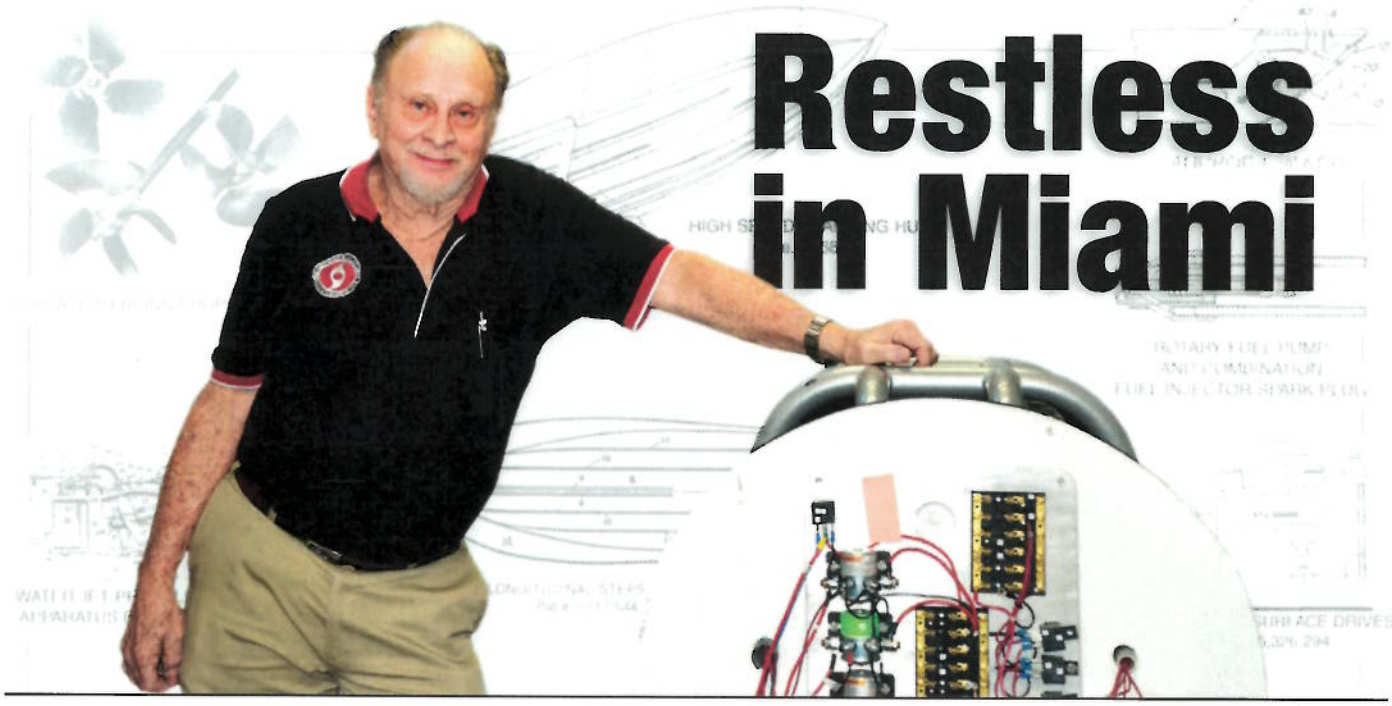
Restless in Miami



Boat designer, builder, and inventor Harry Schoell has a long and storied career creating numerous innovations, from new hullforms to automatic anchor systems and compact steam engines.

by Dan Spurr

Picture this: Harry Schoell's office at Schoell Marine in an industrial section of Pompano Beach, Florida. Four workstations with computers, buried in papers. He's in the corner, surrounded on three sides. The station next to him, usually occupied by consultant and longtime friend Allen Brown, has a drafting board strewn with parts of an ingenious, compact 5-hp (3.75-kW) Cyclone steam engine, Schoell's current obsession. Wall-mounted bookshelves support numerous models of high-performance powerboats. There are photos of his boat designs and builds, too. Pinned to one wall is a photocopy of his 1964 patent for a V-hull with strakes. It was followed by the DeltaConic (DC), one of his earliest and more significant achievements in the world of boat design, and then by the evolutionary improvement of a step, the Duo DeltaConic (DDC), which we'll examine shortly.

DAN SPURR (ALL)

Top—*Boat designer and inventor Harry Schoell leans against the frame of a race-car he hopes will one day break the world steam-power speed record.* ***Above***—*Schoell, ready to put the throttle down on his 21' (6.4m) Duo DeltaConic (DDC) powerboat to demonstrate its seakeeping and handling qualities.* ***Left***—*Schoell's shop.*

Engineer Mike Hodgson, sitting behind a half-height partition, rotates a part design in SolidWorks. Aubrey England, from Jamaica, puts his elbows on a counter, leans forward and says to Schoell, "I'm afraid I have bad news. There is water in the transmission fluid." He's referring to the engine in the 21' (6.4m) DDC speedboat Schoell built for his wife, Frankie Fruge, 20 years ago, in which he hopes to later demonstrate for me—at high speed—its exemplary behavior and seakeeping.

I'm staring at a cup of black coffee so strong it's making my temples burn. There's no creamer in the galley to cut it.

Next to me, sitting at his desk, the 73-year-old Schoell, says, "Do we have another oil cooler? There was another one around here somewhere."

Judging from the inventory of boats, models, machines, and sundry parts stored in this complex of rooms and shops, there *must* be a spare oil cooler.

Over nearly six decades Schoell has designed hundreds of powerboats, built many times more, and watched others build hundreds if not thousands to his designs. All this interspersed with a variety of marine and non-marine inventions, most of which were profitable, a few not. But any way you assemble the pieces of his varied career, the mosaic is colorful, jagged, and tuned to a low rumble. There is a record of them here in the office and in several shops and up in the storage room above us, thanks largely to Hodgson, who's been with Schoell for 30 years. Schoell describes him as an excellent engineer and his polar opposite in personality. But there are gaps in the record. There are simply too many pieces.

