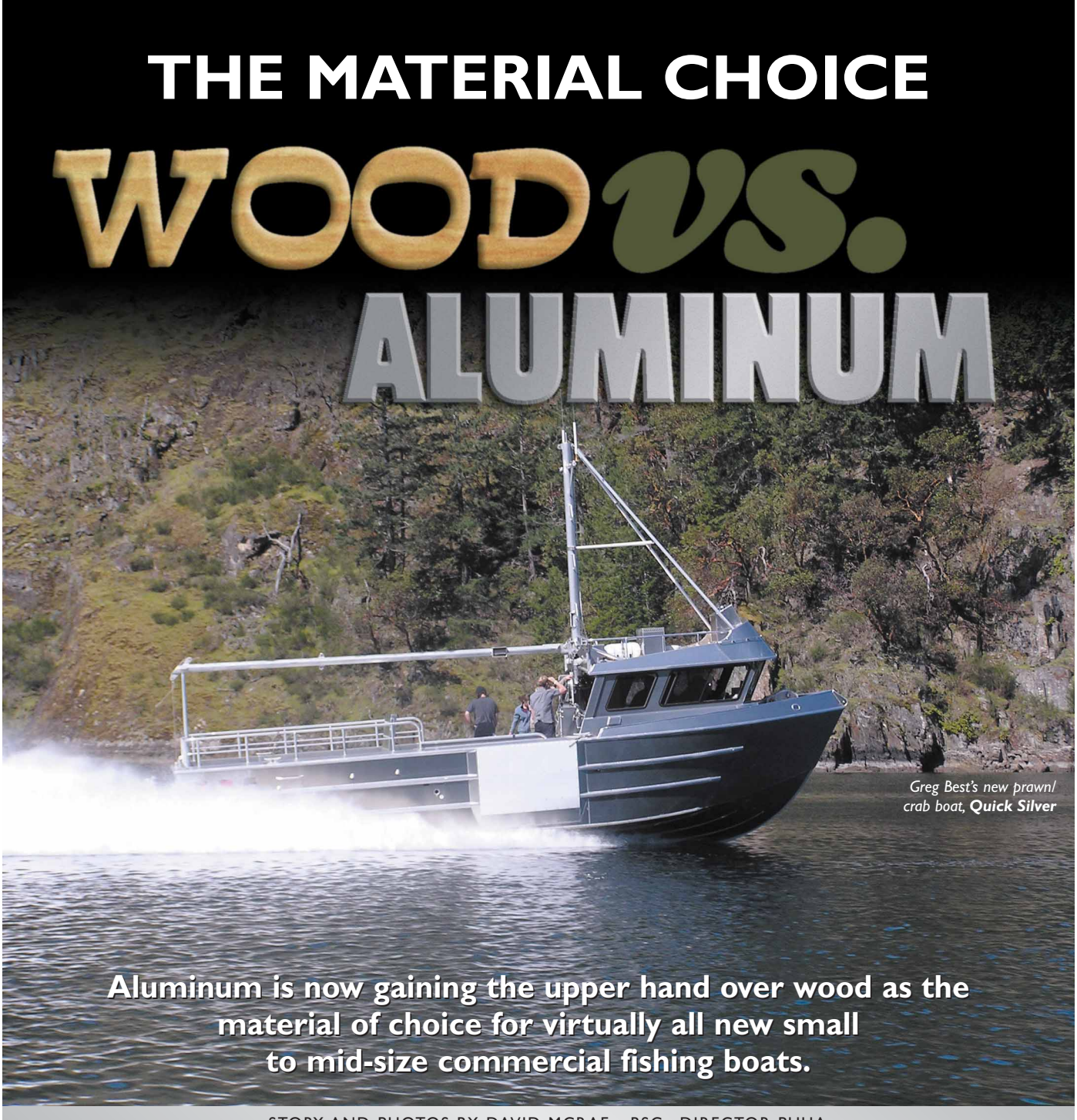
THE MATERIAL CHOICE

WOOD vs. ALUMINUM



Greg Best's new prawn/ crab boat, ***Quick Silver***

Aluminum is now gaining the upper hand over wood as the material of choice for virtually all new small to mid-size commercial fishing boats.

STORY AND PHOTOS BY DAVID MCRAE - BSC., DIRECTOR PUHA

Venture into any fishing community along the West Coast and it's likely that the majority of fishing vessels you'll see in port or at sea are made of wood. Some feature elegant, graceful lines and are brightly painted to display the builder's refined woodworking skills, and some are easily identified as the signature boats of well-known craftsmen. Most of the wooden vessels still operating were constructed after WWII until the early 1960s, and a few are still around that are as old as a century.

