ON A SCALE OF ONE TO TEN

By A.P. Brooks

Dudley Moore had it right in "10", nobody really ends up with a ten. Or with a one for that matter. The boat show season again brings the problem of rating sailboats to the minds of shoppers and aficionados alike. There are no tens, but salesmen will tell you, "This is the fastest, driest, best-built boat in the show."

Reason alone tells us that can't be true for every boat. Yet, without a study of a new boats' Performance Handicap Rating Formula (PHRF) ratings, International Measurement System (IMS) sheets or performance packages from the USYRU, it is awfully tough to make sense out of the sales claims. If you don't believe it, take a look at any listing of new boats, set out by length overall with whatever generic description the manufacturer or ad writer decided to hang on them. Veteran sailors have their own ideas about what constitutes racers or cruisers, but there is no universal agreement on how to classify sailboats.

Trying to compare sailboats by the builders' classifications is nigh onto impossible. Some boats called "cruisers" will, under IMS or PHRF, rate well above some called "racer-cruiser" and vice versa. You don't get what you think you're getting, and many new boats have yet to be rated under IMS or PHRF. For instance, one new boat is called a racer-cruiser by its manufacturer. It has a displacement of 41,200 pounds on a waterline length of 38'3" and 1,286 square feet of sail. Those translate into a Displacement/LWL ratio of 328.67 and a SA/Displacement ratio of 16.88. On my scale it rates a 1.5 and qualifies as a "lead sled."

Another sailboat rated by the manufacturer as a cruiser has a displacement of 10,000 pounds on a waterline length of 30 feet and a sail area of 712 square feet. This is DISP/LWL ratio of 165.34 and a SA/DISP ratio of 24.13. On my scale, this so-called cruiser rates a 4 and a description as a racer-cruiser.

Or take the boat the builder classified as a racer-cruiser that has a displacement of 2,750 pounds on 27'5" of waterline with 524 square feet of sail; DISP/LWL ratio of 59.57 and SA/DISP ratio of 42.18. To me, this rates as an 8.75 and an out-and-out "racing machine," but of the two given a racer-cruiser designation by the builders, one will not sail away from Granny paddling in her water wings!

Normally magazines publish lists of new boats and classify them by whatever name the manufacturers decided to call them. Sometimes that's like putting the family sedan in fancy chrome trim, a muscle car in dowdy grey, and calling the former a pace car and the latter a commute special.

So how about those funny numbers and neat categories I just tried out on you? Categories of lead sled, cruiser, racer-cruiser and racing machine with numerical ratings to help sort out the boats overall and within the categories. If you don't care about the basics, skip the next three paragraphs and go on to how to work out the "S" number on the accompanying graphs.

LOA is just an indicator of how much space there is likely to be in the boat and what its hull speed might be. Might be? You hear that it is a hard and fast 1.35 times the square root of the waterline length (LWL), but Marchaj and other elder gurus of aero/hydro-dynamics hedge and say that the potential speed performance of sailing craft varies from 0.9 for heavy keeled yachts to 4.0 for an out-and-out racing machine.

The speed differential is a function of increased ability to carry sails, increased stability, and reduced specific resistance and DISP/LWL ratios. Lower DISP/LWL ratios generally indicate lighter boats or less weight loading per foot of length. Sail area displacement ratio (SA/DISP) is found from Sail Area divided by (Displacement/64)$^{2/3}$; and Displacement/Length of Water Line ratio is equal to (Displacement/2240) divided by (.01 x Length of Water Line)^{3}. These are the real factors that determine performance, and the hardest to come by when standing on the pier trying to compare a Gee Whiz 31 to an Awesome 32.