Born to Boats

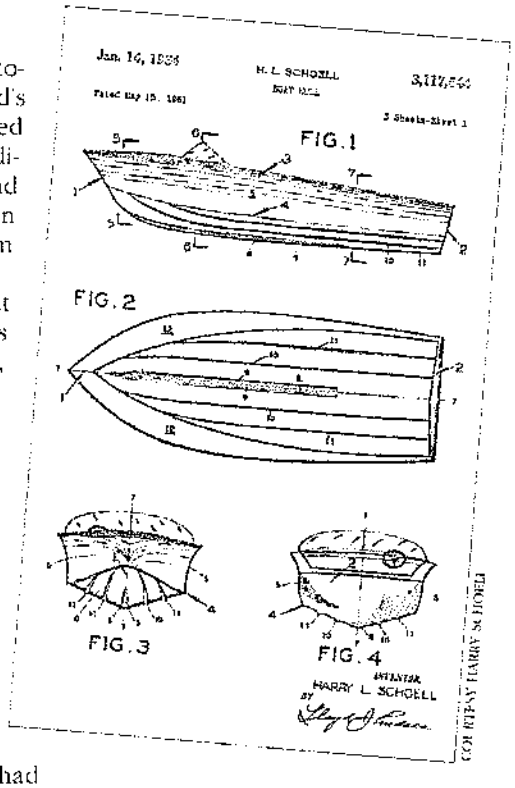
Here's a name that has appeared in *Professional BoatBuilder* only twice: Troy Wollard. The first mention is in PBB No. 103, in an article I wrote about Dudley Whitman and his Challenger Marine company in Miami Beach, Florida, ostensibly the first builder of fiberglass boats in the southeastern U.S., circa 1947–49. Wollard, who'd built a lot of wood boats with Bennell Sawyer and others, designed the boat and assisted Whitman with the prototypes. Resin on the floor of Wollard's shop on 95th St. is commemorated by the City of Miami in a sign dedicated on May 6, 2006. (The second appearance of Wollard in PBB is in the PBB No. 120 article about Jim Gardiner, referenced on page 28.)

This is all by way of saying that Wollard was a close friend of Harry's father, Kenneth Eugene Schoell, that the two built boats together, and that young Harry used to hurry from school to the shop to see what the two were up to. Also frequenting the shop was Howard Abbey, whose pioneering work in composites was recounted in PBB No. 104 ("Abbey & Brownie"). No doubt those times fomented the creative streak in Schoell.

"My dad met Troy before the war," says Schoell. "Around 1930. Dad had built a little step boat with a Star engine. Thought he had something pretty fast... maybe 50 mph [81 kmh]. One day he was running down the bay and here comes this other boat with Troy in it that went by him like he was a stump. Troy had a 'Hisso' [Hispano-Suiza] airplane engine that would run about 70 mph [113 kmh]. They met and became friends.

"Dad was an inventor, a machinist, and owned a foundry. My grandfather had several patents and so did my uncle. We're all inventive types. You can't help it... always trying to improve stuff. Me and my friend Rusty Weiss were at Troy's shop all the time."

After the war, when Harry's father grew tired of making tools and dies and working the foundry, he "decided to play with Lambretta scooters" and broke his collarbone. He was in the hospital for a year, which devastated the family financially. After he recuperated he opened a boatshop, building small wooden boats, including sailboats, mostly of plywood. Harry and Rusty started building model boats, powered by a 0.049-cc airplane engine that cost $3.95. "Had to mow a lot of grass to get $3.95!" he says. He learned how to loft plan lines onto the shop floor, and before long he was drawing his own model plans. To gauge performance, he devised a method of measuring drag while towing a model behind a small outboard boat.

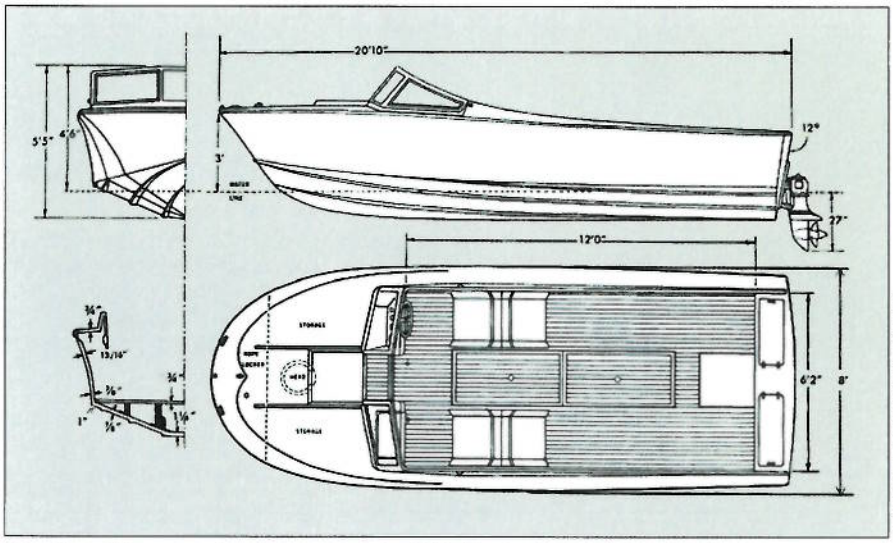


Schoell's 1964 patent #3,117,544, filed in 1961, is for a hullform described as being efficient at fast and slow speeds thanks to its "surface contour," and "longitudinal stabilizing steps." It preceded the 1974 DeltaConic patent, and the 1990 Duo DeltaConic patent, reissued in 1999.

"I had a piece of plywood," he explains, "with a pivoting stick across it. A screen door spring created tension. A monofilament line was attached to the stick and the model, and as drag increased, the stick crossed numbers on the board. Didn't have to go very fast. The model is running square of the scale. You tow the model at different speeds and you can see the difference in it. Numbers on the board were arbitrary. They didn't matter. You can always convert them to something else. I put the numbers of three different models on a graph and won the Dade County science fair contest in junior high school." In high school, Schoell built a model sailboat that won a Ford Foundation award, as well as Engineer of the Year recognition from the school.

On graduation he applied to several colleges, including the University of Miami and Webb Institute. Schoell says he "did the interviews, got accepted, but, you know, I just wanted to get on with it. Too anxious. I weighed 135 lbs [61 kg] and sometimes I'd forget to eat."

