The Masthead

News from Westlawn Institute of Marine Technology

Volume 2, Issue 2 | June, 2008

Inside This Issue

Westlawn is a not-for-profit educational affiliate of:

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Setting Standards for Safer Boating

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Welcome

Dear Students, Alumni, and Friends,

Our free newsletter continues to provide you with information on educational opportunities at Westlawn and ABYC, marine industry news and events, and useful technical articles for students and professionals.

Let us hear from you. We'd like to publish your news, comments, and ideas.
Address your E-mail to: nnudelman@ abycinc.org
We reserve the right to determine if the content is appropriate and if space permits.

Norm

Norman Nudelman, Editor
nnudelman@abycinc.org

Two Industry Leaders Sponsor Westlawn Scholarships

Hargrave Custom Yachts and The Taylor Made Group Support Westlawn Students

Westlawn is pleased to announce that both Hargrave Custom Yachts and The Taylor Made Group have given generously to Westlawn to create scholarships for Westlawn students. These scholarships are an important aid enabling more students to afford their studies and complete their work. Support like this from boating-industry leaders is crucial to ensuring a supply of trained personnel and thus the long-term health of the boating business.

The Hargrave Memorial Scholarship

HARGRAVE CUSTOM YACHTS

Hargrave Custom yachts has funded scholarship in memory of renowned Westlawn alumnus Jack Hargrave. It is the "Hargrave Memorial Scholarship Fund." (A book about Jack Hargrave is available from Westlawn at: Hargrave Book, with proceeds also donated to Westlawn.) This scholarship is for advanced students enrolling in Westlawn Modules 3 or 4. It is effective starting June 15, 2008 and cannot be applied retroactively. Students enrolling in Module 3 or 4, with a grade-point average of 85% or higher, will qualify for a $500 scholarship. Students must have passed at least lesson 19 in Module 2 to enroll in Module 3. The scholarship award will be applied to students' initial payment and first monthly payment(s) if they chose the monthly-payment plan.

The scholarship will remain available on a first-come, first-served basis, for those students who meet the scholarship criteria, until the funds in the Hargrave Memorial Scholarship are expended. Westlawn students should be sure to take advantage of this opportunity to assist with their tuition for Module 3 or 4.

The Taylor Made Group Scholarship

Taylor Made — The Taylor Made Group

The Taylor Made Group has funded a scholarship in memory of Willard (Bill) Taylor. It is the "Taylor Made Scholarship." This scholarship is for intermediate students enrolling in Modules 2, who have done well in their Module 1 or Yacht Design Lite studies. It is effective June 15, 2008 and cannot be applied retroactively.

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Two Scholarships Continued from Pg .1

Students enrolling in Module 2 from either Module 1 or Yacht Design Lite, with a grade-point average of 85% or higher, will qualify for a $250 scholarship. Students must have passed at least lesson 10 of Module 1 to enroll in Module 2. The scholarship award will be applied to students' initial payment and first monthly payment(s) if they chose the monthly-payment plan.

The scholarship will remain available, on a first-come first-served basis, for those students who meet the scholarship criteria until the funds in the Taylor Made Scholarship are expended. Westlawn students should be sure to take advantage of this opportunity to assist with their tuition for Module 2.

Students wishing to apply for either of these scholarships should contact Patti Schulte, student services coordinator: pschulte@abycinc.org

Particularly in the current economic environment, Westlawn is always looking for ways to help students with their tuition. We welcome contributions for scholarship funds to make it easier for more students to enroll in Westlawn to fulfill their dreams and meet industry needs. We have consistently had more positions to fill than graduates to fill them. Westlawn is a not-for-profit institution so all donations are tax deductible.

Hargrave Custom Yachts was originally known as the top yacht design firm in America when, under the direction of legendary designer Jack Hargrave, the company played an important role in the success of companies like Hatteras, Burger, Amels, Prairie, Atlantic, & Halmatic to name just a few.

In 1997, shortly after Jack Hargrave passed away, Michael Joyce returned to the company after an absence of twenty years to take over as president and CEO. Recognizing that Hargrave was far more than a design office, Joyce explained to Boating Industry International Magazine that Jack's name was in fact a "brand name" and outlined his plans to begin construction of luxury yachts under the Hargrave banner.

"In our company we measure our design objectives against Jack Hargrave's dictum that, at the end of the day, the boat has to perform at sea. Everything else in the design process needs to bend to that single principle. It's the right way to do it, and at Hargrave, it's the only way to do it."

The Taylor Made Group consists of several manufacturing enterprises known for the quality of their products and the leadership of their technologies. Although the marine market is the Group's principal focus, its diversified capabilities enable it to compete in a number of other markets as well Member businesses include: Taylor Made Products, Taylor Made Systems, Trend Marine Products, Water Bonnet, Taylor Made Technologies, Taylor Made Glass Systems, and Taylor Made custom Products.

Designing Boats & Careers

Westlawn and Tom Fexas Yacht Design Working Together for Over Four Decade

Over the past four decades, Tom Fexas Yacht Design (TFYD) has turned to the Westlawn Institute of Marine Technology for first-rate design talent. Most recently, Westlawn alumnus Mark Bowdidge, joined TFYD making a remarkable seven Westlawn alumni to be employed there.

Tom Fexas

Founded in 1966 by the renowned designer, the late Tom Fexas, TFYD has pioneered some of the most unique and influential powerboat designs of the second half of the 20th century. With about 1,000 vessels built to their designs, ranging from 17-ft. launches to 160-ft. motoryachts, the Fexas office has remained incredibly busy for decades, with designs from the famous Midnight Lace series, to projects for Palmer Johnson, Cheoy Lee, American Marine, Burger, Derecktor, Royal Denship, Knight and Carver, Mikelson Yachts, and others.

Mark Bowdidge

In order to gain the skills needed for such an influential career, Tom took the Westlawn course in yacht and boat design, in addition to his engineering degree from SUNY Maritime. As his office grew and projects piled up, Westlawn continued as one of the principle sources for design talent. TFYD has many Westlawn alumni over the years, including: Tom Fexas, Jay Coyle, George Rodzon, Earl Alfaro, Stuart Kityama, Nick DiMatteo and just recently, Mark Bowdidge. Not only does TFYD rely heavily on Westlawn to supply top-flight talent, but Tom served on Westlawn's Board of Directors for several years, and TFYD Senior Designer Nick DiMatteo was a Westlawn instructor before Joining Fexas in 1985.

Tom Fexas Yacht Design is one of the foremost yacht design offices in the world, and has been in business since 1966. In 1977, the office moved from Mystic, Connecticut to Stuart, Florida where it grew from a one-man operation to a firm with a staff of seven designers. Tom Fexas Yacht Design, Inc. prides itself on its technical expertise and innovation.

Continued on Pg. 3

Designing Boats & Careers.....*Continued from Pg. 2*

Fexas 160 ft. Motor Yacht

Although Tom passed away in 2006, the TFYD office remains as busy as ever with numerous projects in all phases from early development through recent completion, and the design firm's reliance on Westlawn talent and training has continued unabated. Furthermore, Tom's wife Regina Fexas has taken the reigns as president of TFYD. Deeply involved in TFYD since 1987, she has inspected vessels all over the world and operated their two boats for years. Regina also worked with Tom on his many published articles and in the daily operation of the firm. To further consolidate her knowledge and ensure the continuation of the extraordinary design quality TFYD is known for, Regina has also signed up to take Westlawn Elements of Technical Boat Design/Yacht Design Lite, bringing the total to eight Westlawn people at TFYD over a four-decade relationship.

Regina Fexas
President of Tom Fexas Yacht Design

Dave Gerr, Westlawn Director, commented, *"Westlawn offers an online job board to help all current and former students find employment. We enjoy a long-term relationship with TFYD as well as other design and boatbuilding firms, and we are always happy to work with them."*

Fexas 52 ft. Motor Yacht.

2008 Westlawn Mystic Meet For Westlawn Students and Alumni

Stu critiques a student's work at the June 2007 Mystic Meet

Westlawn's Third Annual Mystic Meet is scheduled for **Saturday and Sunday July 26 and 27.** Guest speaker will be Rod Johstone, founder of J-Boats and a Westlawn alumnus. Plan to arrive Friday, July 25 because we'll start early on Saturday morning. The meet will take place at the same time as Mystic Seaport's *Antique and Classic Boat Rendezvous*. There will be plenty to see and do at **Westlawn's Mystic Seaport campus**. We have arranged for inexpensive hotel rooms just a few minutes away.

