

Bill Seemann – A Lifetime of Innovation

William H. Seemann was born in New Orleans October 14, 1939. His father served in WWII's Pacific Theater and subsequently went into the lumber import business. His firm, Fine Woods Company, supplied lumber to the local boat building industry. He became the first person in the area to sell fiberglass and resin, primarily to cover wooden boats. Bill actually built some models for his dad while in high school to show customers how these "new" materials could be used. Also while in high school, Bill designed and built a small powerboat using a wooden strip mold male plug by himself. Illustrating Bill's inquisitive nature and competitive drive even as a teenager, he borrowed an outboard engine to race against a Yellow Jacket, which had an established pedigree. He won the race, returned the engine, and never used the boat again.

His success in his first powerboat race did not distract Bill from his true love, which was racing small sailboats. Starting at the age of 13, he worked for a sailmaker in the summers. He mastered racing the Penguin dinghy, starting at the age of 12. Indeed, by the time he was 14 he took second place at the Penguin Nationals in Baltimore and won the regatta the next year in California. He was hooked on the sport at an early age.

Bill attended Webb Institute, as he now regrets leaving after early in his second year, and then studied engineering at Tulane University in his home town. His studies there ranged from ocean engineering to psychology. However, his desire to test his ideas made him restless to dive into the real world. By now, he had graduated from sailing Penguins to the Olympic Finn class, which is a demanding singlehander. He became the Finn dealer for Newport Boats in Costa Mesa, CA. On one trip to California to pick up four Finns, he serendipitously found himself without a transport trailer and was forced to work building boats for about a month. As Bill recounts, this is where he first learned how to build production fiberglass boats.

Bill returned to New Orleans and started building the Finns himself. One of his Finns won the North American Championships. His operation was acquired by Wolf River Laminates around 1965, which led to larger projects. One customer wanted to build a 36-foot custom boat and Bill developed the concept of using 4-inch wide strips of fiberglass to create the hull shape over wooden frames in lieu of a conventional male or female mold. The hull still required a bit of fairing to be smooth so the process evolved to use cured fiberglass rods instead, what we now know as C-Flex. The rods were able to bend in two directions and C-Flex was patented around 1967.

Bill then spent about 3-4 years doing commercial diving in New Orleans, earning enough money to pursue his passion, which was to develop and market C-Flex. He was unable to generate interest with Owens-Corning or Fiberglass Industries at the time so he took on the challenge himself of how to economically produce C-Flex. He found a local machine shop that let him use their equipment for \$1/hour, where he built equipment that could produce C-Flex.

Bill went back to his sailing roots, crewing with a gentleman named Buster Curtis, who designed the Superdome. They just missed going to the Olympics in the Dragon class but the sailing camaraderie led to a business opportunity with Buddy Fredericks and Tommy Dreyfus in what became New Orleans Marine, which funded the construction of the first C-Flex boat. Dreyfus and Seemann built their first boat themselves. In *JEMEL*, a Brit Chance designed 44-foot ketch with a swing keel, they took on quite a challenging project. Figure 1 shows the complexity of this boat's deck layout. New Orleans Marine went on to build a number of offshore racing yachts, including Burt Keenan's *ACADIA* shown in Figure 2, which won the SORC in 1978. These boats enjoyed unusual success in part because they were lighter than sisterships built at other yards. Seemann believes that they were the first builder not to use any mat in their hull laminates.

New Orleans Marine also built *SWAMPFIRE* shown in Figure 3, which went on to win every race in the ¾ world championships. This prompted an amateur builder in England to build his first boat using C-Flex, completing the boat just 8 weeks before the next world championship and winning it. C-Flex went on to be the medium of choice for amateurs wanting to build one-off sailboat hulls.

Bill was also one of the first to use vinyl ester resin to build boat hulls. Indeed, Dow Derakane 510A was associated more with the tank industry. He convinced Bill Snaith to build *FIGARO*, New Orleans Marine's second boat out of 510A. Seemann made the argument that the difference in the cost of resin for the boat was the same as a single winch.

Bill went on to form Seemann Fiberglass to focus on manufacturing and distributing C-Flex. He found himself providing technical expertise to support C-Flex so a logical progression was to take on Reichold resins and CertainTeed fiberglass. The added business propelled Seemann Fiberglass to be the largest FRP distributor in the Gulf region. The company's strong reputation for technical support earned them the local distribution rights for Venus impregnators, with customers such as Textron, Halter & Avondale. Although Seemann had a good 15-year run with this company before he sold it, he notes it wasn't without bumps along the way, especially around Christmas his first year when sales virtually came to a standstill. Like his early stint as a commercial diver, Seemann used his business acumen to develop sufficient capital to pursue the technical challenges of his trade.

C-Flex was sold around the world, which gave Bill the opportunity to visit boat builders in Australia and Europe. The Scandinavians were the first to regulate the emission of styrene and this prompted Seemann to investigate closed molding methods. Bill was aware that Jeremy Rogers was building the Contessa line of boats in Lymington, England using the VARI process developed by Colin Chapman for Lotus cars. The process used male and female molds to create boats strong enough to withstand the 1979 Fastnet Race. Bill was impressed and returned to the states determined to duplicate the process.