So he kept doing what he wanted to do: design and build boats. In 1960 he designed a powerboat called the Alim V-20, and to finance the project brought in an investor, who later sold it to Wellcraft, which built the boat for many years as the V20 Steplift. "That was my first lesson in business, because he put the screws to us. Everyone knew it. That happens. I was very naïve then. 'Here, sign this. Sign this.' Pretty soon you're out." It wouldn't be the last time Schoell experienced success, profit, and a lesson from the school of hard knocks.



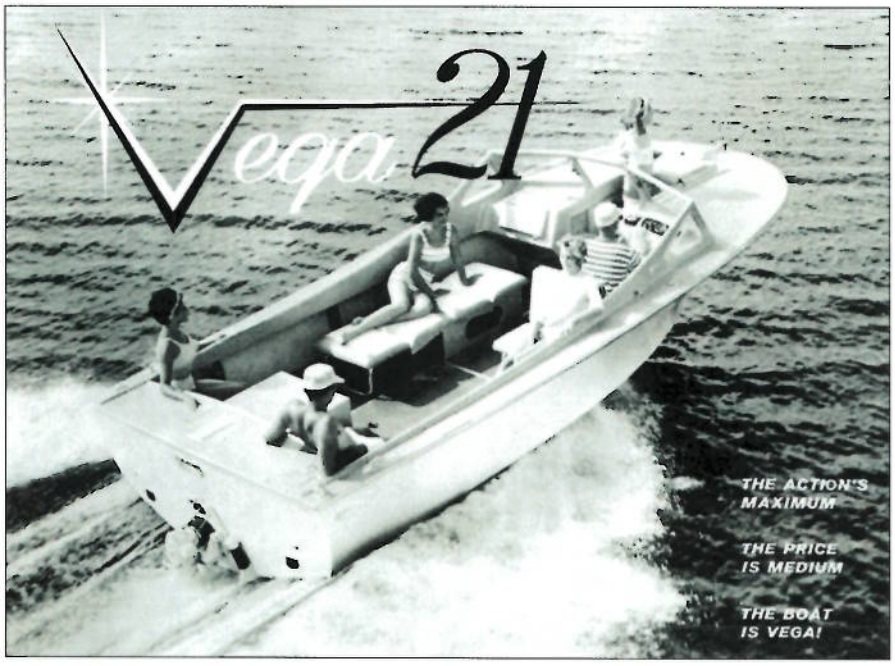
COURTESY HARRY SCHOELL (BOTH)

The Vega 21 was a development of the V20 (6m), which Wellcraft built for many years. The Vega incorporates Schoell's thoughts on deep-V hullforms as shown in the patented hull drawings on the preceding page. The brochure says it is "unhampered by yawing" and does not pitch or broach "even under the most adverse conditions."

Design and Production

Schoell's next endeavor was a 21′ (6.4m) runabout called Vega, incorporating a number of innovations. Where on the V-20 he created a wraparound windshield in Plexiglas, he went a step further on the Vega by molding the aluminum windshield frame into the fiberglass deck. "It was the first boat with a sliding-hatch walk-through windshield," he says. The center section of the three pieces hinged down onto the forward hatch, and then the hatch slid forward, opening to a cuddy with toilet.

More significant was Schoell's decision to core the entire boat with end-grain balsa. Harry was still working with his father at this point, and their materials supplier was a big man named John Cisco. Schoell was working on a small sailboat similar to the Sunfish that he wanted to fill with foam à la Boston Whaler. Cisco gave him a 5-gal (19-l) bucket of expanding foam and the recipe for mixing the chemicals. But he put the decimal point in the wrong place, and "it foamed out of the bucket so fast Dad had to step out of an 8′ [2.4m] donut!"



Schoell says several features on the Vega 21 were industry firsts, such as the soon-to-be-copied sliding-hatch walk-through windshield.

For core material, the Schoells looked for something lighter than plywood, which was commonly employed at the time. To tie together the skins, they experimented with pegboard because of its holes, but it was still deemed too heavy; the thickest available was just ¼" (6mm), and sometimes the finished laminate was imprinted with dots.

Then Cisco brought in planks of balsa wood, which the Schoells cut on a bandsaw into small blocks. Schoell remembers Cisco saying he'd bring the balsa in a sheet with the blocks attached. "They were stuck together alright, with masking tape," Schoell says. "When we picked it up, all the blocks fell off. Then Cisco got a nylon scrim that looked like a honeycomb. Dad built a gang saw to cut all the rows of blocks at once, and they slid onto a scrim with drips of resin. When the other balsa companies got into it there were lawsuits. What beat Cisco was it wasn't an original idea. Lawyers for the other companies brought up bathroom tiles [which are glued to a flexible scrim]. Plus, their lawyer was better than Cisco's, so he lost the patent suit."

The Schoells began in a "little plant" in Hialeah but soon needed an

"expansion partner," who moved the operation into a larger building. Sales were decent and more staff were hired. But, Schoell says, "I didn't like the way it was run, so I left. They survived maybe a year after that."

A man named Lenny Siraga commissioned Schoell to design a larger version of the Vega and set up a plant to build it in Amityville, New York. The weather "up north" didn't agree with Schoell, so when the project was finished he returned to Florida.

At this time, Schoell decided to focus more on design, and in 1965 he opened Schoell Marine Engineering & Prototype, in Hallandale. One of his first customers was legendary raceboat driver Don Aronow.

Schoell: "Don said he wanted me to design a boat for him. I said okay. I drew up a 28 [8.5m] for him and built the plug in his shop. This was the Magnum 28, which later got stretched to 30 [9.1m] and became a Cigarette. Also a 23 and a 36 [7m and 11m]. Later, he says 'Let's do a little shop,' which we did [in Miami] on 151st St., Arrow Marine. Aronow was going to peddle the designs. We did a bunch of little boats. A double-ended lapstrake boat with sterndrive that planed. A tri-hull. A wood 21-footer [6.4m]. Carl Kiekhaefer [founder of outboard motor builder Mercury Marine] used to come around all the time."