For many years in BC's commercial fishing industry wood was the only material suitable for boat building. A reasonably priced, plentiful resource, wood had a large, highly skilled labour force available for construction and repairs. About 40 years ago, however, new wooden vessels started fading from the commercial fishing fleet as fishing vessel sizes, materials and construction costs became increasingly important factors. Steel proved to be the best material for boats 45' and larger, and as synthetic materials technology improved and materials got stronger, fiberglass vessels up to 40' were popular.

Today, although it is expensive and still relatively new to the marine construction industry, aluminum is gaining the edge as the material of choice with small to medium-sized commercial vessels. Aluminum is lightweight, strong, fast on the water, corrosion-resistant, is easily shaped into rounded or chined hulls, and adapts to a variety of designs to fit nearly every fishery. When built to the same strength standard as a

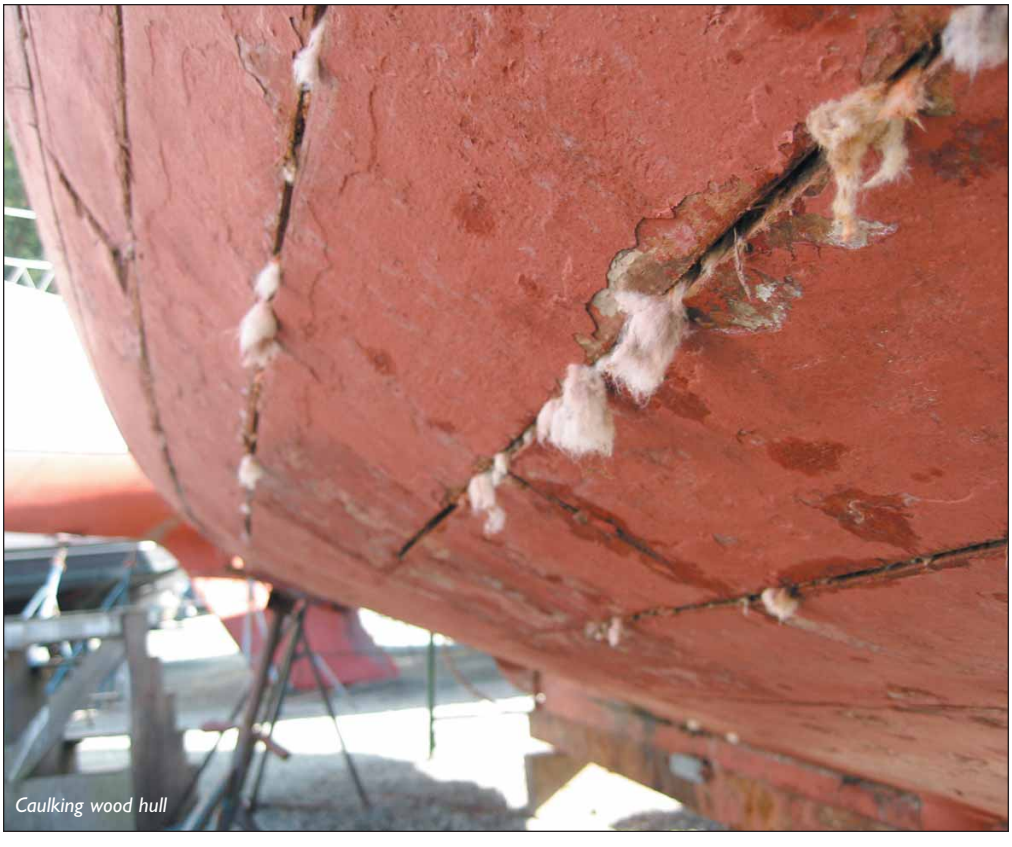
steel vessel, a bare aluminum hull will weigh about a third less than an equivalent steel hull, and requires less maintenance than any other material used in marine construction.

Wood hulls require the highest maintenance, are generally heavier and slower than equivalent metal or fiberglass hulls, and if the boat is damaged, there are only a few skilled craftsmen left in BC to do the repairs. Still, ask small boat fishermen who still use wooden boats whether they would change to aluminum and the answer is usually no. They will tell you wood boats are warmer, that they ride softer and feel better on the water than aluminum, and some even say, "a wood boat can even talk to you."

