

## ***HIGH POINT (PCH-1)***



(More *HIGH POINT* Photos are [in the Gallery](#))

**Chat, Information Sharing, Lessons Learned, and Networking**

IHS Member [Bob Phillips](#) is the new owner of *HIGH POINT*. He is restoring the vessel; see: <http://rpstander.tripod.com/>.

(Revised 26 Jun 03)

[Return to Posted Messages Bulletin Board](#)

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### **History**



The PCH 1 was originally intended to be the Navy's first operational hydrofoil craft. On January 24, 1958, the Chief of Naval Operations requested the Bureau of Ships to perform a design study of hydrofoil craft for harbor defense and coastal patrol. Results of this study were reported to OPNAV on March 7, 1958 recommending that hydrofoil patrol craft replace PCs and SCs in the FY 1960 shipbuilding program. On July 25, 1958 the Ship Characteristics Board (SCB) issued ship characteristics for a Patrol Craft Hydrofoil (PCH). Bureau of Ships Code 420 was directed to provide a preliminary design of a PCH. This was completed on March 5, 1958 and turned over to the Hull Design Branch, Code 440, for contract design.

The PCH contract plans and specifications were approved on January 18, 1960, and a \$2.08M fixed -price contract for construction was awarded to the Boeing Company in June 1960. Boeing awarded a subcontract to Martinac Shipbuilding for construction, and the keel was laid on February 27, 1961 at the Martinac Shipyard in Tacoma, Washington. PCH 1 was launched on August 17, 1962 and christened *HIGH POINT* in honor of the city of High Point, North Carolina. On

November 13, 1962, CINCPACFLT tentatively assigned her to COMASWFORPAC with the expectation that she would be assigned to Anti-Submarine (ASW) forces.

After completion of Final Acceptance Trials on January 28, 1963, *HIGH POINT* was delivered to the Navy at the Puget Sound Naval Shipyard (PSNS) on August 15, 1963. On May 7, 1964, CNO approved the request of PSNS for a 9-month extension of *HIGH POINT*'s availability for special performance trials and, on October 22, a decision was made to effect extensive repair and refurbishment of the ship.

On March 28, 1965, the Bureau of Ships requested DTMB to become the Technical Agent for Navy hydrofoil R&D. This resulted in the establishment and staffing of the DTMB Hydrofoil Development Project Office (Code 050) under Wm. M. Ellsworth, reporting to the Technical Director of the Laboratory. Early deficiencies in *HIGH POINT* had made it clear that there was a pressing need for additional R&D before hydrofoil craft would be ready for deployment to the Fleet. To this end, DTMB established a Hydrofoil Special Trials Unit (HYSTU) as a tenant activity of the Puget Sound Naval Shipyard. *HIGH POINT* was placed under technical and administrative control of HYSTU and operational control of COM-13 for the conduct of an extensive R&D test program.

At this point, an extensive R&D effort, described in this book, was undertaken during which *HIGH POINT* became a prime platform for expanding the technology base for hydrofoil craft. This included an evaluation of the ship by the Coast Guard as a cutter (WMEH 1) in April 1975.

In the years that followed, the expanding knowledge base of hydrofoil systems design and application led to design, construction, test, and evaluation of a number of hydrofoil test craft. In the mid 1970s this culminated in the acquisition of a squadron of six Navy Patrol Hydrofoil Missile (PHM) ships. They were built by Boeing and deployed to Key West, FL. Working with the Coast Guard, they demonstrated the many advantages of these high performance ships, with heavy firepower, and the capability of very high speed in very rough seas. The technology developed in this program also contributed to the building of several types of commercial hydrofoils such as the Boeing Jetfoil.

*HIGH POINT* was deactivated on December 01, 1984, and her Navy crew was reassigned. She had spent twenty good years in making major contributions to the knowledge of how to design and operate military and commercial hydrofoil ships. -- Wm. M. Ellsworth, P.E.

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## Correspondence

### Photo Update

[26 Jun 03] Here's a pic by my son Michael Cline of the current state of the *HIGHPOINT* moored near Tongue Point, Astoria, Oregon. I worked for Boeing Hydrofoil Div. during the latter stages of the *TUCUMCARI* development. -- Bob Cline ([clinewlt@pacifier.com](mailto:clinewlt@pacifier.com))

#### Response

[26 Jun 03] Thank you for the excellent (and large!) photo of HIGHPOINT today that you posted in the history section of the [IHS Bulletin Board \(BBS\)](#). A smaller version appears below. This is a good opportunity to point out some of the HIGHPOINT information available on the IHS website and elsewhere. Archived correspondence on this subject appears on this IHS page devoted to the ship. Additional photos are in the [IHS Photo Gallery](#). IHS Member [Bob Phillips](#) is the current owner. He has done good work on an interesting and folksy webpage for the ship at <http://rpstander.tripod.com/>. That site has photos, drawings, and other information that will be of interest to hydrofoil history buffs

and modelers. The faces in the pictures will be an interesting update for people who worked in the US military hydrofoil programs.



