5       | H    | 30-Jul-03 | 21-Oct-03 | 14-Nov-03 | 19-Jan-04 |           |           |           | 83-26-01-C_Mast_Step_040119            | 5107264            |
| Composite Chainplates                           | 27  | 01    | C   | GV/G/S | Noted     | H    | 22-Aug-03 | 29-Aug-03 | 16-Oct-03 | 19-Jan-04 |           |           |           | 83-27-01-C_ShroudChainplates_040119    | 5107265            |
| Stemhead Fitting Stainless Steel Weldment       | 28  | 01    | C   | GS     | 1:5       | H    | 5-Aug-03  | 28-Aug-03 | 10-Oct-03 | 19-Jan-04 |           |           |           | 83-28-01-C_Stem_Fitting_040119         | 5107266            |
| Backstay Chainplates                            | 28  | 02    | B   | GS     | 1:10/Full | H    | 8-Aug-03  | 27-Aug-03 | 15-Oct-03 |           |           |           |           | 83-28-02-B_Backstay_Chainplates_031015 | 5107267            |
| Bonding and Grounding Diagram                   | 31  | 01    | B   | GS     | 1:15      | H    | 31-Jul-03 | 16-Sep-03 | 14-Oct-03 |           |           |           |           | 83-31-01-B_Bonding-Grounding_031014    | 5107268            |
| Piping Schematic                                | 31  | 02    | C   | GS     | None      | H    | 9-Sep-03  | 14-Oct-03 | 4-Dec-03  | 15-Jan-04 |           |           |           | 83-31-02-C_PipingSchem_040115          | 5107269            |
| Electrical Schematic                            | 31  | 03    | B   | GS     | None      | H    | 29-Aug-03 | 9-Oct-03  | 24-Nov-03 |           |           |           |           | 83-31-03-B_ElectricalSchem_031124      | 5107270            |
| Treadmaster Layout Pattern                      | 31  | 04    | D   | GS     | 1:10      | H    | 11-Sep-03 | 17-Oct-03 | 5-Dec-03  | 16-Dec-03 | 19-Jan-04 |           |           | 83-31-04-D_Treadmaster_040119          | 5107271            |
| Nav Station Layout                              | 31  | 05    | D   | GS     | 1:5       | H    | 1-Aug-03  | 27-Aug-03 | 8-Oct-03  | 11-Nov-03 | 19-Jan-04 |           |           | 83-31-05-D_NavSta_040119               | 5107272            |
| Sole Panel Layout                               | 31  | 06    | O   | GS     | 1:5       | H    | 14-Nov-03 |           |           |           |           |           |           | 83-31-06_SolePanel_031114              | 5107273            |

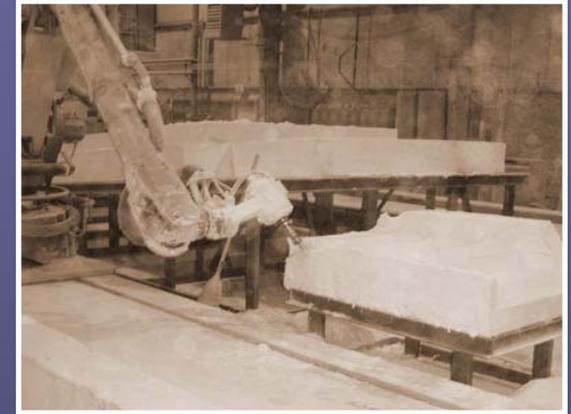
- Standard yacht practice
- Navy contract requirements
- 30 drawings plus 4 IGES files
- Details incl. nav sta & treadmaster layout

# Design of the Navy 44 STC MKII Construction -- Hull Plug



- CNC milled at DLBA Robotics in Virginia
- Final fairing & polishing at Pearson Composites, RI