PLEASE RSVP BY JULY 12:

Email Patti Schulte to let us know you'll be coming: pschulte@abycinc.org. Be sure to include your name and student ID number in the subject line of the email type: **"Attending the Mystic Meet – YOUR STUDENT ID NO."** If you are a Westlawn alumnus, type "alumnus" in place of the student ID number. Let us know if your spouse or a friend is coming too, so we can arrange for additional Seaport passes.

CLICK HERE to read about last year's Mystic Meet, including photos.

MYSTIC SEAPORT
THE MUSEUM OF AMERICA AND THE SEA

Westlawn is affiliated with Mystic Seaport. Visit the Seaport to learn about the history of boats, boatbuilding, and design

Know-It-All Contest Winners
From the March 2008 Issue

Congratulations to Westlawn Students **Doug Frolich**, **Jon Ames**, **Ricardo Silveira**, and **Les Allen,** for their correct answers to the March 2008 Know-It-All question. For their brilliant and insightful answers, they have earned the distinguished title of ***Know-It-All*** and have won the coveted prizes of a Westlawn tee shirt and a Westlawn cap. They will also receive a certificate attesting to their great accomplishment. *Note: Know-It-All contest rules award the first three correct entries. The four entries above showed up at nearly the same time, so we awarded four winners to be as fair as possible.*

The question from last issue was:
A client comes to you about his sailboat, *SlowMotion*. Its performance under power is not up to par. *SlowMotion* is 30 ft. LOA, 24 ft. WL, 10.25 ft. beam., and displaces 14,000 lb. Power is a single Yanmar 3GH2CE, 28.5 hp, at 3,400 rpm, with a 2.64:1 reduction gear. The propeller is a two-blade fixed sailor type, 17-in. dia., by 13 in. pitch. The prop is centered in an aperture at the aft end of a full keel. The aperture measures 21 inches high at the propeller.

The problem is that *SlowMotion* is sluggish under power. Maximum cruising speed is about 5.4 knots, with top speed just under 5.9 knots. The boat doesn't have much oomph to push into a headwind or head sea. When put in reverse, *SlowMotion* is sluggish to respond or stop, which makes docking difficult.

Answer the following:
a) Why is *SlowMotion* achieving only these low speeds, and why is it lacking in oomph?
b) What would your recommendation be to improve performance?

The Correct Solution is:
a) *SlowMotion* is not achieving expected speed because the propeller's blade area is too low for the power it is transmitting. The lack of blade area is also causing sluggish response at low speed and in reverse.

b) The correction is to replace the 2-bladed, fixed sailor propeller with a 3-blade propeller. We don't want too much drag under sail, so use either a folding or feathering 3-blade.

Below is a complete explanation:
SlowMotion is a real production sailboat by a well-known designer and a respected builder. The boat's problem is common for sailboats, where the engine and propeller can almost be afterthoughts coupled with the desire for a small propeller to reduce drag under sail. The most common proposed fix is to install more engine power. This, though, would be a mistake. *SlowMotion* has enough power to drive it at hull speed. Using the displacement-speed formula on page 15 of this issue, we find that *SlowMotion* should achieve an SL ratio of 1.31 or 6.4 knots with its current engine. This is close to hull speed; the boat can't be driven much faster with more power.

$$\text{Min. Prop. Dia., in. (Displacement Hulls)} = \sqrt{\frac{125 \times hp}{DAR \times kts \times \sqrt{kts}}}$$

hp = total brake horsepower for each engine
DAR = Disc Area Ratio (or Blade Area Ratio)
kts = Max. Speed in Knots
DARs FOR DIFFERENT PROPS:
2-Blade Sailor = 0.24
3-Blade Standard = 0.50
3-Blade Wide Blade = 0.70

We can assume a 3-blade feathering propeller has a DAR of 0.45, and from this find the minimum recommended blade diameter for this propeller to get sufficient blade area.

$$\text{Min. Prop. Dia., in.} = \sqrt{\frac{125 \times 28.5\ hp}{0.45\ DAR \times 6.4\ kts \times \sqrt{6.4\ kts}}} = 21.1\ \text{in.}$$

For displacement hulls:

To find the maximum diameter for a given tip clearance:

$$\text{Max. Prop Dia., in.} = \frac{\text{Distance To Hull, in.}}{TC\% + 0.5}$$

Where:
Distance to hull = the distance from the center of the prop shaft to the hull
TC% = desired tip clearance percent expressed as a decimal

The aperture is the entire height of the opening for the propeller, not half the height; but—assuming you center the propeller shaft in the aperture—then the distance to the hull is half of 21 in., or 11.5 in., so, with 12% clearance:

$$\frac{11.5\ \text{in. Distance To Hull.}}{0.12 + 0.5} = 18.5\ \text{in.; use 18 in. Dia.}$$

Accordingly, we can't fit a 21 in. prop, but we can go up from the 17-in., 2-blade sailor propeller to an 18-in. 3-blade feathering propeller, with a DAR around 0.45. This means:

Old propeller blade area = 0.24 DAR x π(17 in. Dia. $\div$ 2)^2 = 54.5 sq.in.

New propeller blade area = 0.45 DAR x π(18 in. Dia. $\div$ 2)^2 = 114.5 sq.in.

Though there isn't room to fit the ideal propeller (a common sailboat problem), this is still a 210% increase in blade area and will result in a significant performance improvement.

See Pg. 17 for the June '08 Know-It-All Contest

Continuing Education . . .
Yacht Design Lite/Elements of Technical Boat Design
Distance Education Course for Marine Industry Professionals

A boat design program for marine industry professionals who need to understand the basics of design but who do not intend to become professional designers.

This short course will benefit: marine industry managers, marine surveyors, adjustors, industrial and interior designers, technicians, boatbuilders, professional crew, and others simply looking for an expanded knowledge of job-related disciplines.

Students will gain a working knowledge of the basic principles that affect the design of boats and yachts. With a firm understanding of resistance and stability as well as fiberglass design, the student will gain an appreciation of the problems that a boat and yacht designer must solve in order to develop a successful craft. An understanding of hull lines will enable the student to "read" a bottom to determine why a hull performs the way it does.

Click Here for more details and enrollment information on this and Westlawn's many continuing education courses.

Click Here to learn about Corporate Multiple-Enrollment Discounts.

All Westlawn Courses are nationally accredited by the Accrediting Commission of the DETC

THE DISTANCE-LEARNING ADVANTAGE
Distance learning is *the* cost-effective way to advance your career or train your employees:

- no travel, little or no time lost from work
- no on-site or off-site set up and no facility rental
- no visiting instructors
- modest tuition costs
- start when you want
- study at your own pace

Tuition Assistance

Westlawn's financial aid program offers students two options for financing their tuition for the four-module professional Yacht & Boat Design Program and for the Yacht Design Lite course.

With interest rates from 3% to 9%, students now have the flexibility to choose the payment plan that best meets their needs. Students moving on from Module 1 to advanced modules can continue to finance their tuition by rolling over any balance due as they progress in their study.

This tuition-financing program is available through TFC Credit Corporation, which has been financing student tuition for over 35 years. In that time, TFC has financed over 250,000 students at over 1,500 schools. With full-service operation centers in both New York and San Francisco, TFC Credit Corporation is a leader in education-financing. TFC's web address is www.tfccredit.com,

Download, Westlawn's catalog and enrollment forms, from the Westlawn website, to read complete details of the tuition financing through TFC Credit, at Westlawn. Click here for enrollment forms. Click here for the Westlawn catalog.

ABYC Courses and Schedule for 2008

The ABYC Education Department has been providing industry certifications, training, high school and college curriculum, and industry seminars for over 15 years. They are providing the marine industry with the skilled workers required to build and maintain modern recreational water craft.

ABYC is currently scheduling on-site factory training for 2008. Please call ABYC for custom tailored, flat rate, instruction by top industry trainers at your facility (410-990-4460, Ext. 31).