The mention of Kiekhaefer prompted Schoell to segue into another story, about his participation in the Gold Coast Marathon, from Miami to West Palm Beach. Schoell was running Chrysler motors in his Vega powerboats. In the '60s Chrysler made sterndrives as well. Kiekhaefer's boats ran Mercurys, of course, but according to Schoell, could do only 50 mph in the class he was running, while Schoell was running 70 mph.

Schoell and his friend Rusty Weiss were competing in the same Vega hulls. "We started on the backside of 79th St. Then we'd come around with the gun. I picked up a 2x4 between the engine and hull. Cleared it and soon was passing the Mercurys. Up around Hollywood there was a low bridge at the time. I'm buzzing down the Waterway and I could see Dad and Troy on top of the bridge. I leaped a wake and was eye to eye with them! I got to the dock in West Palm Beach and wasn't sure if I was at the right place, because there were only four boats. I tied up and pretty soon old man Kiekhaefer comes walking down the dock. 'What the f_ _ _! A Chrysler won it?!' Then he says, 'Nice job, kid.' Turned and walked away."

Self-Taught Design

Young Harry Schoell learned the principles of engineering and boat design more or less on his own, though his father and Troy Wollard were influential. "They knew planing boats," Schoell says. "I learned a lot from both of them. Of course I'm an avid reader. Lindsay Lord's book *Naval Architecture of Planing Hulls* was probably one of the best. Others might have sent you off on the wrong track. Lord's book is where I started to get into steps. I built an outboard boat in the '50s that had an adjustable step on the bottom. It had a screw jack so you could change the angle of attack. It didn't do a whole lot, but I

learned something from it. It speeded it up a bit but not as much as I'd hoped. If I wrote a book, I'd title it *Angle of Attack*."

Like nearly every designer working before the advent of computers and performance prediction software, finite element analysis (FEA), and computational fluid dynamics (CFD), Schoell learned by trial and error, on the water. It was painstakingly slow but essentially the only way to discern performance differences between slight adjustments in chine width, deadrise, bottom shape, strake placement, propeller design, and other features.

"I built lots of models," he says. "I towed them on the river. On a mud puddle. In a swimming pool. Anywhere I could. I had a water-powered test tank with a 3-hp [2.25-kW] Briggs & Stratton motor on it. It was built from two 4′ x 8′ [1.2m x 2.4m] sheets of plywood lined with Formica. Eight feet long and looked like an oval donut. Water circulated in a loop. We hung the models inside, tethered by a string. There were Plexiglas windows so you could look at the model. Water speed was changed with a damper.

"You can do lots of experimentation through observation. I was always really good at physics, so it came naturally. You can put your hands on the model to see how it feels. Some feel so bad... others feel great. You can make a little wake to see how the models go over it. 'Oh, that's what a 4′ wave does.' 'That's what constant deadrise does.' Everything starts as an art first and a science second. The numbers and formulas come after the tests. You build a background. It's a lot easier than screwing up a lot of big boats. Some things cannot be tested on computers, at least not yet."

"Speed," he says, "is horsepower-to-weight ratio, hull type, and drivetrain efficiency. We developed some formulas when calculators didn't even have square roots on them." For more accurate comparison purposes, he photographed the models under way, first with a Kodak Brownie camera, then Polaroids, and later, Super 8 movie cameras. When prototyping for customers, he'd send photos to mark progress—a prequel to the current practice of designers and yards e-mailing digital images to clients.

Schoell's on-the-water studies began to pay off with design commissions; and because he still had a shop, he could also prototype hulls for customers. In fact, in the 1970s he was shipping a hull every two weeks. He and his small crew were busy.

COURTESY HARRY SCHOELL

Schoell spent hours and days towing scale models from a boom attached to his small outboard boat. Besides visual observations of the model's behavior, relatively accurate drag measurements could be recorded with a load cell, measuring in grams.

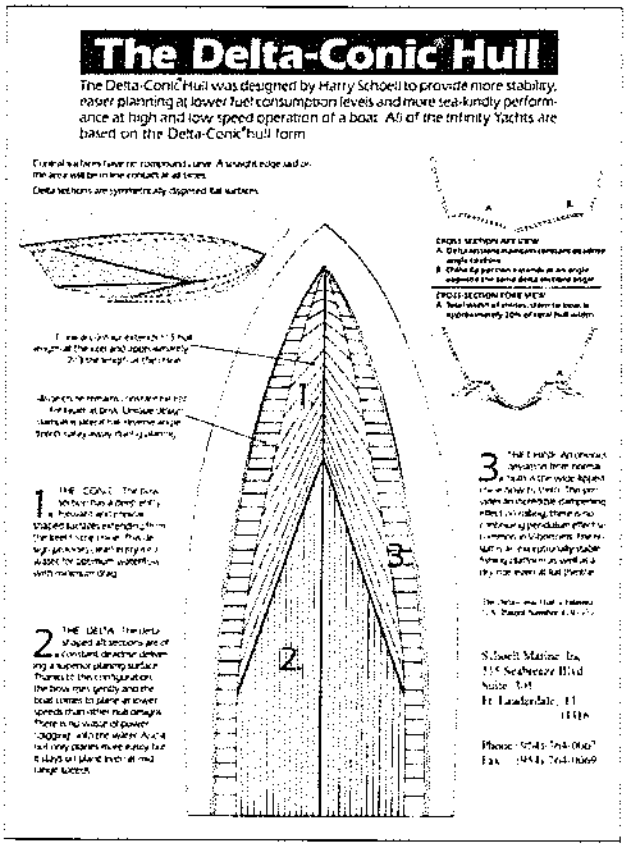
The DeltaConic and Duo DeltaConic Hullforms

Schoell's DeltaConic hullform, with a patent granted in 1974, was featured on the Trojan 10 Meter (33′), a breakthrough design in many ways. Trojan, founded in 1949 by former employees of Owens, was late in making the switch from wood to fiberglass, and that wasn't until 1969, when the Whittaker Corporation bought Trojan. The 10 Meter was introduced in 1981. Significant here is the move away from the constant-deadrise deep-V hullform that Ray Hunt is often credited with, though other designers, like Schoell, were experimenting with it, too. Despite its soft ride in heavy seas, the problem with the constant-deadrise hullform, which Hunt established at 24°, was the additional horsepower needed to get it up on plane, and its tendency to roll in a seaway. So the quest was for a hullform with high deadrise forward and flatter sections aft.