# Design of the Navy 44 STC MKII Construction -- Deck Plug



- CNC milled at DLBA Robotics
- Deck hardware laid out to solve any conflicts

# Design of the Navy 44 STC MKII Construction – Hull Mold



- 3 Part Mold for SCRIMP infusion process

# Design of the Navy 44 STC MKII

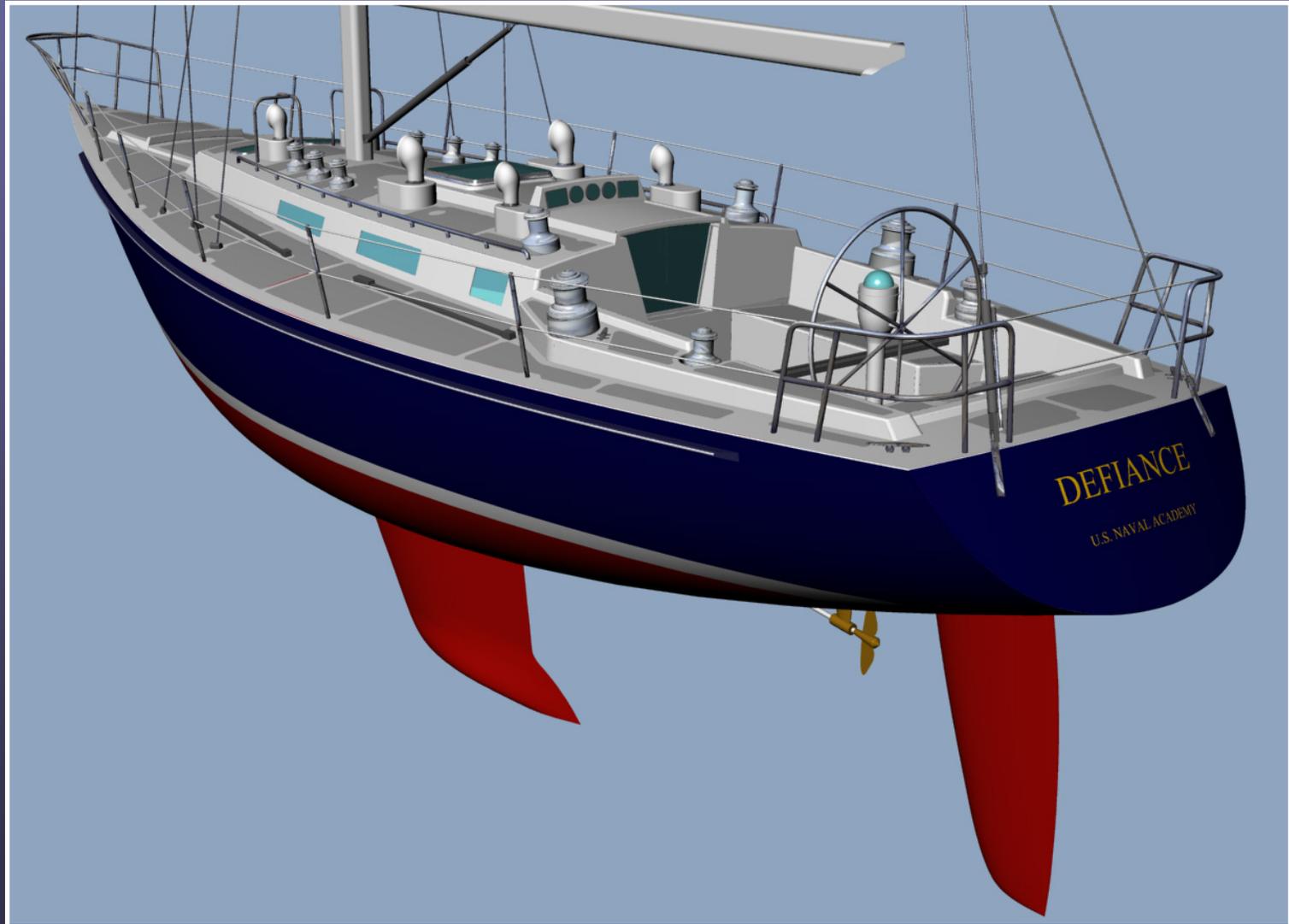
## Conclusion



- Traditional look that will be instantly recognized
- Improved safety via cockpit layout, liferaft, & construction
- Improved interior with lessons learned from MKI
- Lighter, Stronger, Faster
- Continue to train our Navy's leaders for years to come

# Design of the Navy 44 STC MKII

## Questions?



Pedrick Yacht Designs, Inc.