Aluminum boats, on the other hand, are touted as cold and sterile and produce a hard ride. To better understand the differences between these two marine materials, I talked to Rick Corless, a commercial fisherman with more than 22 years experience in commercial dive fisheries. Rick recently completed a wooden boat-building course at Silva Bay Shipyard School. When I asked him which of the two materials he would prefer for commercial fishing, he responded quickly and firmly, "All boats should be made of wood."

Obviously Corless loves working with wood and he builds beautiful cabinets and inlay chests in addition to boats, but he quickly followed up his comment with the reality of the situation: "You can't just go out and build a wooden fishing boat anymore. Not only is it almost impossible to get the old-growth timber that is necessary to build with, there are only a handful of craftsmen left who can do it." Rick says the smell and feel of wood and the artistic sense of working with wood can't be duplicated using any other material. But when it comes to building inshore commercial fishing vessels his pick is aluminum. "Nothing beats the ease of repair and the low maintenance of an aluminum boat," he says. "If they had aluminum 100 years ago I believe all boats would be aluminum today." To view Rick's woodwork and boat building, visit *www.rickcorless.com*.

Marine construction techniques differ greatly between aluminum and wood since aluminum is more forgiving to work with than wood. It can be bent, cut, rolled and, most efficiently of all, it can be welded.



Caulking wood hull


Greg Best

Welding aluminum allows for smooth, seamless construction of the entire hull. When the vessel is complete, it is virtually one piece. Many aluminum boats seen on the water have an industrial look, but with the designer's introduction of some classic gracefulness, a metal boat can be every bit as beautiful as a boat made from any other material.

By comparison, wood is difficult to work with. A wood boat is made from individual laths or planks that are fastened to the hull form with screws and dowelling. To bend and shape wood it must be carved, steamed or soaked in water and then installed plank by plank. It can't just be put it in a press and have the desired shape take form. The boat builder must make each seam between the planks watertight by stuffing or caulking with material such as Polyfill or cotton and sealing the seams with tar and bottom paint. The techniques

for shaping wood are also very labour-intensive, which ultimately results in higher construction costs. But these are not the main reasons that wood has lost out as the material of choice for commercial fishing vessels; it is because of the requirement for old-growth timber, which is just no longer available. In addition, materials for repairs are scarce and difficult to locate and skilled labour is very limited.

To remain competitive in the fishing industry, fishermen need to understand the economics of vessel construction. Unfortunately, when viewed from this perspective, it becomes apparent that the advantages of building or owning a wood boat have all but vanished. Other than perhaps aesthetic value, there are no longer any real financial benefits to wooden boats, while the advantages of aluminum vessels, especially in the small boat fleet, are

Doug Spraggett, owner of Northwest Aluminum Craft

growing. That said, there are still a number of things to know about aluminum.

The second most common metal, aluminum was a late arrival to the marine construction industry. It wasn't until the late 60s and early 70s that aluminum construction began to appear on the West Coast commercial fishing fleet.

In its natural state aluminum is known as bauxite, which is reduced to aluminum oxide and refined to pure aluminum through a process of electrolytic reduction developed in France in 1886. When aluminum first appeared in commercial boats 40 years ago, it was considerably different from the aluminum used in present-day vessels

Today's aluminum boats are actually constructed from a mixture of metals known as alloys. Aluminum alloys are available in several different mixtures, referred to as Series, starting with the 1000 Series of pure aluminum, to the 5000 and 6000 Series, which are most commonly used in marine construction. A mixture of aluminum and magnesium, along with other additives, they produce the best results when welded compared to the other Series.

Modern boat builders can customize aluminum for virtually any use. When mixed with other metals such as copper, silicon or manganese, the builder can create numerous characteristics such as strength, corrosion resistance and malleability to produce a desired special-use material. For example, the earliest aluminum commercial fishing vessels had considerable problems with electrolysis corrosion. Adding zinc anodes and aluminum alloys with corrosion-resistant additives reduced electrolysis considerably. On the above-water portion of aluminum vessels, oxide forms naturally from exposure to the atmosphere, which is actually a benefit as the layer of aluminum oxide creates an airtight coating, protecting the vessel's top sides.

While current marine alloys are generally considered corrosion-resistant, they are subject to pitting, but the pitting action slows as the oxide film thickens with age. The alloys are also subject to crevice corrosion, and since alloys depend on the presence of oxygen to repair themselves, salt water must be prevented from entering the crevice or corrosion will result. What this means is that wherever aluminum is in contact with anything, even another piece of aluminum or zinc, it must be painted with an adhesive waterproof paint like epoxy, or protected with a waterproof adhesive bedding, or both. Aluminum hulls also require special bottom paint. Organo tin-based anti-fouling paints are no loner permitted for use as bottom paint in North America, except in such diluted formulations that render them nearly useless. Currently, the best antifouling paint for aluminum hulls is called "No-Foul ZDF," which is made by the E-Paint Company. Refreshing the coatings annually will result in a top-performing system.