Here's how the boating writer Pete Smyth described Schoell's new design: "In form, the DeltaConic hull has three basic sections. The planing area is the Delta section and is composed of two triangular flat planes aft. The deadrise is between 12 and 18 degrees, with the 10 Meter's deadrise at 14 degrees. A straightedge ruler will lie flat in any direction on the Delta section. Therefore, it cannot form areas of unequal pressure. Forward of the delta, the boat begins to fair sweetly into a fine entry. Each side of the hull is developed geometrically in Conic sections. Once again, by using Conic sections, unequal pressure problems are totally avoided. The entry that results is finer and softer than that of a deep-V. Together, the Delta and Conic sections form a relatively narrow hull. To increase it to a useful beam, a wide chine with a slight deadrise is added. This enhances stability in a turn, as well as avoiding wave slap under the chine."

Schoell: "Roll in a beam sea was also countered by a double pendulum axis. The bow and stern have different roll centers. In a beam sea the boat would roll once, the bow would pitch down, and the roll would stop."

Development of the DeltaConic hullform was not based solely on towing models. Schoell also built another water-powered test tank, out of fiberglass, that was 10′–12′ (3m–3.7m) long. It had a 50-hp (38-kW) motor to drive the propeller inside to create the flow of water, which, as in the earlier tank,



A brochure illustrating the DeltaConic hull. The principal sections are shown: 1. The "Conic"; 2. The "Delta"; and 3. The Chine.

circulated in a loop. An inspection plate and port allowed mounting of a model hull over which a 4"-thick (102mm) sheet of water flowed for the model to ride on.

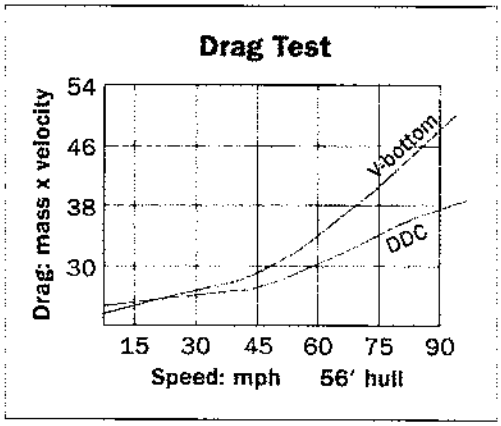
But the Trojan 10 Meter wasn't the first boat with a DeltaConic hull. Schoell did a lot of work with powerboat builders Glastron, then in Austin, Texas; MFG in Union City, Pennsylvania; and Larson, in Little Falls, Minnesota. All were large production builders with multiple models, and for a time Schoell was their go-to designer. Numerous models incorporated the DeltaConic hull.

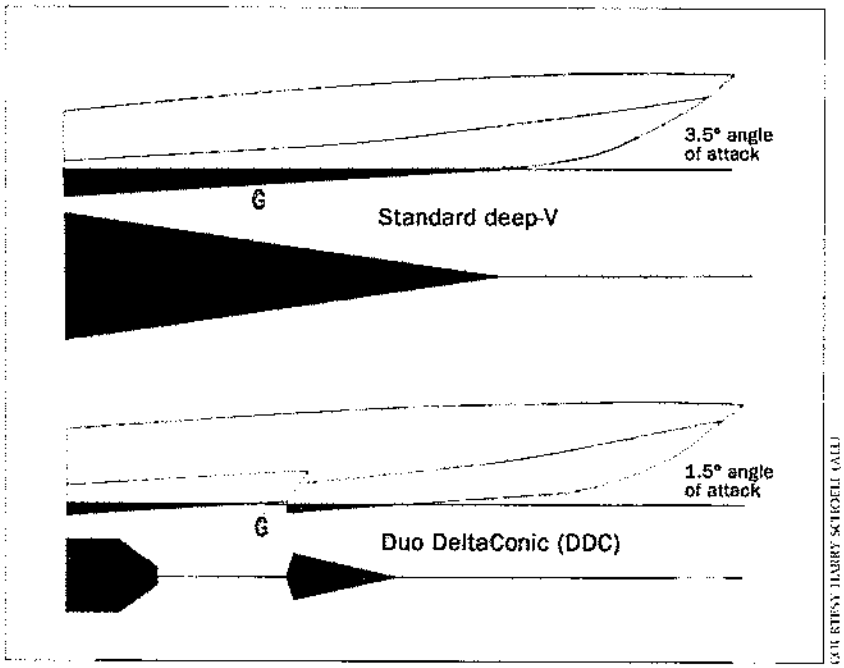
After years of testing, Schoell finally settled on what he still believes is the most efficient hullform for planing powerboats. In the late 1980s, Schoell added a step to the DeltaConic and called it the Duo DeltaConic. The first production boat with this hull was Larson's Senza Spectre, which won the 1991 Boat of the Year award from *Boating* magazine.

Schoell explains this development: "The DDC is a revolutionary new hull design that incorporates two hulls in one *[separated by the 'thwartship step —Ed.]*. The forward DeltaConic hull has a developed conical entry with a constant delta planing [surface]. It also incorporates wide-lipped chines. The aft hull develops a constant planing surface that displaces a delta pattern when on plane. The forward hull creates a bow wave under the hull, allowing the aft hull 'to ride the wave.' As speed increases, the wave moves aft, thereby lifting the stern. The hull then lifts to planing attitude without climbing over the traditional 'hump.'"

Larson literature of the time says the deadrise is 30° forward and 18° aft; the chine flats are 20% of a boat's beam; and the outboard chine lip is angled down 5°. The combined effect is a dry ride and an easily handled boat. Schoell says DDC boats do not require trim tabs, and I found this to be true during a test run with him aboard his 21' speedboat. On acceleration out of the hole, the boat seems to simply rise up without a change in trim. No bow pointing skyward. And the boat remained level and comparatively calm even at 70-plus mph.