## **Mast**

[15 Mar 02] I am a bit confused as to your description about roundels and hydraulic cover [*not posted here - Ed.*], but I will give you what we had and maybe you could figure it out. If you need more help, please provide more details such as size and approximate location. The housing for the lower mast originally contained the hydraulic cylinder for the dunk sonar, which was in the round room of the instrumentation room. On the aft side, we had a TV camera mounted on a pan and tilt unit. The mast had the masthead light, secondary masthead light, towing lights, aircraft warning, and signal lights. I don't recall if we chiseled off the original mounts when the international navigation light requirements changed, and we relocated the lights to comply. We had antennae for Loran, UHF radio, marine VHF radio, test circuit VHF radio (Closed circuit with Boeing tower), pair of IFF, and radar. An air horn was below the radar platform. There were three locations for signal flags. I have suspicion that you might be looking at the foundation for the IFF antennas since the others were most likely left in place. On another subject, I would like to remind you that the outdrive retraction actuator has a built in brake inside the cylinder. You need hydraulic pressure to release it. We found that the brake could not withstand the load of the propeller thrust in a steered position, and thus it started to retract. Note the patch on the stern. Thus the pin was added to hold the outdrive in the extended position. The hydraulic fluid used is Skydrol and if you are changing fluid, most likely need to put in new seals. -- Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

## **Responses...**

[15 Mar 02] What I was referring to about the mast as roundels ( term for British and French war bird insignias, others too I think.) are the two round plaques, one pair port one pair stbd. the upper one has a dark blue border the lower one is light blue to gray with something in the middle (a drawing or number.), that's what I can't see clearly in the photos I've seen and downloaded so far. The alu. plates that apparently held the insignias are still on the mast ( about 1' 6" around I'd guess, one above the other.) but the insignias apparently screwed or bolted to them. I was very lucky to have gotten most of the original drawings and specs with her so I am becoming more and more aware of the layouts of the systems. I found out in last night's reading about the locking cyl. also the servos are really servos ( most hydraulic people will call an electrically actuated valve a servo, kudos to you guys for being accurate!!!) that just makes the job easier. I had thought about using another fluid

but I can probably dredge up some Skydrol as easily as change all the seals. But I think running the steering and release and rotator ram off the hullborne engine, as a completely separate system from the rest of the ss hyd. makes sense, don't you? -- Bob Phillips ([rpstander@bigplanet.com](mailto:rpstander@bigplanet.com))

[15 Mar 02] I now know what you are talking about. The ship was assigned to what was called David Taylor Naval Ship R&D Center (now Naval Surface Warfare Center, Carderock Division) and funded by NAVSEA. The two insignias (plaques) were on the mast. The DTNSRDC one has the compass version, whereas the NAVSEA one was the standard Navy version which has the eagle. There was some decals of the DTNSRDC version stuck to the bulkheads on the ship As for the ship service hydraulic system, at the present time, you do not need the strut/foil extend/retract system. Thus only the hullborne drive functions are left. CAPT Fraser bought a replacement anchor windlass, but I don't know any details of it. You might make sure it is not hydraulic. Depending on the pump you find, it could be cheaper to change fluid and seals. Ron Ihle found an aircraft surplus store and was looking at replacing the pumps from that source. I am happy to hear you received all the drawings. We furnished CAPT Fraser a complete set of microfiche. The technical manuals were in the file cabinet forward of the Engineering console. If you got the logs, the manuals should be there also. -- Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

