What makes an Olson 30 a great value?

This article is a combination of information found in various Olson 30 sales literature and should provide some insight into the construction techniques involved in building an Olson 30. The carefull engineering and construction are evident in the fact that our boats have held up so well after 15+ years of life on the race course. Be sure to share this article with fellow sailors who might be thinking of a new boat purchase! *...ed*

Fiberglass: When most people think of fiberglass they are thinking of fiber reinforced plastic FRP. When a boatbuilder talks about fiberglass he is talking about the dry, flexible fibers themselves. Woven cloth and woven roving have excellent strength and stretch characteristics. When sandwiched between layers of chopped strand mat they have good impact strength, they are easy to work with and inexpensive. They produce medium glass to resin ratios (30-50%). Chopped strand mat or chopper gun fiber is the cheapest, easiest to work with form of fiberglass. They have relatively low strength but if enough is used they can produce a hull of adequate strength. They have the poorest glass to resin ratio (20-30%). In better boats, a thin layer of mat is used next to the gelcoat to improve the finish. Mat also has superior bonding characteristics and is often used in bonding. In general the more high grade forms of fiberglass that are used in a boat, the better the strength to weight ratio will be. The basic Olson 30 hull laminate schedule is 3/4 oz. mat, 36 oz. bidirectional cloth, 3/4 oz. mat, 3/4" balsa core, 36 oz. bidirectional cloth in a polyester resin.

Resin: Even the best resins are relatively brittle. Glass fibers are very resilient but rely on resin to do their job. The best combination for a tough hull is a glass to resin ratio of 50% or better. As glass content relative to resin goes down, so does resilience. This not only lowers initial strength, one of the reasons older hull go "soft" is because excess resin tends to get tiny microscopic fractures. As the boat ages, the normal flexing the hull goes through multiplies the amount of these fractures and finally you start noticing that your boat doesn't hold headstay tension as well as it used to. A certain amount of this is normal in any boat. In an Olson much of the engineering is directed at increasing the life expectancy of hulls by using materials and techniques that yield high glass to resin ratios. Not only does this produce a tougher, longer lived hull, it reduces weight which improves performance.

Coring: There are two basic methods of laminating the skin of a hull or deck, cored or uncored. Uncored construction is known as single skin construction. Cored construction is known as sandwich construction, where the sandwich is composed of two FRP skins with a core separating them. Cored construction is often compared to an I beam where there are two flanges (like skins) separated by a light web (like a core). The reason engineers use I beam like construction throughout all sorts of structures is because it is stiffer for a given weight. Stiffness in a hull or beam goes up as the square of its thickness. For example, if you were to compare an Olson 30 with a 1" thick cored hull to a similar 30 footer with an uncored 1/4" hull, the Olson would be almost 16 times as stiff for the same weight. Increased stiffness means less flex and significantly extends hull life. The Olson 30 is constructed from a sandwich of end grain balsa which when properly used in a well designed laminate provides a superior strength to weight ratio.

> **"The only reason to own a sailboat is because it can be deeply satisfying to be noiselessley propelled by the wind. Less elegant structural systems are used primarily because they are cheaper. Those who would compromise your sailing enjoyment to save a few dollars are making an awful compromise"**
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> *Carl Schumacher*

Laminating: More important than which core is used is how it is applied. There are two methods. The first and by far most common method is to apply it like kitchen tile. A notched trowel is used to apply an adhesive putty to the outer skin of the laminate and then the sheets of core are pressed down by hand or roller pressure until the sheets bond to the first skin. The second skin is then laminated by normal means to the exposed top surface of the core. Although many fine boats have been built this way, this method has several flaws. It requires quite a bit of this putty to get good results. This thick putty adds little strength but does add quite a bit of weight. Because the core is opaque, it is impossible to tell if it has voids lurking underneath, between it and the first skin. The thick putty is mostly resin which makes it brittle and therefore poor on impact and poor on longevity. Its advantage is that it is cheap and easy to do.

Vacuum Bagging: A very few of the best manufacturers use a system borrowed from the safety conscious aircraft industry called vacuum bagging. With this method, we are able to bond the core in an Olson 30 with a thin 3/4 oz. mat which has superior bond characteristics compared to a putty. While mat is not the strongest form of glass fiber, it has significantly greater strength than a putty. Because it is thinner than a putty and is less resin rich, it is considerably more resilient thereby increasing impact resistance and longevity. The vacuum bag process is difficult to describe. Essentially, the core is placed against the wet mat and first skin then covered with a sheet of vacuum plastic or "bag" which is sealed around its edge to the first skin. A vacuum is applied which causes the "bag" to collapse onto the core pressing the core firmly against the first skin with atmospheric pressure. This "clamping" pressure can reach a ton per square foot and is perfectly even across the surface. The vacuum also sucks out any that air bubbles may be hidden under the opaque core thus eliminating the dangers of voids. Most builders don't vacuum bag because it is a technique that is costly and difficult to master.


Airtime demonstrated at Winter Vashon the kind of abuse that an Olson 30 can take!

Furniture as structure: The first thing that you should ask about the interior of your boat is not "how many does she sleep" but "how are the bulkheads designed and bonded". A hull and deck by themselves have long spans that can be quite flexible. The flexibility of a beam or hull surface is proportional to the square of the span. For this reason, it is essential for seaworthiness to increase the stiffness of your yacht by decreasing the length of its unsupported spans. The ABS recognizes this and one of the most essential parts of their rule is bulkhead placement. In an Olson 30, bulkheads are carefully engineered to carry significant loads. Notice the number of bulkheads in the keel/mast area. These bulkheads are all fully bonded on both sides and around the circumference of each one. Throughout the interior, you will see carefully bonded glass work. The woods and painted finishes are all designed to be "wash and wear". This means that you shouldn't need to worry about strange odors and mildew smells collecting in carpeted hull surfaces or liners designed to hide less elegant glass work. You should be able to pour a cup of water anywhere in the boat and it should find its way to the bilge.

Hull to Deck Joint: In many boats the deck is placed on the hull with what is called a hat box joint. This means that the deck has a vertical flange that overlaps the top edge of the hull. The seam is filled with caulking and then screwed or pop riveted together. You can usually tell this kind of joint because it typically has a vinyl or rubber rubstrake that covers the seam a few inches below the gunwale. These sometimes leak because the contact area at the joint is small and that allows the joint to flex. If caulking is constantly flexed it eventually leaks. This joint is used because it allows a boat to be built in a mold that doesn't break apart. This eliminates cosmetic seam repair which lowers cost. An Olson 30 comes out of a mold that breaks apart on centerline. This allows it to have an inward turning hull and flange that is over 3" wide. This surface is rough sanded and then permanently bonded to the deck with an enormously strong, catalyzed rigid adhesive. Then it is pulled together with massive through bolts through its aluminum toerail. This enormous bonding area combined with special adhesive rigid bolted toerail makes a permanent monocoque hull/deck structure that does not leak. The disadvantage is that some cosmetic seam detailing is required. Most of the best boatbuilders use this sort of hull/deck joint.