

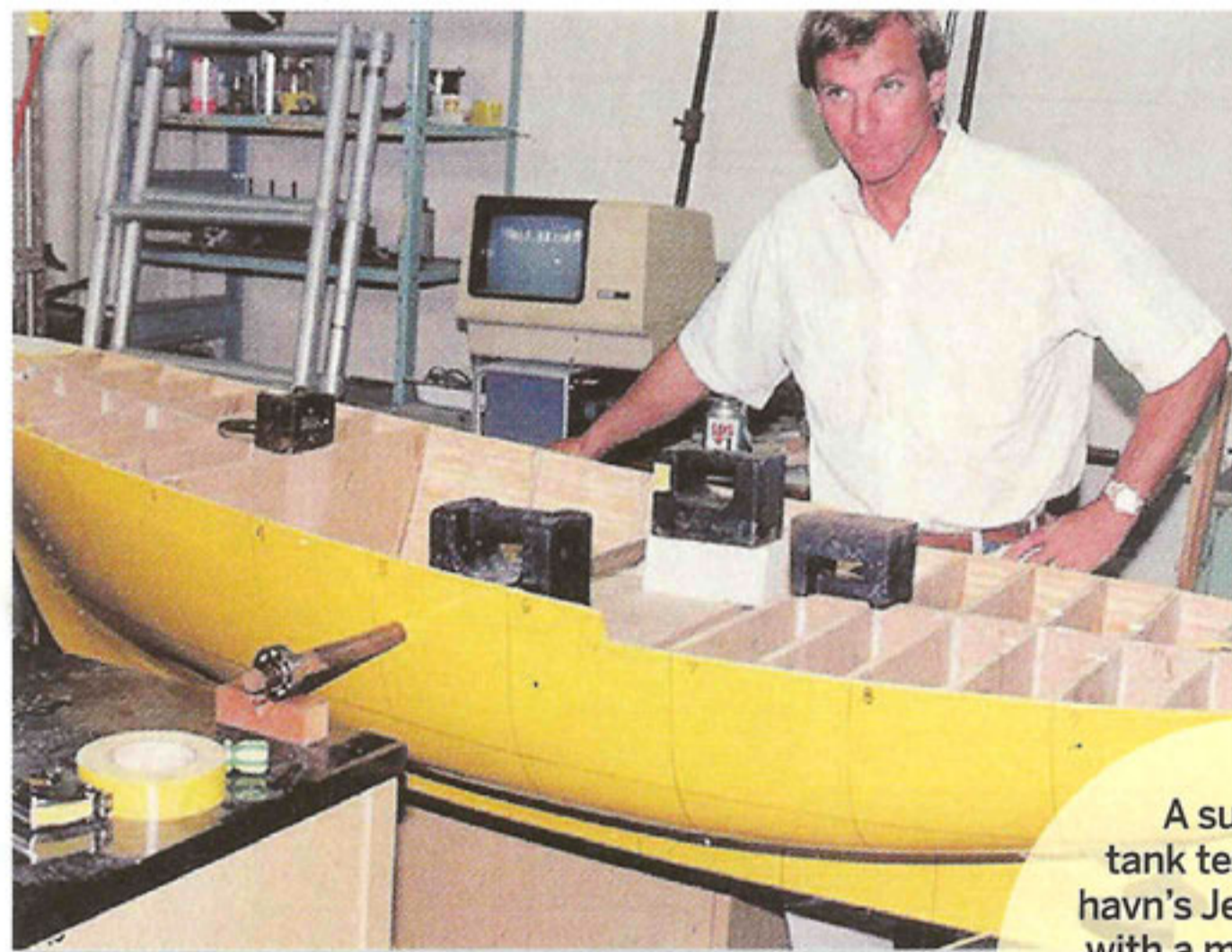


BY MICHAEL PETERS

SIGHTLINES

Reality Bites

DATA CRUNCHERS SHOULDN'T IGNORE THE GUT-CHECK.



A successful tank tester: Nordhavn's Jeff Leishman with a model for the Nordhavn 46. Comments for Michael? Give him a shout at inbox@pmymag.com.

According to aerodynamic theory, a bumblebee can't fly. Reality of course tells us it can. So what is going on here? The fact is that science doesn't understand everything. Science is fluid, always changing, and what was thought to be understood at one time is surpassed as man gains knowledge and makes new discoveries. This concept gives many people real heartburn, especially some Republicans. No, this is not about global warming. I am only allowed to write about boats.

For centuries, ships were designed with the aid of scale wooden models. Museums around the world house beautiful collections of ship models that were once used to develop hull lines and transfer them to full scale for construction. These early models were used to analyze everything from hull form to the beauty of the sheerline. To advance ship design, it naturally followed that an accurate method of testing models was needed and the first dedicated test tank was built in 1871. Even today, towing a scale model through the water of a test tank remains the most reliable method of predicting resistance and ship motions. Most ships around the world owe their shapes to tank testing and the accumulation of test-tank data serves as the basis for modern naval architecture.

About ten years ago I was on a panel of three naval architects at an IBEX seminar. I was certainly the dumbest of the group. One of the guys began to speak about Computational Fluid Dynamics (CFD),

which is a numerical method of flow analysis used to augment and sometimes replace tank testing. I can certainly understand tank testing, because it is just miniature boats being towed through the water, but this CFD stuff was more than I could fathom. The whole time he was talking, I was thinking this guy needs to get out in the sun and spend some time on a real boat. I clearly resented his academic approach and had yet to open my mind. Today my firm no longer has to always book a test tank months in advance, but instead we can rely on CFD computer analysis for many projects ranging from high-speed yachts to amphibious planing tanks for the U.S. Marines.

Although we utilize them both, I have some difficulty with both tank testing and CFD, because each has been correlated to what is known but can have trouble accommodating anomalies. A case in point is that, according to both methods of analysis, stepped hulls indicate increased resistance over conventional hulls, when in reality we know the opposite is true. Stepped hulls, as it turns out, are the naval architect's equivalent of the bumblebee. In reality they fly, but they don't do well in the science lab. The real problem, however, arises when the scientist refuses to believe reality, because he can't duplicate the results by testing. Sometimes tank testing is just flawed.

Perhaps the most memorable case of tank testing gone bad is the 1972 America's Cup Challenger *Mariner*, designed by Britton Chance. Chance was regarded as a real test-tank whiz kid and he designed *Mariner* to have a blunt stern below the waterline. The idea was to trick the water into behaving as if the hull was longer, thereby making a faster boat. It reportedly tested great in the tank, but was a complete disaster in reality and prompted the famous quip from its skipper Ted Turner that "Everyone knows even a piece of shit is pointed on both ends." The "Mouth of the South" was right and it was the end of Chance's career. It also taught me, as a young designer, not to place all my trust in test data.

So today we have learned to use interceptor plates and ventilation tubes to get data that correlates with our real-world stepped hulls. We also know not to believe in miracles. The most important test of all is what I call "The Test of Reasonableness," the ability to spot flawed data and not believe it. Perhaps we can close the gap on reality just a little if a few scientists will open their minds and take a ride on one of our stepped hulls and see that it really can fly. □