The Marine Technician Certification Program developed by ABYC with "NOCTI Certification*" has proven to be the industry standard. We continue to provide the highest quality marine education and training throughout the country and throughout the year.
For course dates and descriptions **Click Here**

**NOCTI (National Occupational Competency Testing Institute) is a regular provider of the assessments on which many certifying bodies depend for measures of applicants' standards-based knowledge and skills. Certificates benefit employers by showing that applicants have acquired specific skills. The status of having a certified staff can lead to higher sales and customer satisfaction.*

ABYC
Setting Standards for Safer Boating

Westlawn *Profiles* / Rodger Martin of Rodger Martin Yacht Designs

Rodger Martin

Rodger Martin grew up in South Africa, where he developed an early interest in boats and sailing. He owned several dinghies and formed a sailing club while at St. Johns College. After school, he spent a year in the bush in Botswana & South West Africa, working for a geological company, looking for the Lost Vein of the Congo Copper Belt. On returning to Johannesburg, he joined yachts seeking additional crew for the difficult passage of rounding the Cape of Good Hope. Deciding to adventure further, Rodger then joined a fellow South African who went to England to buy a 43 footer to sail around the World. He sailed in England in the 1973 Admirals Cup races and then cruised around Europe and the Mediterranean before crossing the Atlantic. Rodger left the circumnavigation for the lure of the Caribbean and began working on big boats. Adventures in the States, the building of interesting small boats to his designs, and a return visit to South Africa reinforced his decision to pursue yacht design as a profession and on return to the U.S. he enrolled in Westlawn and started learning the mechanics of boat and yacht design in earnest.

Rodger Martin 45-Ft. *Cetacea*

Rodger worked for Robert E. Derecktor in Mamaroneck, New York from 1977 to 1980, becoming chief designer. Projects included the 88-foot motor yacht, *Titania* for William Ruger, three 75-foot high-speed patrol boats for the U. S. Navy, *Flying Goose*, fast ferries, and others. He then bought a 28 foot sailing boat, *Good Hope* and, with his wife Patricia, went for a yearlong, six-thousand-mile cruise of the Bahamas, San Blas Islands (Panama), Bay Islands of Honduras, Belize, Mexico and Florida, ending the cruise in Newport, Rhode Island in 1981. He worked at Pedrick Yacht Designs from 1981 to 1984, again becoming Chief Designer. Projects included the Maxi IOR boat, *Nirvana*, various production boats for Cheoy Lee and the 70-foot cruising yacht, *Unfurled*.

In 1984, he was ready to go it on his own, and started Rodger Martin Yacht Designs in Newport. Mike Plant was his first client. Mike's Class victory in the 1986 BOC Single-handed Around the World Race on *Airco Distributor* gave the new designer the credibility he needed to fulfill his own enduring dreams of designing many more boats!

Design Philosophy: *"An early interest in boats (or yachts) that travel fast set the tone for the types of boat we have designed at RMYD since 1984. We have been lucky to attract owners who really use their boats to fulfill their dreams. I have always enjoyed working with experienced owners; and almost by definition, these are owners who cannot find their 'ideal' boat in the field of production boats or of used custom boats. Our delight is in the design of finely balanced, cleanly designed, responsive boats that are pleasing to all senses. We think of naval architecture as art. It is essential to us that our designs reflect the dreams, demands and ultimate needs of their owners, rather than foisting our preferences on them. This has been successful in that several of our clients have become life long friends, beyond the relationship forged by the creation of a boat together."*

The First American *Class 40* by Rodger Martin

CLICK HERE to learn more about Rodger Martin, his firm, his many accomplishments, and to see a gallery of his designs.

News & Views

Ethanol Still a Boating Industry Problem

The National Marine Manufacturers association did a great job in Washington in getting several provisions into the recently passed energy bill that will slow the push for increased mid grade levels above E10 in the nation's gasoline.

The energy bill increases the amount of ethanol and other renewable fuels in our gas supply from 9 billion gallons in 2008 up to 36 billion gallons in 2022. Since mid-level ethanol blends above E10 are known to damage marine engines, the bill also includes the boating industry-supported provision requiring the EPA to thoroughly review new fuels for safety and engine damage prior to approving them for sale.

The pressure to increase the E formula will come from manufacturers attempting to convert cellulose into ethanol since low cost cellulose is the structural component of plants. Cellulose is most abundant organic material on Earth and doesn't compete with food, because it's inedible for humans and only makes up a small part of the diet for most domesticated animals. Moreover it is easy to produce with renewable fast-growing plants like switchgrass and cottonwood trees which require much less fertilizer than food crops like corn. The Departments of Agriculture and Energy says the U.S. could grow more than a billion tons of those crops each year. This is why companies and venture capitalists are pouring hundreds of millions of dollars into cellulose technology to develop efficient means of turning cellulose into ethanol on a large scale.

The challenge they, and many others, are facing is to solve the problem that bacteria find so easy: digesting cellulose so that it turns into sugar. Once the sugar is made, the rest is easy: Just use yeast to ferment it to produce the alcohol and distill the resulting alcohol to concentrate it. When they do, costs for ethanol will drop dramatically, triggering new pressures to significantly increase ethanol and reduce reliance on oil, and boating's battle to deal with ethanol will begin all over again.

Source: Trade Only Today March 20, 2008

Homeland Security outlines new boating strategy

At the American Boating Congress meeting in Washington D.C., Homeland Security Secretary Michael Chertoff announced a small-vessel security strategy.

As detailed in a 31-page strategy paper entitled "Overarching Vision", "The SVSS aims at insuring the maritime domain remains a secure environment, where small vessel operators are able to safely earn a living, travel, and recreate freely, without unduly burdensome government regulations and with the freedom to sail upon the navigable waters of the United States."
The DHS document four scenarios of grave concern in using small vessels in terrorist-related attacks..."
Domestic use of waterborne improvised explosive devices (WBIEDs) [i.e. using small boats loaded with explosives to ram a target, as was done in the USS Cole incident.]

Using small craft as conveyance for smuggling weapons (including WMDs) into the United States.

Using small boats as conveyance for smuggling terrorists into the United States.

Waterborne platform for conducting a stand-off attack (e.g. Man-Portable Air-Defense Systems (MANPADS) attacks

By implementing the following four programs the Department of Homeland Security proposes to defend the homeland against the above four small boat "scenarios":

"Develop and leverage a strong partnership with the small vessel community and public and private sectors in order to enhance maritime domain awareness."
The DHS plans to work with organizations such as the Coast Guard Auxiliary and the U.S. Power Squadron to provide security as well as to continue to promote its "America's Waterway Watch" program.

"Enhance maritime security and safety based on a coherent plan with a layered, innovative approach."
The Federal Government has a number of systems in place ad is increasing its observations of small vessels approaching our coasts. For example, there is the Pleasure Boat Reporting System (PBRS), the Vessel Identification System (VIS), and the Marine Information for Safety and Law Enforcement (MISLE)..
"Leverage technology to enhance the ability to detect, determine intent, and when necessary, interdict small vessels."
This includes among other things, the use of small boat barriers, and possibly the use of low-cost Radio-Frequency Identification (RFID) tags.
"Enhance coordination, cooperation, and communication between federal, state, local, and tribal partners and the private sector as well as international partners."
"Federal Agencies, where appropriate, will use the Maritime Operational Threat Response (MOTR) Plan to interdict threats as far from U.S. shores as practicable."

The National Marine Manufacturers Association said it supports adequate water patrols and improved coordination among the United States Coast Guard and state and local law enforcement to ensure security. "We know that security will not be found in extreme measures that limit boaters' rights, but working hand-in-hand with the Department of Homeland Security will be an effective way of ensuring a balance of national security with the rights of recreational boaters to unobstructed access to America's waterways," said Thom Dammrich, the NMMA's president, in a statement.

Source: Trade Only Today 4/28/2008
boatTest.com 4/30/2008

News & Views Continued from Pg. 7

Grey Water Update from Canada

In the last few months, there has been talk that pleasure craft would be subject to grey water regulations. Transport Canada and the Department of Justice drafters are developing the provisions to authorize discharge of grey water containing liquefied food wastes for existing vessels over 400 tons. Existing vessels below 400 tons and pleasure craft will be excluded from the requirements to hold grey water.

Source: NMMA Canada Newsletter, May 7, 2008

Discover Boating

To find out the latest information and details about NMMA's Discover Boating program, **CLICK HERE** .

2009 World Superyacht Competition Invites Entries

The Royal Institution of Naval Architects, in association with Boat International and Camper & Nicholsons International, are inviting entries for the 2009 competition to find the world best young superyacht designers.

The competition will be open to any one who is studying for a qualification in a subject related to yacht or small craft design, or who graduated from such a course within three years of the closing date for entries.

For Information go to:
http://www.rina.org.uk/worldsuperyachtaward

Recreational Boating Act An Update .....