Seemann built about 20 15-foot boats, none what he'd consider a complete success. Bill was concerned that the matched-mold method with a fixed gap between the molds would

be problematic at seam that could overlap and lead to variation in fiber content. He focused on a vacuum process, ultimately devising a distribution media that would ensure resin wetout over a large area. Bill knew that this could be accomplished by scoring the core or embedding flow media as is now common but his objective was to obtain strong laminates using a minimum amount of resin. He was able to achieve high fiber volumes because the extra resin associated with the distribution system is discarded with the media.

Now ubiquitous in the world of boatbuilding after receiving support from Everett Pearson and John Walton, the manufacturing process was named SCRIMP, which stands for Seemann Composites Resin Infusion Molding System. As their literature states, Seemann Composites was able to achieve: high fiber-to-resin volume content; extremely low void content; low/no VOC exposure to workers and environment; and near autoclave laminate quality at shipyard prices.

Bill calls it luck but the rest of us would call it perseverance that led him first to Ingalls Shipyard and then to the U.S. Navys's lab in Carderock, MD (NSWC) to see if his new process would be suitable for building deckhouses. At Carderock, Dr. Milt Critchfield recognized the potential that SCRIMP had for producing large, high quality parts for surface combatants at a cost that may some day compete with steel. This was after he visited Seemann at his Gulfport facility and witnessed the construction of a deckhouse section in the two days he was there. Up until this time, NSWC research in the area of composites was focused on submarine structures, often being done by aerospace companies. Autoclave-cured prepreg technology has its size and cost limitations so NSWCCD funded Seemann to build a number of technology demonstrators, as shown in Figure 4. This was only after Dr. Critchfield recounted his eyewitness experience in Gulfport to assure the navy that indeed a deckhouse prototype could be built to their specifications at one third the cost of what other fabricators were quoting at the time. Figure 5 illustrates the navy's goal for composites manufacturing, then and now.

Seemann had earlier purchased some looms from the UK to manufacture C-Flex and utilized this capability to weave his own 60 oz fabric using "twill" architecture for the navy to reduce ply counts and achieve high fiber volumes. He also convinced the navy to switch to vinyl ester resin for improved mechanical properties over the ISO polyester they were using. He went so far as to offer the navy a \$20K discount on their first deckhouse module, although in the end the decision to switch stood on its technical merit. Today, Bill credits his partners at Carderock for trying new ideas in the early phases of SCRIMP development with the navy. This close relationship was not without its contracting hurdles as the navy certainly couldn't "sole source" everything composite to Seemann Composites. Indeed, the navy termed the phrase Vacuum Assisted Resin Transfer Molding (VARTM) to use instead of SCRIMP to avoid the perception that the relationship was too cozy. However, when NSWCCD wanted to build 1/2-scale corvette hull sections for structural testing (see Figure 4), the VARTM prototype wound up being far superior to those made using less mature pultrusion and UV-cure technologies.

Building the ½-scale corvette section for the navy shows how Seemann seems to be following in the footsteps of an earlier New Orleans boat builder named Andrew Higgins. Higgins doggedly promoted his landing craft that made the landing at Normandy possible, often using his own money to build prototypes for the navy to evaluate. Seemann was not happy with the quality of the first ½-scale corvette section he built because of what he attributed to be a leaky mold. Although this hull section looked good to me when I saw it, Bill fabricated a new one at his own cost to give the navy the best possible product. In his mind, to do any less would undermine the case for using the SCRIMP process to build large naval combatant structures.

With all the demanding work Seemann Composites work has done for the navy, including submarine components, Bill insists the fuselages that they built for Boeing (see Figure 6) was his most challenging project. The entire part was done in one shot and Boeing has said this is the most complex composite part they've seen built to aerospace standards.

Seemann's cycle of innovation to support the manufacture of high-value composite parts has come full circle, as he shifts his company from being 80% oriented towards process development to 80% devoted to manufacturing. Indeed, he plans to significantly upgrade his robotic CAM operations to tackle the immense post-molding machining operations needed to make high precision parts, such as those found on submarines. Bill Seemann has shown us a road map for success in the composites industry by developing novel process technologies; refining them to near perfection; and then producing the parts for the right niche market to make the whole thing rewarding, both financially and professionally.