Writing an article about steps in PBB No. 5 ("Stepping Into the Future"), Pete Smyth described a similar experience on the Larson Spectre: "As the Larson's throttle is advanced from an idle and the 25-footer [7.6m] speeds up, the bow doesn't rise. Instead, the whole boat lifts onto a





Also in a brochure, a comparison of a representative deep-V hullform and Schoell's stepped Duo DeltaConic shows the difference in angle of attack, wetted surface area, and resultant drag.

DAN SPURR

LARSON BOATS

***Left**—A fiberglass model that Larson used to illustrate the principles of the DDC hullform, with the white areas showing wetted surface area under way. The black stripe on centerline is wet, too, of course, and shows what Schoell refers to as a "pad," a flat area that improves lift compared to a sharp V.* ***Above**—One of hundreds of boats Larson built to Schoell's designs, the Senza Spectre, with DDC hull, won a Boat of the Year award in 1991.*

plane smoothly, with absolutely no 'hump.' The first time we did this, I literally had to look astern at the wake to see whether we were up and planing.

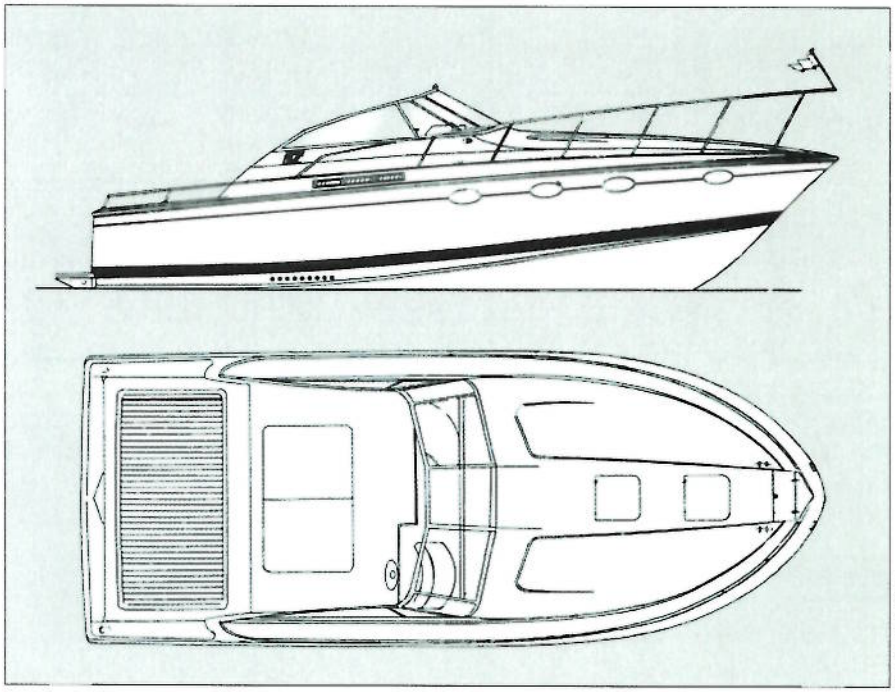
"Similarly, when slowing down, the stern does not fall off a plane and squat, as is the case with most boats. Instead, the Larson tends to coast to a stop with, again, no change in trim. Operationally, you need a lot more space to get the Senza Spectre down off a plane than you'd expect."

The DDC was also patented. When asked what the patentable features were, Schoell was circumspect: "With a step, there are certain features you have to have to make it work right, turn right. You don't just put a step in the bottom. I did a lot of research, all the way back to the boats [Napoleon] 'Nap' Lisee designed for Gar Wood; some ran, some didn't. Most didn't turn well. Even Gar Wood's boats had a rudder in the bow. Stepped boats were not popular, because they didn't handle well. Some roll over, and we know why. We solve that with the DDC's angles of attack and double constant sections. We don't put a hook in the back. There are other tricky things we do that's art we keep to ourselves. I make boats that track perfectly and don't lean on their side. Pads are faster than Vs but they ride harder. Vs run the smoothest, but they don't handle as well. The right mix is required."

Trojan 10 Meter

Schoell explains the significance of the Trojan 10 Meter's introduction. That was in 1981, when Trojan Yachts was owned by the Whittaker Corporation, one of a number of nonmarine conglomerates that in the early days of fiberglass believed boatbuilders could be profitable additions to their group.

Schoell says Trojan "needed new product," and he was approached by president Don Seith and vice president of engineering Ron Pickle. He took them for a ride on a 37′ (11.3m) boat with a DeltaConic hull, and the two were sufficiently impressed to commission the new 10m (32′10″) design, a sensible size, Schoell says, because it can accommodate twin engines.



TROJAN YACHTS

The immensely popular Trojan International 10 Meter, introduced in 1981 with a DeltaConic hull, was prototyped by Schoell at his Fort Lauderdale marina; the deck plug was Troy Wollard's last project before he retired.

At the time, Schoell had bought a marina on State Road 84 in Fort Lauderdale. He was selling a few lines of boats and also had a building there on the New River in which he was producing prototypes for customers as well as a few large finished yachts. That's where the plugs for the Trojan 10 Meter were built. Troy Wollard's last project before retirement was the deck plug.

"We designed everything," Schoell says. "All the engineering. First rounded-aluminum-frame windshield. Designed the oval portholes. Every stitch of the boat. Everything but the colors."

"The 10 Meter had an integral liner/stringer system," Schoell says. "We invented that years ago. Our first was in the '60s. A lot of the Larsons and MFGs used it. Some guy filed a patent on it in 2000. He was suing some other builders, and I was commissioned as an expert witness. Frankie dug up at least 30–40 drawings of boats with them."

The Whittaker Corp., which also owned Bertram Yachts, thought of a marketing gimmick in which writer Pete Smyth would "independently" compare the Trojan 10 Meter with a Bertram of similar size. Schoell says the idea was the two would essentially tie in performance on the 10-point "test." The plan to publish the results ended when the Trojan won nine out of 10 points, tying on the 10th—riding in a head sea. In a beam sea, Schoell remembers, "we stood on the Trojan with arms folded, while on the Bertram they were hanging on."