### **New PCH-1 HIGH POINT Website**

[10 Mar 02, updated 3 Nov 02] Here's the address of the site on PCH-1 progress, <http://rpstander.tripod.com/>. As far as foilborne operations: I've some ideas, other than as original (couldn't afford the fuel or gas turbines, at least for very long.), such as shortening legs( weight advantage, lower sea state operation), water jet power ( pump in nacelle instead of gearbox and wheels more weight.), Diesel power foilborne (I believe that in your book it states that liftoff was successful as slow as 23kt. that should be able to be accomplished with about 500 hp per shaft.). But for the time being I'm just cleaning, repairing the electrical systems, installing up-to-date navigation gear, and re-doing the hullborne systems for dependable independent operation (I've decided there is no need to be able to unlock, raise, lower the stern drive from helm, so it will be done from engine room, with indicators only to show green board when all is well ) the mods I do should greatly simplify the hydraulic and electrical systems without endangering the redundancies or safety built into the ship. -- Bob Phillips ([rpstander@bigplanet.com](mailto:rpstander@bigplanet.com))

### **HIGH POINT Changes Hands**

[27 Feb 02] I've just finished purchasing the *HIGH POINT* from Mrs. Fraser (I know you are aware of the other deal that fell through, but I really bought). We moved her to Tongue Point for now, and she will be staying in the area for the foreseeable future as I live in Skamokawa WA. Should be able to maneuver hullborne soon. -- Bob Phillips ([rpstander@bigplanet.com](mailto:rpstander@bigplanet.com))

### **HIGH POINT Update**

[16 Dec 01] Great News [that Ron Ihle is planning to restore *HIGH POINT*!] When the *HIGH POINT* first became available, I went to check her out. In my opinion, she is a very restorable ship. Is it your plan to have her operational? If so foilborne, or strictly hullborne? I believe you are short some steering mechanism, as far as input goes anyway. But the bulk of the hullborne driving mechanism and the hullborne engine was still there when I inspected her. I really prefer the outdrive approach for hullborne

propulsion used on *HIGH POINT* as far as our type of operations go. It enables you to keep the propulsion dry and not have to worry so much about corrosion. If you have read any of the info on the IHS site, you know our strong point is the technical side, especially where it comes to "field engineering" solutions to problems that are too expensive to solve conventionally. Our weak point is the administrative side, we are just now figuring out what we are going to do with her. Are you planning on ferrying her to San Fran Bay Area under her own power? As I recall, this wouldn't be really difficult. I believe the *HIGH POINT* is "fly by wire" isn't she? We have some extra helms from our ships that may work if you want to put together a helm control system like ours. I don't know how far it is, but if moving a ship on the West Coast is as expensive as on the East, it could easily be more cost effective to put her under power. We have just begun to accumulate paperwork for the non-profit org, as well as the 501-c3 exempt status. We have applied for associate membership in the Historic Naval Ship Association, (HNSA). Is this the same organization you referred to as National Register of Historic Ships? Or is that something else entirely? Quite frankly, taking a ship that we or anyone else knows nothing about, have no documentation on, and have no engines for, and putting it back into ferriable shape with no budget, never seemed like much of an obstacle compared to the administrative tasks now before us. Any help you can provide would be very much appreciated and reciprocated wherever possible. -- Eliot James ([esjames@cvalley.net](mailto:esjames@cvalley.net))

### Responses...

[16 Dec 01] Our plan is to have *HIGH POINT* as a fully operational museum vessel. We indeed hope that this includes foillborne also, at this early stage it all looks good. All this paperwork and corporate business is for the birds but I think we have to do it in order to preserve these vessels for the future. We put the cart before the horse with *HIGH POINT*, we started our 501-C3 paperwork and our National Register work before we even had a deal on *HIGH POINT*. I thought it best to try and be a step ahead, if all failed we'd just go "all stop." We still have some paperwork delays, but I know all will work out. We hope to get *HIGH POINT* operational hullborne for her transit some 650 miles down the coast to the San Francisco Bay. I estimated that it would cost 30K to tow her home. Instead of just handing that money off, I'd rather put it into operational improvements on the ship. Engine wise, I'm sure we can light a fire under that 12V71 and get the outdrive system operational. I own a small tugboat company on San Francisco Bay, and diesels are part of the normal op for us (if you are in need of diesel parts or help please think of us, we'd be glad to help in any way possible). As far as our association goes I'm in the process of involving several youth programs into our group. These are older teenagers and the hope is to instill an interest in hydrofoils, engineering and the maritime fields. We are an open volunteer operation and I hope we can draw both young and old into this working side by side. Big hopes, but it has been done before. Anyway, more to come later. -- Ron Ihle ([ronihle@netscape.net](mailto:ronihle@netscape.net))

