

FIBERGLASS BOATBUILDING: Hull-Deck Joints

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Created: Tuesday, 31 January 2012 23:01

Written by Charles Doane



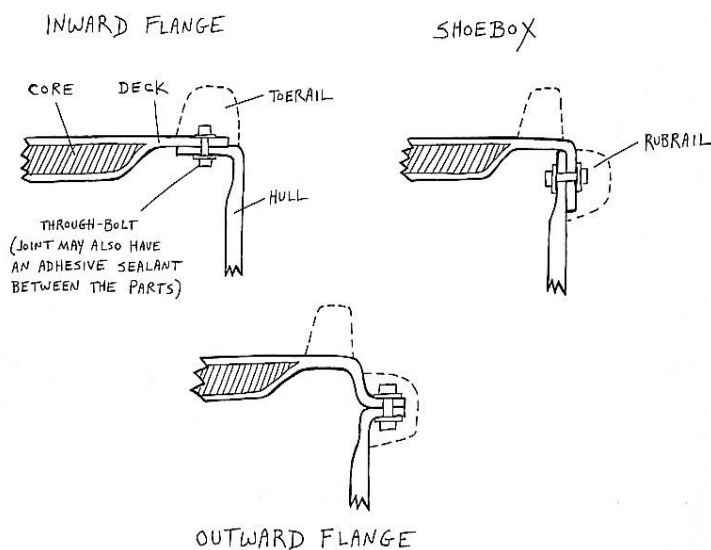
My last missive in this continuing series on plastic boat construction dealt with [internal structures](#) within a hull and how they help support and stiffen a boat. This time we'll look at how the two biggest pieces of a plastic boat, the hull and deck, are married to each other.

Almost all builders these days first install a boat's interior and then close up the hull by placing the deck, another very large fiberglass part, on top of it. Large pieces of equipment, such as engines, electrical generators, and water and fuel tanks, are also installed while the deck is off. Sometimes owners later discover they cannot remove such equipment from inside the boat, as there is no deck aperture large enough to accommodate it. A few builders--Catalina Yachts is a good example--install all mechanical equipment after decks are installed to make sure this never happens.

The bond between a deck and hull is critical. Ideally, it should include all interior bulkheads and partitions. The best practice is to tab these separately to both the deck and hull so that the finished boat is a solid unitary structure. Often, however, these important vertical structures are merely tacked to the deck (or worse, to a deck liner) with adhesive putty. In all cases, the exterior perimeter of the hull and deck must be directly joined to each other. This primary hull-deck joint is often the area most likely to leak when you are actually using a boat. Normally you only learn about such leaks sailing closehauled into a fresh breeze with the boat well heeled.



There are many different ways to engineer a hull-deck joint, particularly if you consider the myriad methods for installing caprails, toe rails, and rubrails on top of them. Their basic architecture, however, falls into three categories. The most common method on sailboats is an inward horizontal hull flange mated to an outward-facing flange or margin on the deck. Another option is the so-called shoebox joint, where a downward-facing vertical deck flange fits like a shoebox lid over a vertical lip on the hull. In the third variant both the deck and hull have outward-facing horizontal flanges that are joined together.



However a hull-deck joint is formed, what's most important is how the two surfaces are joined together. Most high-quality joints these days are bedded with a tenacious adhesive sealant (3M's 5200 compound is often used, for example) and are through-bolted at regular short intervals (1/4-inch bolts on 6- or 8-inch centers are highly recommended). An acceptable alternative is to glass over a bedded joint with fiberglass tape so that the hull and deck effectively become one part. The most bulletproof method is do all three: bed the joint, through-bolt it, then glass it over.

Unfortunately, many hull-deck joints are of rather poor quality. The most common practice, especially on mass-produced boats, is to bed the joint with an adhesive sealant and fasten it with self-tapping screws rather than bolts. Screws can be installed much more quickly than bolts, but they make poor fasteners when threaded into fiberglass laminate. An even worse practice--and you will find this on some boats--is to fasten the joint with lightweight aluminum pop rivets.

Otherwise the difference in terms of quality between the basic types of joints is open to debate. Some prefer the double outward-facing flange because the joint is outside of the boat. It is much easier to install through-bolts on a joint like this; it's also easy to assure a good fit and trim away excess material. Others dislike these joints because they are more likely to be damaged in collisions. The flip side of this argument is that repairs can also be made more easily. The other types of joints, by comparison, are better protected but are also harder to install and repair, as the working surfaces are hard to access. Probably the most problematic type is the shoebox joint, as the tolerances between the hull and deck are quite fine and a close fit is hard to achieve.