Staff Naval Architect
Dave Glasco

Stretch-A-Boat:

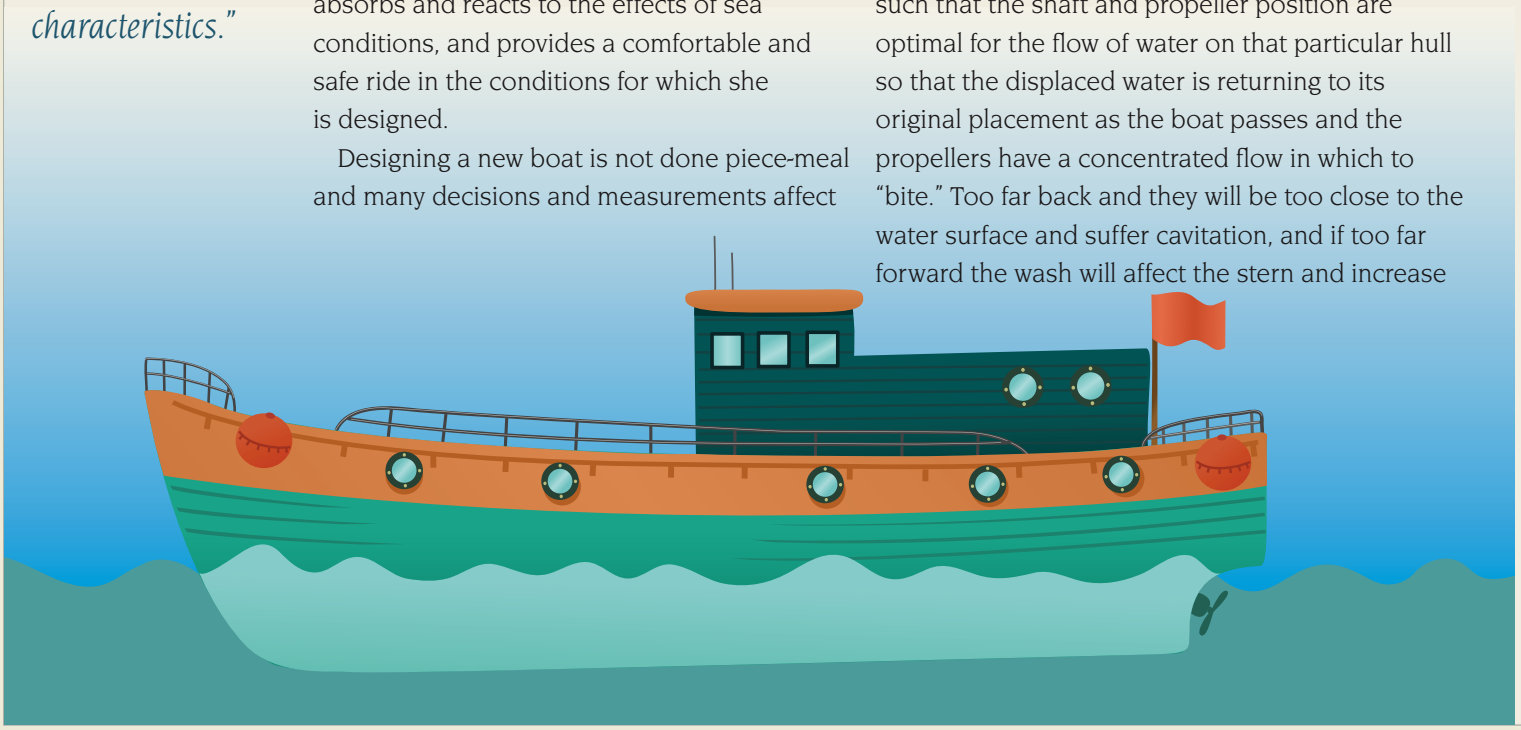
Many Trawler Manufacturers Ignore Architectural Integrity. Not Kadey-Krogen!

When I was a kid going to my first prom, my buddies and I rented a "Stretch" limo for the evening. Especially back then, to make a Stretch you just cut a Cadillac in two and inserted a section in the middle and then welded them together. We were of course really impressed and told the driver what a really cool car it was and what a great job he had. His response was, "Well kid, that's because you don't have to drive it." Hold that thought.