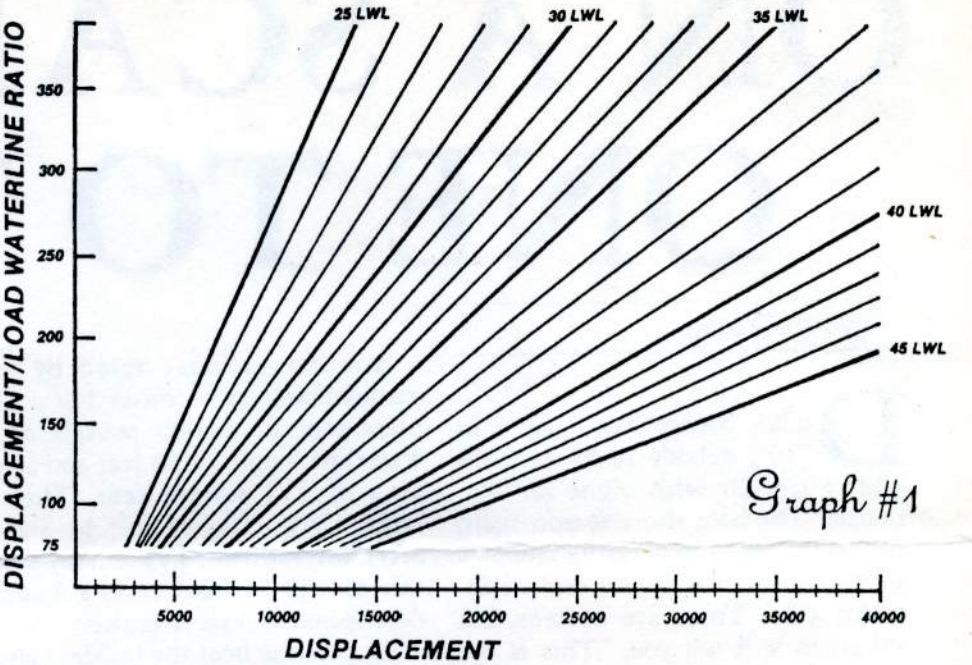
Sales literature generally gives you some numbers, solid ones such as length of water line (LWL) and the displacement (DISP). So if you carry a calculator and understand basic algebra, you tap out the displacement in pounds, divide by 2240 and have the answer in long tons. That you divide by the result of LWL times 0.1 raised to the third power. Or, if you want to skip the calculator, use the accompanying Graph I. It will approximate the DISP/LWL ratio for you with enough accuracy to give you the first of the guides to the comparisons mentioned in the opening paragraphs.

More myths have been created around the DISP/LWL ratio than almost any other. "Heavy is better... Lighter is faster... Moderate is cruiser... Don't go to sea in anything under 400... ULDB's come apart after six races." As with all black and white statements, one can argue either side on any given day.

Face it, you are the one who is going

to use the boat. If you want one with a high DISP/LWL ratio because you're nostalgic for heavy cruisers, will never go out in anything over fifteen knots of breeze and are willing to sail at four knots max, it's your money, your time and your boat. Critics can stick it in their ear for all you care. But stay out of the ULDB's because they *will* accelerate, *will* go fast in fifteen knots of breeze and *will* tend to be a handful in the middle of the Gulf of Mexico in a line squall. But you don't ever leave Galveston Bay and are tired of four knots? Then maybe you want a faster boat to beat the crowd to Redfish on Friday night. Hey, there are trade-offs.

That is what makes any one measure of a boat so difficult, there are other factors as set out above. So how do you rate those two great-looking boats? The Gee Whiz 31 has a displacement of 11,000 pounds and LWL of 24'2"; Graph I gives a DISP/LWL of about 346. The Awesome 32 displaces 9,800 pounds on water line of 25' 10" and Graph It gives her about 256 for a DISP/LWL ratio. Nice numbers, but what about that comparison?