In its short history, aluminum has earned a reputation as an excellent marine construction material, but how will it perform once the vessel is launched? It is easy to understand that a smooth, seamless aluminum hull will have much less drag above and below the water line. Less drag equals lower fuel consumption plus an increase in speed, resulting in a more economical vessel. Aluminum also offers excellent

protection against impact damage, especially compared to wood hulls.

It is rather common to hear that a wooden boat has popped a plank or sprung a leak after hitting something while underway. Fishermen witness the benefit of aluminum's impact resistance almost daily in the West Coast sea urchin fleet. Sea urchin vessels operate in the shallow waters of the exposed coastline, often right in the surf line, so hardly a day goes by without a vessel making contact with rocks. Rarely do these impacts result in any serious damage; the consequences are usually a few scrapes or dents, which can be easily repaired. Today, virtually all welding shops are able to handle aluminum, and many small boat building and repair shops have established themselves along the coast.

Once you have decided on buying or building an aluminum fishing vessel, the most important consideration is design, and the design depends on the intended fishery. Builders and fishermen need to consider variables such as length, beam, weight, speed, load capacity and sea conditions expected in the area where the vessel will operate. Look for other vessels that are close to your design requirements and don't be afraid to copy something that works; the ease with which a builder can weld and shape aluminum offers great options for hull design. One example of this is the bulbous bow, which greatly increases the hull efficiency of any vessel. Grade and thickness of aluminum are also determining factors, along with many other details that are specific to each hull and the expected sea conditions. Next, meet some of the builders and look at boats they have built. Discuss designs that will meet your specifications, then choose the builder you feel comfortable with and follow his recommendations – unless you have the time and money to have him experiment or you need a radical design for some reason. Having gone through the process once myself while building the *Kuroshio*, here is a general outline of the steps you can expect if you decide to build rather than buy an existing vessel.

Once you have decided on hull design and a builder, I suggest hiring a naval architect to draw up the plans to help ensure the success and safety of the vessel. After all, you want it to float and operate correctly on the water as well as look good (appearance is important because a vessel with nice lines and functional looks will hold its value in the marketplace). A naval architect will also ensure the structural integrity of the vessel and may reduce complications when fitting other components such as engines and propulsion systems. Also, avoid under-building – that is, using materials that are too light or structural ribs spaced too far apart or rivets instead of welds. A shorter vessel life span and earlier hull maintenance requirements will wipe out any savings from taking short cuts.

There are many aluminum boat shops out there. My preference was to find one that made vessels that look good because at the end of the day if the aesthetics aren't there, then in my opinion it's a bad job. I talked to Doug Spraggett, owner of Northwest Aluminum Craft in Victoria. Doug has been in business since 1994 and currently has three full-time employees.


*Inner hull of **Quick Silver***


Rick Corless with some of his woodwork

Doug has manufactured vessels up to 42' and when I first talked to him I asked him what he thought about wood vs. aluminum for commercial fishing vessels. He looked at me and started to laugh, and with a big grin, said, "I prefer aluminum because the grain is always clear and the pieces are straight."

We talked about today's market for aluminum vessels, and Doug stated that he is booked for the next year. He said he wants to expand his business but the difficulty is finding qualified employees. This is apparently a problem across the West Coast, as aluminum vessels are now in high demand. Doug just finished building a 36' prawn/crab vessel for Greg Best, who worked alongside Doug making final changes and additions to the engines, hydraulic and electrical systems.

Greg has been a commercial fisherman for many years, and as we were standing on the deck of his new boat I asked him about his thoughts on wood and aluminum for a fishing vessel. With a shrug, Greg said matter-of-factly, "I've owned wood boats, and the simple answer is wood doesn't plane." Greg's new boat, the *Quick Silver*, is powered by a pair of Volvo D-9 500-hp, twin-disc transmissions, and Arneson Drive ASD 10s. It will be an impressive vessel as sea trial reports on Greg's new vessel are all positive.

Assuming we are considering vessels of equal size and complexity, when all is said and done, builders estimate that an aluminum vessel will be around 10% more expensive to build than the same vessel in, say, steel, while wood will be considerably more expensive – assuming the builder can even find materials and skilled craftsmen to do the work.