In the December issue of the Masthead we reported that in May 2007, "The Recreational Boating Act of 2007" had been introduced to the House of Representatives by Congressman Gene Taylor and Congresswoman Candice Miller. This bill, if passed into law would restore the exemption for recreational boats from regulations under the Clean Water Act and once again allow incidental discharges of water such as engine cooling water, bilge water, grey water, deck runoff, and water from bait wells. The loss of the exemption for recreational boats and yachts resulted from a lawsuit brought by environmentalists to halt the introduction of invasive species (e.g., zebra mussels, quagga mussels, round gobies, spiny water fleas, etc.) through the dumping of ballast water by commercial ships arriving in U.S. Waters. Strict regulation on ballast water discharges by ships is necessary. However, since recreational boats don't have ballast water discharges, including them in ballast water regulation doesn't make sense and places an unnecessary and expensive permitting burden on the U.S. boating public.

We are happy to report that on May 21, the Senate Environment and Public Works Committee voted unanimously to pass the Clean Boating Act of 2008. However, like the House version, the bill still must go to the full floor for an affirmative vote before it can become law.

There is still work to be done and your help is needed. If you haven't done so yet, go to http://www.boatblue.org/takeaction.aspx , find your two senators and one representative and their e-mail addresses and send a short message asking them to support passage of "The Clean Boating Act of 2008" (Senate Bill S 2766 House Bill HR 2949).

See pg. 10 for e-mail received from Senator Charles Schumer of NY regarding this legislation

We Get Mail

We received this e-mail a prospective student:

Greetings,

After a number of years wanting to enroll in your courses, I have finally reached the point where I think I can, and plan on applying in a month or so, after I finish this college semester.

I've looked over most of the info' on your web pages, including course materials and costs, but was wondering about computer hard- and software, specifically:

What is the least powerful hardware configuration (i.e. RAM, processor, graphics boards, disk space for CAD applications and files, etc) recommended for the most powerful/processor-intensive software I'll be using - assuming everything is running full bore at the same time? Is there an optimum configuration? I like to have a little fault tolerance in my computers and prefer to err on the side of massive overkill. Also, I'll assume a plotter won't be required for submitting assignments in the 4th module, but is one desirable, if even just for personal use?

Thank you,
EH

Continued on next page

We Get Mail Continued from Pg. 8

Dave Gerr's reply:

Dear EH,
Thanks for your interest in Westlawn. In answer to your questions about computer hardware, below is our standard information on this subject:

Manual Drafting and CAD for Westlawn

Mastering CAD is integral to the Westlawn program; however, before you can become a fully competent designer and a skilled CAD draftsman, you need to master basic manual drafting. For this reason, manual drafting is taught and required for all Westlawn lessons in the first year (Module 1).

Starting with Module 2 (the 2nd year) students may submit CAD drawings as they choose, and most gradually submit more and more work in CAD as they progress through Module 2. By the final exam for Module 3, CAD is required. All of Module 4 and the final-exam/graduation thesis (two complete boat designs) must be wholly done in CAD.

This approach gives students three years to master CAD during the standard four-year Westlawn program. Some students have never touched CAD and three years is a generous time to become familiar with the different CAD packages and to learn how to use them. Other students are already expert in CAD and quickly go to all CAD starting with Module 2.

The Westlawn course material includes detailed discussion of CAD, the various software packages, and their uses. This is a complex subject and we urge our students not to rush into purchasing a suite of CAD software before they've become familiar with the Westlawn coursework and have had time to review the software-package options and discuss this subject with their instructor.

Students are allowed to use any CAD package they wish, but Westlawn generally recommends AutoCAD for standard drawing simply because it is the most common program in use and thus mastering AutoCAD enhances your employability. In addition to this, a hull-fairing program is needed and a general-purpose 3D modeler is recommended. Rhino is the most common.

It doesn't hurt to get AutoCAD and start learning it early, but—again—don't rush into purchasing CAD software (or new computer hardware either) until after you have received the course information on CAD with your enrollment material and you have had time to give this complex subject careful consideration with this information as a guide.

Oh yes, there's another good reason not to rush into purchasing CAD software before you enroll: Once you are an active student, you will be eligible for very substantial student discounts on CAD software (and on other software too).

Note on Computer Hardware:
Until a few years ago, rather powerful computers were required to run 2D and 3D CAD programs. This has changed. The power of average computer hardware has generally caught up with the requirements of most software. For all the standard 2D and 3D CAD you will need for your Westlawn work, any good recent-model Windows computer will do the job. Minimum ram is 1 gig, but 2 gigabytes or more is ideal. An 80 gig hard drive should be considered minimum. A decent graphics card is recommended too, but these generally come standard with most new computers.

You will only need a high-end graphic accelerator card, and tremendous computing "horsepower" if you are doing advanced 3D rendering, animation, and flybys. These are not required for Westlawn. We don't recommend this expense for Westlawn students.

A plotter is not required for your Westlawn work. You will send in your CAD files electronically. Of course, a plotter is nice to have but they take up space and are quite expensive. Consider a plotter very definitely an optional extra to add over time, if and only if you have both the money to spend on one and the space to install it.

Cheers,
Dave

We received this announcement from Westlawn Graduate, Doug Zurn of Zurn Yacht Design

April 12, 2008

To all:

I'm very pleased to announce (if you have not heard already) that Craig, Heidi and Hannah Gorton have now been joined by Ainslie, and on Mother's Day to boot. I thought you all would like to share in this exciting news.

Craig has other exciting news as well as he has decided to return to Boston University to attain his Master's Degree in Computer Sciences. Craig has been with ZYD for four years. He contributed in many aspects to the success of several designs in the time he was here, most notably in his beautiful renderings he was able to provide us with, in relatively short order. I'm sure you all would agree what a pleasure it was to work closely with Craig and we wish him continued success in his endeavors. I will be counting on Craig's assistance from time to time as I gain a stronger understanding of the rendering capabilities of our software.

Palmer Moore is a 2000 graduate of The University of Michigan with a BSE in Naval Architecture, with honors.

Continued on next page

We Get Mail Continued from Pg. 9

Prior to coming to us in the summer of 2000, he worked on honing his skills at Freedom Yachts and Whiticar Boatworks. He as contributed significantly over the last 8 years to many successful designs and has been the backbone of our web based marketing. After a short spell at C.W. Hood Yachts, Palmer has returned to pursue his interest specifically in the field of Naval Architecture. He will work to expand our exposure world wide through the web while fulfilling his other duties as a Naval Architect. It is my pleasure again, to have him working here at ZYD.

My very best,

Doug Zurn
Zurn Yacht Design
89 Front Street
Marblehead, MA 01945 USA

In the December 2007 issue of *The Masthead* I discussed the Recreational Boating Act which had been recently introduced to the U.S. Senate. The purpose of this legislation if passed would exempt the nation's recreational boats from the requirement to obtain a NPDES permit for non-harmful, incidental discharges associated with the usual operation of pleasure boats. I urged our readers to **go to http://www.boatblue.org/takeaction.aspx , find their Congressman's (Representative and two Senators) e-mail addresses and send a short message asking them to support and co-sponsor "The Recreational Boating Act of 2007"**
The following is the is the E-mail response that I received from Senator Charles E. Schumer:

Friday, May 2, 2008

Dear Mr. Nudelman:

Thank you for your letter regarding S. 2766, the Clean Boating Act of 2008. Recreational boating is an important part of New York's economy, and it is a wonderful activity that is enjoyed by thousands of New Yorkers. I agree with you that Congress must be careful not to hamstring recreational boaters and the tourism industry which depends on them by passing unnecessary environmental restrictions.

Boating has the potential to introduce pollutants and invasive species into lakes and rivers. To protect the health of our nation's waterways, Congress has enacted several national water-quality laws. Among these, the Federal Water Pollution Control Act – commonly known as the Clean Water Act – directs the U.S. Environmental Protection Agency (EPA) to restrict water pollution from ships and boats by requiring them to obtain permits. For 34 years, the EPA exempted recreational boats from this requirement on the grounds that they do not pose a significant danger to water quality. In 2006, the Ninth Circuit Court of Appeals struck down this regulation. As a result, recreational boaters will have to comply with the same Clean Water Act regulations as ocean-going commercial ships beginning in 2008.

The Clean Boating Act of 2008 simply clarifies the scope of the Clean Water Act's restrictions on boating specifically to exempt recreational vessels. If passed, this law will protect recreational boaters from having to obtain permits. I have not yet had an opportunity to vote on this legislation, but if I do, I will certainly keep your thoughts on the matter in mind.