[27 Dec 01] I am Ken Plyler, Master Chief Engineman USN ret, ex-High Point, ex Tucumcari, ex SeaFlite Hawaii, ex-Turismo Margarita de Venezuela. Was a plank owner on all these boats. Chief Engineer, *HIGH POINT* and *TUCUMCARI*, Director of Maintenance, JetFoils Hawaii and Venezuela. I know quite a bit about *HIGH POINT* during the first 3.5 years of her active/inactive life. I admire what you are trying to accomplish with *HIGH POINT*. If I can be of technical help in any way, please give me a shout. -- Ken Plyler ([Markskidmark@aol.com](mailto:Markskidmark@aol.com))

[13 Jan 02] My father, Alec McClair was a naval architect on the *HIGH POINT*. I have

absolutely no doubt that he'd love to hear from you, and offer assistance in some way. I too would like to help if I can, you'll find a message from me about the *PLAINVIEW*, proposing this very thing. As for Dad, you can reach him at: [alecmclair@yahoo.com](mailto:alecmclair@yahoo.com). -- Douglas McClair ([doug.mcclair@bateswhite.com](mailto:doug.mcclair@bateswhite.com))

### **HIGH POINT Update**

[16 Dec 01] My name is Ron Ihle, and I started the Hydrofoil *HIGH POINT* Association to first save, and then preserve, the PCH-1 *HIGH POINT* as a fully operational museum. We indeed hope that this includes foibleborne also, at this early stage it all looks good. All this paperwork and corporate business is for the birds but I think we have to do it in order to preserve these vessels for the future. We have already applied for 501-C3 paperwork and have begun our National Register of Historic Ships work. We hope to get *HIGH POINT* operational hullborne for her transit some 650 miles down the coast to the San Francisco Bay. I estimated that it would cost 30K to tow her home. Instead of just handing that money off, I'd rather put it into operational improvements on the ship. Engine wise, I'm sure we can light a fire under that 12V71 and get the outdrive system operational. I own a small tugboat company on SFBay, and diesels are part of the normal op for us (if you are in need of diesel parts or help please think of us, we'd be glad to help in any way possible). As far as our association goes I'm in the process of involving several youth programs into our group. These are older teenagers and the hope is to instill an interest in hydrofoils, engineering and the maritime fields. We are an open volunteer operation and I hope we can draw both young and old into this working side by side. Big hopes, but it has been done before. Anyway, more to come later. -- Ron Ihle ([ronihle@netscape.net](mailto:ronihle@netscape.net))

### **Response...**

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### **HIGH POINT Sold**

[18 Nov 01] Negotiations have been completed between Janice Fraser, executor of the estate of CAPT Ronald Fraser, and Ron Ihle for a change in ownership of the *HIGH POINT*. Ron Ihle is establishing The *HIGH POINT* Association as a non profit group to restore the *HIGH POINT* to fully operational condition. Application is also being submitted to National Register of Historical Ships. Initially, some work will be done at Astoria, and eventually towed or propelled to San Francisco Bay for the restoration work. Ron estimates the tow to SF Bay at 30K, and would rather put the money into making *HIGH POINT* operational hullborne if at all possible. -- Sumi Arima([arimas1@juno.com](mailto:arimas1@juno.com))

### **USS HIGH POINT (PCH-1) Veteran...**

[16 Oct 01] I was promoted to Boatswain Mate 1st Class in the High Point at Bremerton, Wa. going on to a Career of 22 years. I retired in 1995 as a BMC and think back from time to time of the days in *HIGH POINT*. LCDR Daniel Mulhall was my Skipper, the XO QMC P. Henderson, CHANG, ENC James Mustoe. BM1 Barney and BM1 Huffman were there as were ET2 Ragzetts? SM3Christain MS1 Ray Shoquist, ET1 Turner, OS1 Tucker and others. I have a great picture of *HIGH POINT* that is showing its age any chance of finding another? -- Stephen L. Heald, BMC(SW) USN (Ret)

([bosnusr@starfishnet.com](mailto:bosnusr@starfishnet.com)) 107 Heron Ct. Newport, NC 28570

### **HIGH POINT Offered For Sale, Last Chance...**

[5 Dec 00] IHS received a call from Janice Fraser about her frustration with *HIGH POINT*. She says she's just got to get rid of her by the end of this month (Dec 00). The cost of keeping the boat at the dock is too high, and apparently the lease runs out and needs to be renewed Jan 1, 2001. If interested, contact: Ms. Janice Fraser; 200 Harbor Drive, Apt #2703; San Diego, CA 92101; Tel: 619-233-3549

