THE EVEN KEEL

Volume 5
March 1998

Ask The Experts by Kevin Milne

Q: ***I have noticed that some boats have a T-keel while others have an L-keel. Could you explain the advantage of each of these designs, and how each is constructed?***

A: Extensive testing has been done on L-keels and T-keels with no clear winner, as each seem to have its own advantages and disadvantages in different conditions. L-keels, where the bulb trails the fin, are a very dynamically stable arrangement. Studies conclude that the L-keel performs better in high-load conditions, and does not appear to have a significant viscous drag penalty when each design is fully optimized. The L-keel produces less of the drag caused by pitch and heave in waves. In theory, this design is also less likely to catch submerged objects or floating obstacles, but if such a circumstance occurred, it would be easier to clear.

In contrast, the T-keel offers some hopes of a little less drag, due to more laminar flow at very low speeds, and improved handling downwind, because the keel fin is located farther aft on the hull.

In conclusion, the L-keel would be slightly superior while sailing upwind and hard reaching, but the T-keel would have a very small advantage downwind and during other lightly loaded conditions, such as light air reaches.

In most cases, L-keels and T-keels are produced using dissimilar metals. Iron, stainless steel or bronze can be used for the fin, and antimonial lead is used for the bulb. This arrangement produces a very low centre of gravity and reduces the overall keel weight, while maximizing stability.

A few different options are available for attachment. One method of attaching the fin to the bulb is by incorporating a recess in the bulb section and through-bolting. We have developed what we feel is a much more secure method of attachment that integrally casts the bulb to the fin, thereby eliminating any bolting mechanism and potential attachment failure.

Q: ***I am considering reducing the draft of my CS 30 because of the area I sail. However, I am concerned as to how this draft reduction will affect the sailing characteristics of the boat. Will the boat become tender, and will the balance of the helm be adversely affected? I suspect there are some tradeoffs, but I want to understand them, make my decision.***

A: The trade-off for draft reduction when correctly 10 engineered, is minimal. The first

step is to establish the draft you require for your geographical sailing area or mooring needs. Depending on the LOA and starting draft, we usually recommend a maximum of 18 inches. We also recommend that you reduce only what you actually need, thereby maintaining as much wetted surface area as possible.

When the keel is refitted, we recommend a split torpedo bulb, which is fitted to the foils of the keel's tip cord, and then simply through bolted to replace the weight removed, We utilise a factoring chart based on the current boat's displacement ballast ratio to maintain the same righting moment and stability factor as before the reduction. This added weight along with the reduced draft, will maintain the keel's current vertical centre of gravity without sacrificing stability.

In most cases, adding a bulb, which weighs 25 to 30 percent more than the weight removed, will maintain your current stability at the reduced draft. This added weight will not have any significant effect on your keel bolts or hull joint if the manufactured boat was produced to proper standards, and all is in good repair. If your boat is of an older vintage, a survey of the keel bolts to ensure that there is no corrosion is a good idea.

Any reduction in draft can cause a loss in pointing ability. To compensate for the loss of wetted surface area in depth, we suggest installing the bulbs aft of the leading edge, with a portion of the bulb aft of the trailing edge. This will add wetted surface area to the keel, thus increasing lateral resistance when the boat goes to wind.

"Any amount of draft reduction is a compromise. Just remember, as in life, take only what is needed."

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