"Designing a new boat is not done piece-meal and many decisions and measurements affect multiple characteristics."

For years now those contemplating a cruising boat have been inundated with a variety of naval architecture terms such as displacement-to-length ratio, prismatic coefficient, pounds per inch immersion and longitudinal center of buoyancy. Each plays a specific and very important role in determining the handling characteristics of a yacht. When a naval architect designs a boat, the hull is designed to accomplish a set of goals, and the resulting hull can be measured by these terms. The builder of a cruising boat will want the naval architect to create a hull that flows optimally through the water, dissipates rather than absorbs and reacts to the effects of sea conditions, and provides a comfortable and safe ride in the conditions for which she is designed.

Designing a new boat is not done piece-meal and many decisions and measurements affect multiple characteristics. The entry of the bow dictates the shape and beam of the forward sections and therefore the usability of the space inside. It also dictates fuel economy. The shape of the stern dictates drag, sea keeping ability, and fuel economy as well. The boat, especially a trawler, must flow through the water with mathematical precision, parting, displacing and most importantly, replacing the passing water at the same volume and at similar angles as it was displaced. All of the boat is designed to act in unison. Therefore, part of this design process must also consider where you will be placing tankage, battery banks, engines, stringer supports, etc. The engines must be placed such that the shaft and propeller position are optimal for the flow of water on that particular hull so that the displaced water is returning to its original placement as the boat passes and the propellers have a concentrated flow in which to "bite." Too far back and they will be too close to the water surface and suffer cavitation, and if too far forward the wash will affect the stern and increase



the drag on the hull plus increase shaft angle, thus decreasing the efficiency of the propeller. The same is true with the rudder, which also must be appropriately sized and placed optimally within the flow of the propeller, and yet not too far forward or aft in order to steer the boat properly. Too far one way and she will steer like a sleepy drunk; too far the other and she is a hyperactive puppy pulling on her leash.

Back to the naval architecture terms and what I believe to be one of the most important and often ignored today: architectural integrity. In the last 12 months alone we have seen notable manufacturers stretch a 41-footer to be a 49-footer, a 47-footer to a 52-footer, and a 55-footer to a 60-footer. This disturbing trend violates the architectural integrity of the original hull design. Perhaps the best-known example of violating architectural integrity occurred back when SUVs first became all the rage. Manufacturers simply took the chassis of another vehicle and put a large boxy structure on top, thereby raising the center of gravity. Remember all those early stories about SUVs rolling over?

So why do manufacturers violate the architectural integrity of one hull design and stretch it to make another model? Simple. It's a relatively low cost way to introduce another model, and with more models there is a greater chance a builder will have a vessel that appeals to a particular customer. Keeping costs down and building and selling more boats equates to greater profits.

"So why do manufacturers violate the architectural integrity of one hull design and stretch it to make another model? Simple. It's a relatively low cost way to introduce another model."

Why not stretch a boat? To design a boat with optimal performance involves a mathematical formula in which everything is a variable and the goal of the formula is optimal efficiency and stability. Like any mathematical formula, if you change some of the variables without changing the others you will get a different answer. This is inescapable.

If you take a boat that was designed at 55 feet and "stretch" it to 60 feet, all of the engineering is changed. You simply can't design the proper curvature and shape of a hull, then stretch the middle by 10% or more, or stick a larger cockpit on it, and have the physics stay the same. You can't, using sound naval architecture principles, place the propellers, rudders, etc. on a boat and then change its length by 10-15% and add a larger engine and prop, and expect the same handling result. Like most bad ideas, this one tends to magnify itself. It's hard enough to get a big heavy boat to turn, and with my 60-foot stretch example for the first few moments when the rudder is turned, the boat is going to try to push sideways until the reduced torque available finally starts the turn. This may result in just an unpleasant ride, but at some sea state it will approach the line between difficult steering and being unsafe. Just like that Stretch limo–it's got a lot more space, but the chauffeur really didn't want to drive it!

"Just like that Stretch limo–it's got a lot more space, but the chauffeur really didn't want to drive it!"

Don't just trust me. Take a sea trial, preferably on a really rough day. Insist on turning off the stabilizers and hand steering the boat in all conditions. You wouldn't buy an SUV without road testing it, would you?