Sheet Panel Construction

Schoell's smaller series-produced boats were laid up in female molds; for larger yachts, he utilized a system in which all the basic parts—bottom and topside panels—are laminated in sheets on a flat table. He perfected the developable surface system on a 19-footer (5.8m) in the 1960s.

"First," he explains, "you lay out the geometry of the shape. You need to know how to do a conical surface. If you bend a piece of paper, you have a straight line. Then you put a twist in it, and you have to know where all the straight lines are. You make a paper drawing, cut it out, and stick it together with Scotch tape. It'll hold its shape. The boats are perfectly symmetrical and fair. The bottom is one panel; strakes are attached separately. There are panels for the sides, the step, the chines, even the decks. You can bend it, fold it, anything you can do to a sheet of paper. We built the first 67' [20.4m] in 90 days. It was a tight schedule because I had just enough money to last 90 days. The last piece to go in was the transom. If you do what I call a do-or-die schedule, you know what you have to do every day, and if you don't get it done, you stay until it's done. You don't make it up the next day."

I asked if it was built over a frame. "No," he said. "There's no form. The shape puts it together. Just a cradle. It only goes together one way. Sometimes the crew would say we had to cut it. I'd say, 'No, adjust until it fits.'" This was all done with hand drawings, which Schoell still prefers over computer drawings. For the first draft "quick inventing," Schoell says it

INFINITY YACHTS

In the mid-1990s Schoell began designing, building, and marketing a line of large high-performance sport boats with Duo DeltaConic hulls and constructed with sheet panels. Literature for this 56' (17m) quotes the general manager of Johnson & Towers, which supplied the 8V92 Detroit Diesels, as saying it was the only equivalent boat to exceed 50 mph (80 kmh).

is much faster. Today, the drawings are later converted to SolidWorks for a professional finish.

For panels requiring bend, he bagged the core down over the exterior skin of glass, attached the panels, and then glassed the inside. Dead-flat panels, of course, can be glassed on both sides before fitting. He built an impregnator with rollers to wet out fabric. Once it was set up, he says he could lay up a 70′ (21.3m) panel in 45 minutes.

In the mid-1990s he sold the marina and moved to property with a dry dock on the other side of the river. He also bought a 20,000-sq-ft (1,860m²) building to the west, where he made up panels.

Schoell started a line of motoryachts called Infinity, all constructed with sheet panels. During this time he says he built the first all-vinylester-resin boat and the first with knitted unidirectional fibers. He billed the 56′ (17m) as "the ultimate sport yacht," featuring a DDC stepped hull, achieving speeds exceeding 60 mph (97 kmh). Another Infinity was fitted with a U-shaped downwind sail rig that rolled on a drum and stowed below-deck. The luxury tax of 1990 killed

On the Page and On Stage

Harry Schoell is no newcomer to the pages of *Professional BoatBuilder*. Indeed, his first appearance was in Pete Smyth's article "Stepping into the Future," No. 5, mentioned in the main text. Jim Gardiner's work with Schoell is chronicled in "Hot Shop," PBB No. 47, also noted in the main text. In PBB No. 49, Val Jenkins called on Schoell to provide a "pragmatic speed-estimating formula" in his article "Building Fast Boats That Don't Break." One of Schoell's designs, a 16′ (4.9m) speedboat built by Alsberg Boat Works in Stuart, Florida, was powered by an inboard Mercury jet drive and had but one wood part: the steering wheel (PBB No. 60).

Schoell has presented six times at the International BoatBuilders' Exhibition & Conference (IBEX), on subjects ranging from alternative powerboat designs to testing hulls, and stepped hulls, a specialty of his. In 1999 he delivered the keynote speech, "Looking for the Leading Edge."

—Dan Spurr

the enterprise, along with much of the industry. Schoell says he had to lay off 35 workers.

Schoell also designed custom yachts, such as an 85′ (26m) motoryacht that Jim Gardiner (see "Hot Shop," PBB No. 47, and "Small Shop, Large Parts," PBB No. 120) built in 2003 at his yard in Miami Beach. Before going out on his own, Gardiner had apprenticed with the Gougeon Brothers in Michigan, and worked for Schoell. "When Jim came down," Schoell says, "he was a young kid in his 20s. Came in driving an old station wagon with epoxy glue rolling out the back. He wanted to build boats. His first job was building the deck plug for the 24′ Donzi. He stayed to the Infinity project."

Among Schoell's many clients was Reggie Fountain, who built high-performance powerboats. All of Schoell's designs for Fountain were credited to Fountain, which reminded Schoell of Don Aronow once telling him in so many words, "If the boat runs, it's an Aronow. If it sucks, it's a Schoell." Schoell says he didn't care as long as he got paid.

One of Schoell's stories about Fountain goes like this: "Around 1994, I designed a 65′ [19.8m] DDC for him. But he wanted to tow some two-step and DDC models. The DDC was better than his two-step, but he didn't believe it, despite my showing him the data. The DDC had S marked on it and the two-step had an F. I switched the letters and he thought the boat ran different. It was good for a chuckle.

"We were getting ready to build the boat; even built a sheet panel model around 16′ [4.8m]. We were ready to start and he says, 'Let's go to lunch. I decided I'm not going to do the boat. I'm going to do it myself.' He paid his bill. I said, 'I think you're going to get into trouble. If you need help, call me.' In a year he was in trouble. They built a two-step boat and it wouldn't run.

He called and I went up to check it out and found that the angles of attack were wrong. It went *womp*! *womp*!

"I said, 'This is what you've got to do to this boat. Cut the chine corners down because there is too much angle of attack out on the chines, and that's what makes it do that. So I put some rocker out on the two chines, took the boat out, and it ran perfectly. Reggie says, 'All you did was put rocker on it.' He had his crew fill in where I'd placed the rocker, and it went back to before. *Womp*! *Womp*! Vibrated so badly. Worst boat I ever rode on. It wasn't just the rocker. It's where you place the *positive and negative pressure*; that makes a big difference.

"I like Reggie. He's honest and only wants to build the best boats he can, but sometimes we are our own worst enemies."