Thank you for contacting me about this important issue. Please do not hesitate to contact me again if I can ever be of assistance to you on this or any other issue.

Sincerely,
Charles E. Schumer
United States Senator

A tip for qualmished sailors

For those of you who suffer with that ancient malady that has plagued many seaman throughout history, here is a helpful tip.

1st Viscount, Vice-Admiral Horatio Nelson, (1758-1805) the British seaman famous for his victories during the Napoleonic Wars, especially in the battle of Trafalgar, was also credited with developing a surefire cure for seasickness. Nelson, who was known to rush to the lee rail several times on the first day out, was rumored to say "the best cure for seasickness?....sit under a tree."

A lot of cures have been suggested in the 200 years since Nelson's advice, so your editor recommends that you check with your physician or pharmacist for an effective modern motion-sickness remedy. If none of these work for you, you can always sit under a tree.

source
Boat US Membership eLine News May 08.

Alumni Gallery

Cherubini 48, designed by Westlawn alumnus John Cherubini. Thousands of boats and yachts have been designed by Westlawn alumni. To see a selection of these by John Cherubini and many other Westlawn alumni, go to the Design gallery at www.westlawn.edu

Events Schedule

Royal Institution of Naval Architects 2008 Conference & Training Programme

For further details on any of the following **RINA** events please contact:
Conference Organiser, at RINA,
10 Upper Belgrave Street, London SW1X 8BQ, UK.
Tel: 44 (0)20 7201 2401 Fax: 44 (0)20 7259 5912
E-Mail: conference@rina.org.uk
www.rina.org.uk/events

WARSHIP 2008: NAVAL SUBMARINES 9
10 - 11 June 2008, Glasgow, UK

DESIGN AND OPERATION OF CONTAINER SHIPS
3rd – 4th July 2008, London, UK

INTERNATIONAL SYMPOSIUM ON SHIPBUILDING TECHNOLOGY – FABRICATION AND COATINGS
2 - 3 September 2008, Gdansk, Poland

WATERJET PROPULSION 5
17-18 September 2008, London, UK

INTERNATIONAL CONFERENCE ON SHIP & OFFSHORE TECHNOLOGY 2008
DEEP & ULTRA DEEPWATER OPERATIONS
16-17 October 2008, Busan, Korea

FUNDAMENTALS OF CONTRACT & CHANGE MANAGEMENT
FOR SHIP CONSTRUCTION, REPAIR & DESIGN
29 - 31 October 2008, London, UK

MARINE RENEWABLE ENERGY
19- 20 November 2008, UK

PRESIDENT'S INVITATION LECTURE
5 November 2008, London, UK

HIGH PERFORMANCE YACHT DESIGN
2 - 4 December 2008, Auckland, New Zealand.

The 18th International Boatbuilders exhibition & Conference (IBEX) October 6-8, 2008

For up to the minute information on seminars, exhibitions, travel, and reservations visit:
www.ibexshow.com

2008 NMMA Boat shows

43rd Tampa Boat Show

September 5 - 7, 2008
Tampa Convention Center
Tampa, Florida
www.tampaboatshow.com

Toronto In-Water Boat Show 2008

September 11 - 14, 2008
Ontario Place Marina
Toronto, ON
www.torontoinwaterboatshow.com

Virginia In-Water Boat Expo & Sailfest

September 12 - 14, 2008
Downtown Norfolk Waterfront
Norfolk, Virginia
www.virginiaboatexpo.com

33rd Norwalk International In-Water Boat Show

September 18 - 21, 2008
Norwalk Cove Marina
Norwalk, Connecticut
www.boatshownorwalk.com

104th New York National Boat Show

December 13 - 21, 2008
Jacob Javits Convention Center
New York, New York
www.newyorkboatshow.com

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- Materials and Fabrication
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- Failure Analysis and Repair
- Modeling and Simulation
- Software, Electronics and Systems
- Racing Yacht Developments
- Sails and Rigging
- Lessons Learned from Volvo/IAC Racing
- Human Factors in Sailing

DEADLINES

13 May 2008 Submission of abstracts, ~ 400 words
24 June 2008 Authors informed of acceptance
20 October 2008 Submission of manuscripts for review
27 January 2009 Submission of manuscript final drafts

SUBMIT ABSTRACTS TO:
Prof. Marc Zupan email: mzupan@umbc.edu website:
www.csysonline.com

Practical Speed and Powering Calculations

A Method for Determining Power and Speed in Boat Design

By Dave Gerr, © 2008 Dave Gerr

Gerr 34 Sportfisherman

One of the primary tasks in boat design is determining either the power required to achieve a given speed or the speed resulting from installed power. There are many approaches to this. Tank testing of hull models can give resistance data which in turn is used to predict needed power. Standard-series test results for various "parent" hull forms may be used to estimate resistance and thus power. A wide assortment of formulas and mathematical methods are in use, from the Admiralty-coefficient method, to the Savitsky method, to Keith's formula, to Crouch's formula, and many others. Used with care and understanding, all these approaches can give reasonable results. It would be useful, however, to have a single, straightforward, and reliable method to solve speed-and-powering problems quickly. Happily, two formulas, one by naval architect David B. Wyman and the other by myself, have been developed recently. Combined with a basic understanding of hull form, these formulas offer a good approach to answering such speed-and-powering questions.

Determining the speed a boat will achieve with a given power can be divided into two tasks:

1) Determine if the hull form is suitable for the intended speed, or if the hull form limits speed.

2) Assuming optimum selection of the reduction gear, propeller and drivetrain, calculate the resulting speed for a given power.

Each of these two items are immense subjects in themselves. Hull-form considerations alone could fill several books as would propeller selection and drivetrain specification. We can, however, cover the basics of hull form with enough detail to provide a practical reference for basic speed-and-powering calculations.

Hull Form

The most fundamental division in hull forms is between displacement and planing hulls. Displacement hulls don't lift out of the water. They move forward only by pushing the water aside. Planing boats—by virtue of their hull forms—can and do lift out of the water and skim across the surface (plane). This dramatically reduces resistance at high speed and so allows these craft to achieve much greater velocities than displacement hulls. In between displacement speeds and planing speeds is a hybrid region termed "semi-displacement" or "semi-planing." This is a particularly difficult speed range to design for.

Boats running at no more than a speed-length ratio (SL ratio) of 1.34 are considered displacement hulls. Boats running at SL ratios of 3.0 or greater are planing hulls, and vessels operating at SL ratios between 1.34 and 3.0 are semi-displacement or semi-planing craft.

$$\text{SL ratio} = \frac{\text{Knots}}{\sqrt{\text{WL, ft.}}}$$

Where:
SL ratio = Speed-length ratio
Knots = Boat speed, knots
WL = Waterline length, ft.

A 30-foot-waterline boat operating at 7 knots is running at an SL ratio of 1.28, definitely displacement speed. A different 30-foot-waterline boat going at 32 knots is moving at an SL ratio of 5.84, high planing speed.

Hull Speed – Old and New

Traditionally, boats without planing-hull characteristics were considered to be limited to a maximum SL ratio of 1.34. This was (and often still is) termed "hull speed." You'll read many references which insist that such craft simply can never go faster than hull speed (SL ratio of 1.34).

This was the old and very pervasive view, but I've found it's not correct. In fact the "1.34" is not a constant but varies

depending on how long and light a hull is. Lighter boats can be driven to higher so called "hull speeds" without planing or lifting out of the water. The 1.34 multiplier actually varies. It is a function of displacement-length ratio (DL ratio). Lower DL-ratio craft have higher theoretical hull speeds without planing, though they need considerable extra power to achieve this added speed.