Figure 1. New Orleans Marine First Boat, 44-Foot Brit Chance-Designed *JEMEL* in St Petersburg, FL for the SORC (Eric Greene photograph)



Figure 2. Burt Keenan's ACADIA, 1978 SORC Winner (Eric Greene photograph)



**Figure 3. *SWAMP FIRE*, First Place, $\frac{3}{4}$ Ton World Championship 1974
(courtesy of Seemann Composites, Inc)**

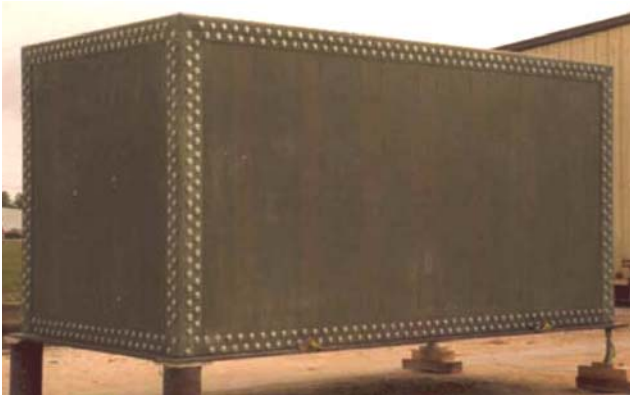


Figure 4. SCRIMP Technology Demonstrators Funded by NSWCCD, Clockwise from top left: Advanced Composite technology Deckhouse (1988); Advanced Material Transporter (1991); Helicopter Hanger Door (2000) (courtesy of Seemann Composites, Inc) and Half-Scale Corvette Hull (tested 2003)

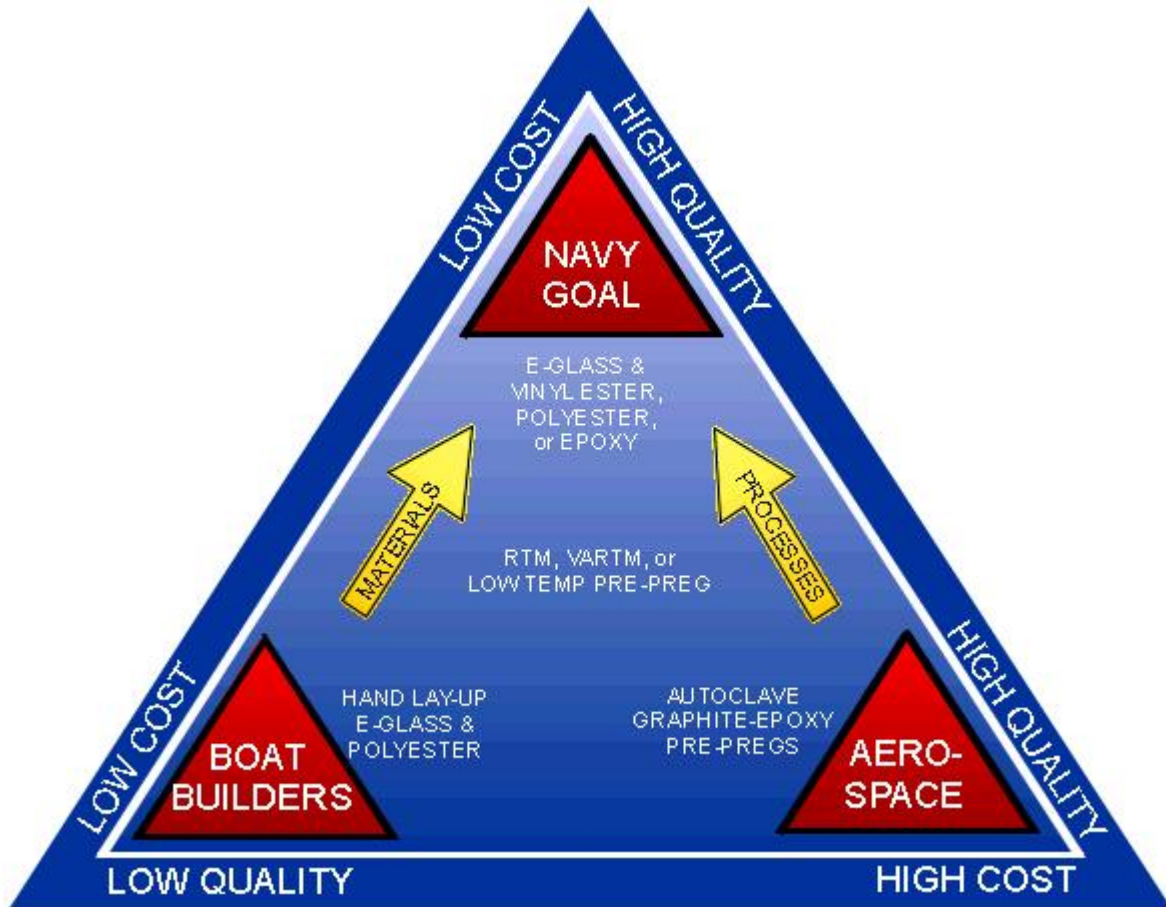


Figure 5. U.S. Navy Philosophy on Marine Composite Construction
 (<http://www.dt.navy.mil/sur-str-mat/str-com/mar-com-bra/index.html>)



**Figure 6. Prototype Apache Helicopter Fuselage for Boeing Corporation
(courtesy of Seemann Composites, Inc.)**