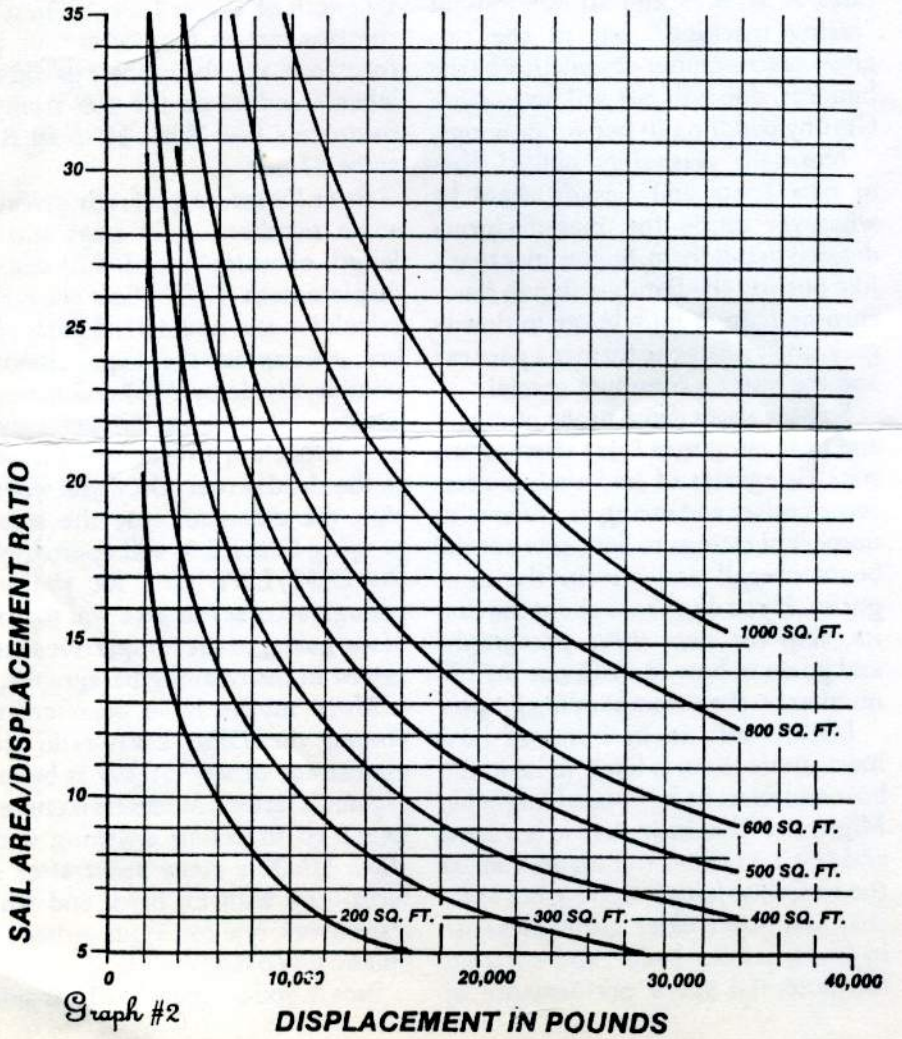


Graph #1

Well, first we need to look at that other ratio, and that's where Graph II comes into play. With the displacement and the sail area we can find the SA/DISP ratio. One word of caution here is to use the 100 percent fore triangle, not that monster 150 or larger genoa the salesmen want us to buy with the boat. We're looking for constants in comparisons, not sails to put on the boat.

The Gee Whiz 31 has 485 square feet of sail and the Awesome 32 has 496. Plugging those numbers into Graph II, read up from displacement on the bottom scale to the line corresponding to sail area, then across to read the ratio from the lefthand scale. About 15 for the Gee Whiz and 17 for the Awesome. But they both have about the same amount of sail, so why the difference? Because of the DISP/LWL ratios, one boat is easier to drive than the other; the Awesome, with almost the same amount of sail, will be quicker off the mark and run easier in a given amount of wind than her heavier sister. The bigger the engine in the dragster of the same weight, the faster; with the same engine, the lighter the faster.

But we are still not comparing the boats with an ten scale, right? Well now, with those two ratios we can. If you have about the same size boat, in terms of length, this scale will give you several answers in one handy



Graph #2