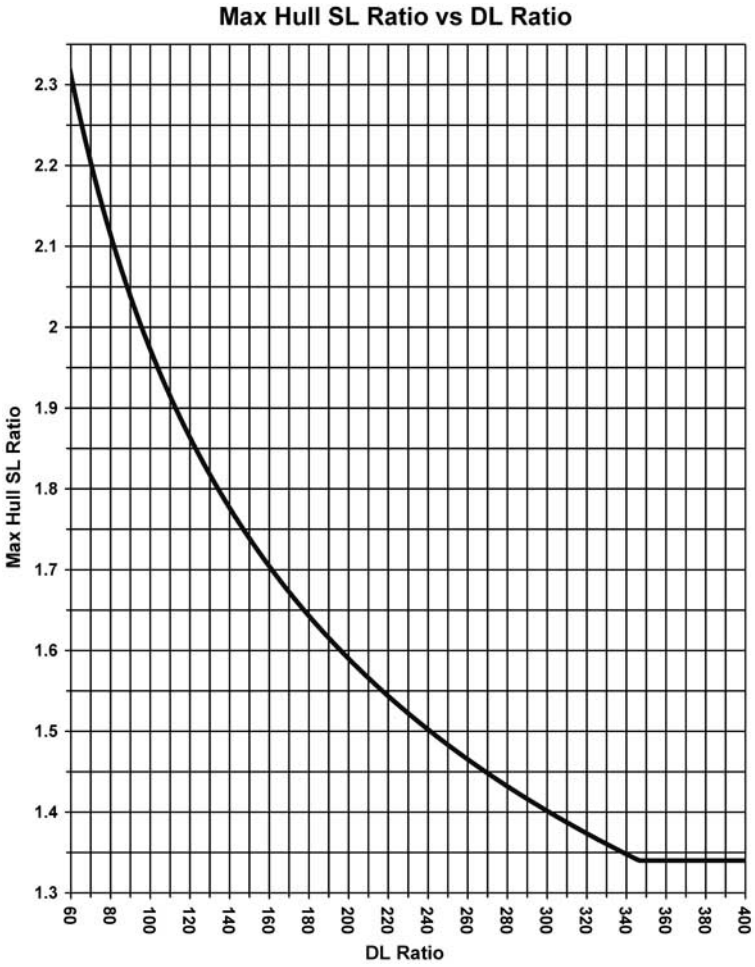
$$\text{DL ratio} = \frac{\text{Disp.T}}{(0.01 \times \text{WL, ft.})^3}$$

Where:
DL ratio = Displacement-length ratio
Disp.T = Displacement in long tons of 2,240 lb.
WL = Waterline, ft.

In my *Propeller Handbook* (International Marine/ McGraw-Hill, 1989), I included a new formula I'd developed that gives the maximum SL ratio a hull can achieve without planing based on DL ratio. It is:

Max Hull SL Ratio = $8.26 \div (\text{DL ratio})^{0.311}$
But never less than 1.34

Where:
Max Hull SL Ratio = Maximum SL ratio the hull can achieve without planing
DL ratio = Displacement-length ratio



As you can see from the graph, hulls with a DL ratio of 345 and over are limited to SL ratios of 1.34, traditional hull speed. Boats with DL ratios lower than this can achieve higher speeds without planing (with enough power). A boat with a DL ratio of 120 can reach an SL ratio of 1.86, for instance. A typical moderate-displacement cruiser with a DL ratio around 250 can achieve an SL ratio of 1.48. (As always, considerable added power and a correctly selected propeller are required to attain these higher speeds.)

Planing Hull Requirements

So far, we've been discussing how fast a hull can be driven without planing. To go faster—to plane—the hull must have the correct shape to lift up and skim across the water without squatting (trimming down excessively by the stern). Indeed—if you tried to power a boat without proper planing-hull characteristics faster than its hull speed simply by installing huge engines—you'd find that it wouldn't go faster than its Max Hull SL Ratio. Instead, the boat would build up a huge bow wave which would lift the bow and depress the stern. This can literally sink such a boat by swamping it over the transom.

The group of lines best indicating speed potential are the buttocks aft. These lines define the shape of the *run.* The *run* is the after half of the underside a hull. It has a tremendous influence on resistance and speed potential. If you look at the profile view (the view from the side) of a lines drawing, the angle that the buttocks make relative to the horizontal reveals the hull's speed capabilities. For almost all average hulls, the quarter-beam buttock defines the average angle of all the buttocks—of the run. A hull with a quarter-beam buttock that climb sharply up, say, at 12 degrees or so from the underbody amidships to the stern, is suited for low, displacement speeds. If, on the other hand, the quarter-beam buttock runs aft flat and horizontal, then you're looking at a design intended for high planing speed. Naturally, buttocks that sweep up at an intermediate angle are meant for intermediate speeds. The faster the boat, the flatter its run should be (the smaller her buttock angle should be). Buttocks should never angle down from midships to the transom (negative buttock angle), this would depress the bow and cause dangerous handling problems.

Buttock Angle vs Speed

	Speed-Length Ratio	Buttock Angle
Planing Boats	2.5 or higher	2° or less
Semi-Displacement Boats	1.5 to 2.5	3° to 6°
Displacement Boats	1.5 or less	7° or more

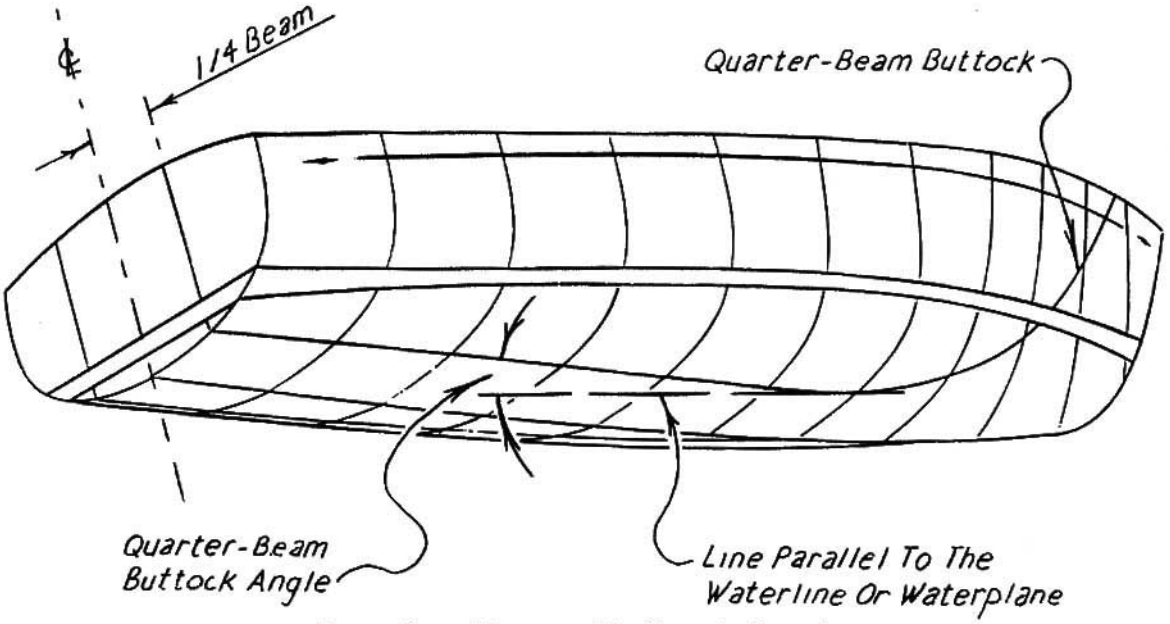
Note: Angles are relative to the at-rest waterline.

If we had, say, a 40-foot WL boat with a quarter-beam buttock that swept up at 6 degrees, you'd expect it to run at an SL ratio of about 2 maximum. Accordingly, it could be ex-

pected to go about 12 to 13 knots.

Square root of 40 ft. = 6.32
6.32 x SL ratio 2 = 12.6 knots

Now, this doesn't guarantee this craft will actually go this speed; however, its buttock lines indicate that the vessel would do best in this range. You could install a smaller engine and run the boat at lower speed, but it would be somewhat more inefficient than a comparable hull with greater upsweep to its buttocks–a hull designed to operate at this lower speed. Similarly, you could stuff twin super-charged engines in with hundreds more horses than required to move at 13 knots. The boat might go just a smidgen faster with these monster power plants, but it would cause a lot of fuss in the water and waste a gallons of fuel doing it. *Don't power a boat go faster than it's Max Hull SL Ratio unless it's a planing hull with the characteristics described above.*



Quarter-Beam Buttock Angle

So far, we've assumed that the buttocks are straight lines. What if they curve up in profile? Straight line buttocks are best suited to higher speed craft, whereas buttocks that curve up (as well as angle up) as they rise toward the stern are intended for low speed. This is why virtually all high speed powerboats have straight or nearly straight buttocks aft while nearly all cruising sailboats have buttocks that sweep up to the transom in a graceful arc.

The trade-off all designers face when shaping the run is, generally speaking: Flat, low-angle buttocks are great for going fast, but they're not as good for comfort and seakeeping. Steeply-angled and well-up-curved buttocks are ideal for comfort and seakindliness, but are only suited to lower-speeds.