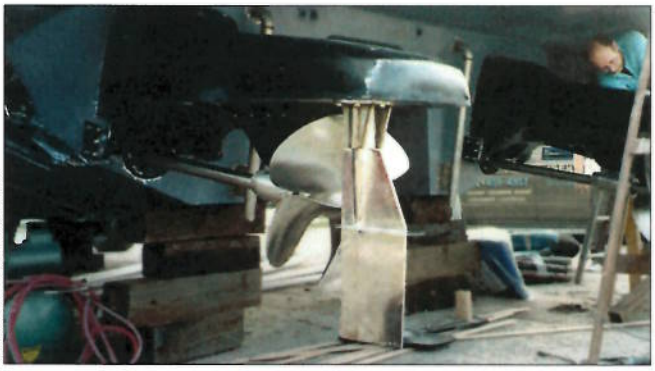
An Inventor's Mind

Schoell is first and foremost an inventor. He can't look at something, be it a boat or an engine, and not think he can make it better. Considering surface drives, he figured they'd be improved if they were trimmable. So he developed a trimmable surface-drive system and started a company with Frankie called Pulse Drive. Propellers of all sizes and all the shafts and parts were made in his machine shop. Eventually he sold the company, but the buyer sued him in an effort not to pay. Schoell countersued, and the inventory ended up back in his warehouse. The last thing Schoell wanted was all the parts back. "Sometimes you win you lose," he laments. "Know anyone who'd want to buy a great surface-drive system?"

Seemingly there's no end to what Schoell has dabbled in, from automatic anchor systems hidden in the bow to ground-effect machines, mechanically aided human "iron man" suits to waterjets—I was afraid to ask if he'd looked at mousetraps. In passing he says he built the first underwater engine using Moden Fuel (a monopropellant able to burn in the absence of air) for Raytheon.

The past 10 years he has devoted his mind and resources to compact steam engines. "We wanted to build a clean-air multi-fuel engine, because it fit the times and the marine industry was faltering," he says.

He's currently working on the Mark V iteration of the Cyclone, which will



COURTESY HARRY SCHOELL

Always searching for a better way to do things, Schoell developed a line of trimmable surface drives called Pulse Drive.

COURTESY HARRY SCHOELL

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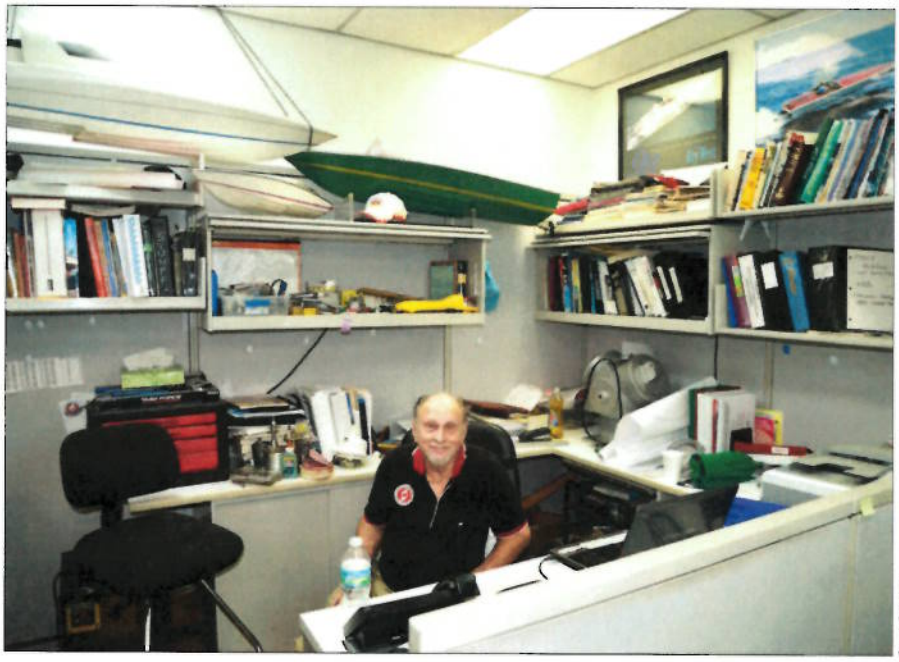
***Left**—Among the many unusual boats Schoell experimented with was this ground-effect machine prototype, where, as forward speed increases, aerodynamic lift is developed, separating the hull from the surface, which in this case is water. **Right**—Schoell's current fascination is with compact Rankine-cycle steam engines that are essentially silent and run on numerous types of fuel.*

run on solid, liquid, or gaseous fuels, forward and backward without a transmission, solving problems by removing parts—150 out of the valve train alone (see "Coal-Fired," PBB No. 134, page 6). Durability of valves and seats has been an issue for this Rankine-cycle engine that operates on expanding gases. He notes that the problem was the same with internal-combustion engines until lead was added to gasoline. He introduced me to a machinist making rotary valves in Schoell's machine shop. Schoell sold two 5-hp (3.75-kW) engines to a Spanish company for a solar application, but it went bankrupt before they got them online. To gather attention, he built a small racecar to break the world steam speed record of 147 mph. Dudley Whitman was helping sponsor the project, but died in 2011. The last project was for the U.S. Army, a 10-kW generator that ran on



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Schoell sits in his office amid piles of reference works, patents pinned to the wall, and models overhead.

any kind of fuel and was silent except for the blower fans. It measured just 12″ x 12″ x 17″ (305mm x 305mm x 432mm). "We got paid and were supposed to go into another $5 million project, but the budget sequestration of 2013 killed it."

Seems Schoell has made and lost a million dollars several times over. But he has a balanced perspective on life. He likes people and laughs a lot.

Epilogue

Near day's end, Schoell's wife Frankie Fruge, who is Cyclone's president, and Bruce Schames, Cyclone's CFO, came into the office. Schames, who usually makes coffee for the office staff, asked how it was. Schoell says shitty. Schames looks at the coffee station and says, "No wonder. You used the espresso machine." Everyone laughs.

Later, driving to a restaurant for dinner, Schoell suddenly says, "You know, food trucks are really inefficient. I've designed one that will process people 10 times faster. I've got a client who wants to build them...." PBB

About the Author: *Dan Spurr is* Professional BoatBuilder*'s editor-at-large.*