Calculating Speed and Power

Keeping the above hull-from considerations in mind, we can move on to address speed-and-powering calculation themselves. For years, any number of fairly simple formulas have been used to solve these problems. There have been two drawbacks. One is that almost all these formulas required constants that had to be selected by experience, or from reference to tables, or by reference to similar boats. The other is that different formulas applied to displacement and planing hulls, with no formula providing reliable predictions in the semi-displacement or semi-planing region.

I have been trying for years to create a single formula to do just this without success, but Maine-based naval architect David B. Wyman has come closer than anyone so far in creating such a universal speed-and-powering formula. His formula gives good results across all speed regimes, and it generates it's own constant. Accordingly, there's no need for external reference or guesstimating of a constant. The Wyman speed formula offers exceptional results at SL ratios over 2 and fairly good results at SL ratios under 2. A speed-and-powering formula I developed gives somewhat more accurate results at SL ratios under 2. It requires no constant at all. Though you can use the Wyman formula across the board, my recommendation is to use the Wyman formula for boats running at SL ratios over 2, and my Gerr displacement-speed formula for boats operating at SL ratios of 2 and under.

The Wyman Speed Formula

The Wyman speed formula requires two steps:

1) Determine the Wyman coefficient (Cw)
2) Calculate the boat speed in knots

$$Cw = 0.8 + (0.17 \times (SL\ ratio))$$

$$Kts = Cw \times \sqrt{WL, ft.} \times \sqrt[3]{\frac{SHP}{Disp., lb. \div 1,000}}$$

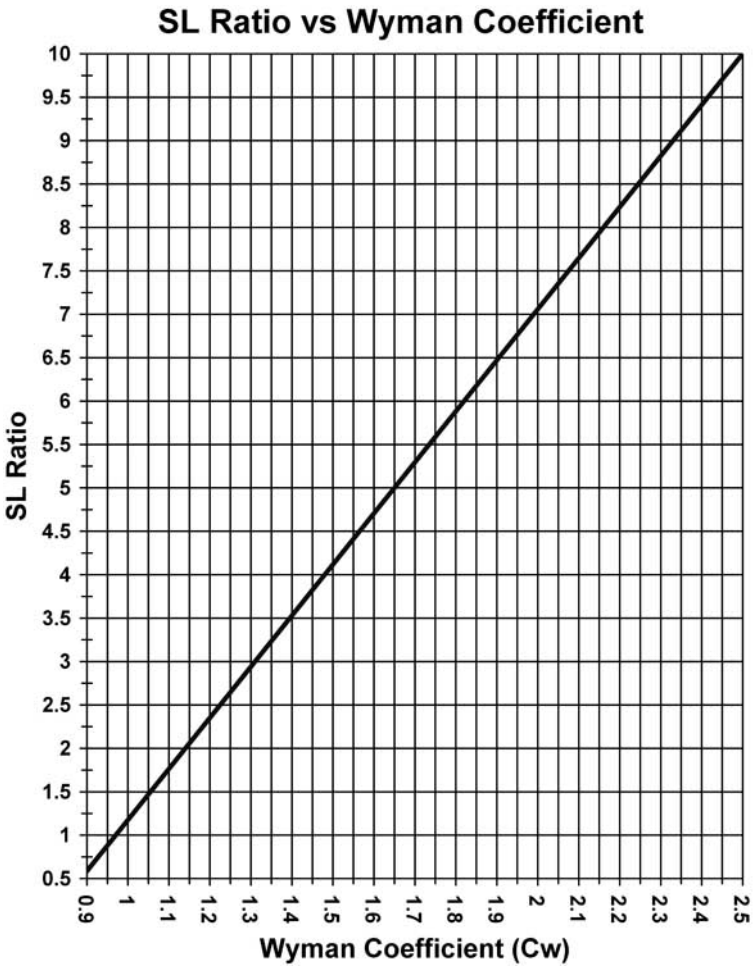
This can be rewritten to solve for required SHP as:

$$SHP = \left(\frac{\text{Disp., lb.}}{1,000}\right) \times \left(\frac{\text{Kts}}{\text{Cw} \times \sqrt{\text{WL, ft.}}}\right)^3$$

Divide SHP by 0.96 or 0.95 to find required engine BHP.

Where:
Cw = Wyman coefficient
SL ratio = Estimated SL ratio
Kts = Speed, knots
WL = Waterline, ft.
SHP = Total installed shaft horsepower (use 95% to 96% of brake horsepower, BHP)
Disp. = Displacement, lb.

You can see all the data is easily entered; however, you need to enter a speed in SL ratio to determine the Cw, but SL ratio is what you're trying to find in the first place? This is not a problem. Enter your best guess for SL ratio, then solve the speed for knots. Find the resulting SL ratio from that speed and—if it differs from your guess—reenter the new SL ratio to get a new Cw and repeat. Continue repeating this process a few times and you will zero in on the answer quite accurately. Alternately, you can use another standard speed formula to initially estimate the SL ratio and then use that estimate to get your initial Cw. I use the Crouch formula for planing speeds (see sidebar next page). This process is solving iteratively. You can set up most spreadsheets and equation-processing software to do the entire iterative calculation automatically starting with a guess value you enter for SL ratio or for knots.



We can work through the numbers for a sportfisherman my office designed and conducted full sea trials on. This is the *Gerr 34 Sportfisherman*. It is a hard-chine planing hull with an accurate displacement (from measured flotation at trials) of 21,130 pounds. Power is a pair of Volvo TAMD-62s rated a 340 BHP each. Total shaft horsepower is 96% of twin-engine BHP or 652.8 SHP. The waterline is 29.5 feet.

We can guess 30 knots for speed, which gives:

$$\text{SL ratio} = \frac{30 \text{ Kts}}{\sqrt{29.5 \text{ ft. WL}}} = 5.52$$

$$Cw = 0.8 + (0.17 \times (5.52 \text{ SL ratio})) = 1.738$$

$$\text{Kts} = 1.738 \text{ Cw} \times \sqrt{29.5 \text{ ft. WL}} \times \sqrt[3]{\frac{652.8 \text{ SHP}}{21,130 \text{ lb. Disp.} \div 1,000}} = 29.6 \text{ Kts}$$

This is very close to the 30-knot guess speed so it doesn't really need further iteration, but iteration will reduce the SL ratio to 5.431, for a Cw of 1.723. Which gives a speed of 29.4 knots.

In fact, the actual sea-trail results were a top speed of 29.5 knots, which is spot on.

The Gerr Displacement Speed Formula

As noted earlier, Wyman's speed formula is remarkable in its ability to give reasonable answers across all speed regimes. For displacement vessels, however, you will get somewhat more accurate results from my speed formula for displacement boats, operating at no more than an SL ratio of 2. It is:

$$\text{SL ratio} = 2.3 - \left(\frac{\sqrt[3]{\text{Disp., lb.} \div \text{SHP}}}{8.11}\right)$$

$$\text{Kts} = \text{SL ratio} \times \sqrt{\text{WL, ft.}}$$

This can be rewritten to solve for horsepower as:

$$\text{SL ratio} = \frac{\text{Knots}}{\sqrt{\text{WL, ft.}}}$$

$$SHP = \frac{Disp., lb.}{\left((2.3 - SL\ ratio) \times 8.11\right)^3}$$

Divide SHP by 0.96 or 0.95 to find required engine BHP.

This formula only applies to craft running at SL ratios of 2 and under.

Where:
SL ratio = Speed-length ratio
Disp. = Displacement, lb.
SHP = Total installed shaft horsepower (use 95% to 96% of brake horsepower, BHP)
Kts = Speed, knots
WL = Waterline, ft.

We can work this through on a displacement-speed design. Again, I'll use a boat I have hard numbers for. This is my 57-foot, aluminum, voyaging motorcruiser *Imagine*. It is a round-bilge, full-keel hull with an accurate measured displacement at trials of 60,780 pounds or 27.13 long tons. Power is a single CAT 3306B rated at 290 BHP, so SHP is 96% of this or 278.4. The waterline is 50.7 feet.

The first step is to find the maximum SL ratio this hull can achieve. It is not a planing hull (though the buttocks have been flattened a bit aft to reduce squatting at modestly higher speeds), so maximum SL ratio is largely controlled by DL ratio. We find:

$$DL\ ratio = \frac{27.13\ Ton\ Disp.}{\left(0.01 \times 50.7\ ft.\ WL\right)^3} = 208.2$$

Max Hull SL Ratio = 8.26 $(208.2\ DL\ ratio)^{0.311} = 1.57$

Accordingly, this boat can be powered to run up to an SL ratio of 1.57. Powering to higher speed would not be practical unless the hull was modified to have semi-planing or full planing characteristics.

Speed is then found from Gerr's displacement speed formula:

$$SL\ ratio = 2.3 - \left(\frac{\sqrt[3]{60,780\ lb. \div 278.4\ SHP}}{8.11}\right) = 1.557$$

$$1.557\ SL\ ratio \times \sqrt{50.7\ ft.\ WL} = 11.08\ Kts$$

Crouch's Planing Speed Formula

For planing boats only, Crouch's speed formula gives good results and is excellent for finding an initial SL ratio to determine the Wyman coefficient (Cw).

$$Kts = \frac{C}{\sqrt{Disp., lb. \div SHP}}$$

Where:
Kts = Speed, knots
C = Crouch constant
Disp. = Displacement, lb.
SHP = Total installed shaft horsepower (use 95% to 96% of brake horsepower, BHP)

The Crouch constant (C) can be estimated from the following table:

C	Type of Boat
150	Heavy runabouts, cruisers, passenger vessels
175	Normal average for most ordinary boats
190	High-speed runabouts, very light high-speed cruisers
210	Race boat types
220	Three-point hydroplanes, stepped hydroplanes
230	Racing power cats and Hickman Sea Sleds

Values over 190 are uncommon for normal boats. If in doubt, use a C of 175.

Imagine 57-Ft. Motorcruiser

Actual sea-trial speed for *Imagine* was 11.05 knots. You can't get any closer.

It is interesting to note that Wyman's formula gives a speed for *Imagine* of 11.8 knots. This is close indeed. The Wyman method is really quite a remarkable universal speed formula. You should find, however, that Gerr's displacement speed formula will give slightly more accurate results for SL ratios of 2 and under.

Wyman's formula was first published in the August/September 1998 issue of Professional Boatbuilder *magazine.*

Adjusting Speed Results For Differing Boat And Propulsion Types

Both the Wyman and Gerr speed formulas assume the hull is the correct type and of normal form for the intended use. This includes proper location of the longitudinal center of gravity and buoyancy (LCG and LCB), and a prismatic coefficient in the suitable range. The formulas also assume that the running gear (propeller, reduction gear, shaft, strut, rudder) are properly sized and matched for best performance. There are many common variants of hulls and propulsion packages, however, and the following adjustments can be used to further refine the results from both formulas:

Round-bilge planing hulls with no spray knockers: .....reduce speed by 6% over SL ratio 2.9
Round-bilge planing hulls with pronounced spray knockers along the bilge: .....reduce speed by 4% over SL ratio 2.9
Deep-vee planing hulls (deadrise midships aft over 19 degrees): .....reduce speed by 3%
Low-deadrise planing hulls (deadrise midships aft less than 8 degrees): .....increase speed by 4%
Outboard and sterndrive boats (if the propellers aren't overloaded): .....increase speed by 5%
Displacement full-keel sailboats: .....reduce speed by 2%

These effects can be added in a single design. For instance, a 24-foot, planing, lobster-type hull could have round bilges with a pronounced spray knocker. That would be a reduction in the calculated speed by 4%, but it might be powered with a sterndrive, which would increase the calculated speed by 5%. The net would be to increase the calculated speed by 1%.

Will You Be The June '08 Know-It-All?

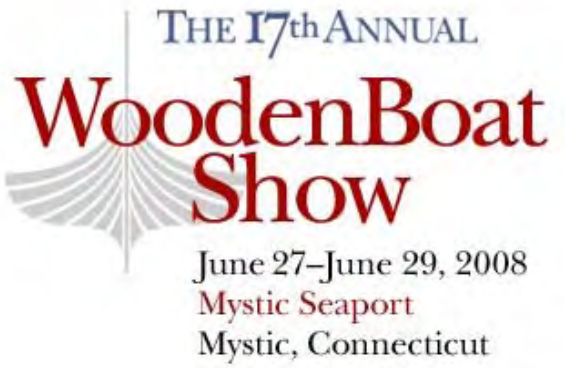
Want to see how much you know? Want to show everyone else how much you know? The first three people to submit the correct answer to the following question will win a Westlawn tee shirt and cap, and will also receive a **Know-It-All** certificate. The answer and winners to be published in the next issue of *The Masthead.*

You've been asked to inspect *TenderFoot*, a 38-foot production fiberglass sailboat. There's a problem with its chainplates. The owner likes to sail hard and races and cruises in all weather. He has been having trouble keeping the lower shrouds tensioned properly, and has had to recaulk around the lower-shroud chainplates repeatedly. Now, the deck seems a bit soft around the chainplates.

Examining *TenderFoot*'s chainplates closely, you find that the lower shrouds are 3/8-inch, 1x19 stainless steel. The owner's manual confirms this and that they are of 316 stainless alloy. The cover plate around the chainplate has lifted a bit, and the recent caulking is already showing signs of separating from the deck. Below decks, you find the stainless chainplate is a flat plate penetrating a slot in the deck (made tight by the cover plate and caulking), with eight 3/4-in. stainless through bolts fastening it into a 3/4-in. plywood bulkhead. There's a solid 1/4-in. aluminum backing plate under the nuts on the opposite side of the of the bulkhead from the chainplate.

1) What is causing the problem?
2) How would your recommend correcting it?

See Us At . . .



Westlawn will be at the WoodenBoat Show in Mystic Seaport. Come visit our booth. Say hello to your instructor. Ask questions about your work. Learn about the Westlawn program. Explore the beautiful and extensive Mystic Seaport. Take in all the exquisite wooden boats. Attend a talk on Westlawn and wooden-boat design by Westlawn director, Dave Gerr, on Saturday, June 28, at 3:00 PM.

Don't miss it!

Click here for show details.

Back Issues of The Masthead

Click on the Back issue that you would like to read:

- **April 2007** Tech. Article: Passenger-Compartment Ventilation Fundamentals
- **June 2007** Tech. Article: Stability Is The Key – Part 1, Initial Stability
- **Sept. 2007** Tech. Article: Stability is the Key – Part 2, Reserve Stability
- **Dec. 2007** Tech. Article: Basic Criteria for Powerboat Stability
- **Mar. 2008** Tech. Article: The Concepts and Applications of Tons and Tonnage

Training Links - *For Current In-Class ABYC Courses*

Click on Course Names for Complete Details on these ABYC Classes

Start & End Dates		Course Name	Region	City
06/03/08	06/06/08	Marine Systems Certification	Pacific	Oakland, CA
06/10/08	06/13/08	Diesel Engine Certification	South	Ft Lauderdale, FL
06/17/08	06/20/08	Electrical Certification	Mid Atlantic	Philadelphia, PA
07/09/08	07/11/08	Basic Marine Electrical	Mid Atlantic	Annapolis, MD
07/22/08	07/24/08	Standards Certification	Great Lakes	Nashville, TN
09/09/08	09/11/08	A/C Refrigeration Certif.	Mid Atlantic	Philadelphia, PA
09/23/08	09/26/08	Marine Corrosion	South	Miami Beach, FL
10/01/08	10/03/08	Basic Marine Electrical	South	Jacksonville, FL

Ship's Store

Click here to visit our ship's store for Westlawn caps and tee-shirts, bronze spline weights *(see picture below)*, and a selection of marine books.

Training Links for *Westlawn Distance Study Courses*

Click on Topic for more information:

Professional Yacht & Boat Design, 4-Module Program

Elements of Technical Boat Design

Continuing Education

Applications & Enrollment

All Westlawn Courses are nationally accredited by the Accrediting Commission of the DETC

The Masthead

News from Westlawn Institute of Marine Technology

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We're on the Web at
www.westlawn.edu

Who We Are

Westlawn is a not-for-profit educational affiliate of the American Boat and Yacht Council (ABYC). Our School is nationally accredited by the Distance Education and Training Council (DETC), and approved by the Connecticut Department of Higher Education.

Our Mission

Founded in 1930, the mission of the Westlawn Institute of Marine Technology is threefold:

- To provide our students with the skills and knowledge required to build a rewarding career in the profession of yacht and small-craft naval architecture.
- To support continued growth of the recreational and small-craft marine community through the development of well-trained, safety-oriented, boat designers developing better products for the benefit of the boating public.
- To provide continuing education to marine-industry professionals.

www.abycinc.org

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