### **HIGH POINT Offered For Sale...**

[12 Feb 00] After long discussions with a naval architect, I can't find a way to put the *HIGH POINT* to any use. So I am going to put it on the market for one year at \$100,000. If there is no interest by next January, off she goes to the scrapper. I don't know what else I can do. -- William Knuth

([wil@pacifier.com](mailto:wil@pacifier.com))

### **Removal of Foils...**

[17 Nov 99] Question; Can I jack the aft foil down all the way out of the boat? It seems to me that the *HIGH POINT* will cost too much to ever fly again and the operational costs are not cheap either. So if I were to remove the after foil and foil guards the boat could be docked easier and maybe even re-powered for twin screw hull borne operation. I'm trying to think of something other than scraping the boat. Suggestions? -- William Knuth ([wil@pacifier.com](mailto:wil@pacifier.com))

#### **Response...**

[17 Nov 99] If you are thinking of removing the aft foil/strut while afloat, forget it. This operation could be done while docked in a high cradle with sufficient jacks and dollies. When Boeing removed the foil/strut for refurbishment, they had a house mover raise the ship to get the assembly to clear. You will have to recalculate the ship's weight and balance. Removing the aft foils and struts would shift the LCG forward, probably not change the TCG, and would raise the VCG where with the other equipment removed, could make the ship very tender in anything but flat calm water. If you are going to pursue this thought further, I would suggest you contact a Naval Architect. A complete set of drawings on microfiche was given to Ronald Fraser. -- Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

#### **Response...**

[24 Nov 99] It looks like removal of the aft foils will be difficult. If it were accomplished, is it feasible to add an equal weight of ballast in the form of water in tanks or lead at that location to relieve its tenderness? -- John Meyer ([jmeyer@erols.com](mailto:jmeyer@erols.com))

### **Location of PLAINVIEW and HIGH POINT...**

[11 Sep 99] I'm just curious if you know the current locations of the ex-*PLAINVIEW* and ex-*HIGH POINT*. I'm driving (from Eugene, OR) to Bremerton this weekend, and I'd like to head out to Astoria to photograph them if they're still in the area. --Joe Lewis ([lewi233@ibm.net](mailto:lewi233@ibm.net))

#### **Response...**

The location of the *HIGH POINT* and *PLAINVIEW* are discussed in various e-mails on the International Hydrofoil Society web pages. The *HIGH POINT* is moored at a private dock in Astoria. The *PLAINVIEW* is anchored on the North side of the Columbia about a mile upriver. Take the road on the Washington side of the Columbia from Astoria bridge. -- Sumi

Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

### **HIGH POINT Questions...**

[21 Aug 99] How is the HP steered when hullborne? I realize that the screw needs hydraulics to be let down into the water. Does the steering come as a function of the foils? Do the foils need to be let down for this? -- William Knuth ([wil@pacifier.com](mailto:wil@pacifier.com))

#### **Response...**

[17 Aug 99] There is an emergency method of lowering the outdrive but at the present time, I cannot tell you exactly how. There is a book that I believe was given to Ronald on configuring various emergency conditions. This book use to occupy the bookshelf on the port rear of CIC. The hydraulic actuator that lowers the outdrive has a brake built into it, and cannot be seen. The brake needs pressure to release. A manual pin was installed after the brake failed and put a hole into the hull. The outdrive rotates 360 degrees when the unit is down. It needs to go 180 degrees to reverse. The propeller is a puller and the outdrive does not have bearings suitable for thrust in the opposite direction. The emergency steering is on the port side of the outdrive housing in the engine room transom. It is configured for a 3/4 drive socket. I don't remember the ratio but it takes many turns to move it a few degrees. We have used an air drive instead of the provided crank. At this same location, a gear train with a hydraulic motor that sits vertical when extended is the normal method of steering. It is syncho controlled with the helm in the pilothouse. The indicator in the pilothouse, right side of helmsman, shows the outdrive position. The power is fed from the 400 hz power supply. The hydraulic pumps were on the two ship service diesels. Both of the original diesels were removed. The hydraulic system used Skydrol as its hydraulic fluid. This is an aircraft, non inflammable, and highly toxic fluid and should be handled with care. I originally suggested to Ronald that he consider replacing the helm with a lever control system like on the tugs and adapting a commercial marine hydraulic system motor to the outdrive. The hullborne drive can propel the ship with either the struts up or down. For least resistance, the flaps should be in zero position (straight back). The hydraulics for the foils and strut steering came from a separate system, and is not tied in with the outdrive and strut retraction hydraulics. --Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

### **Where to Buy a Hydrofoil Legend...**

[29 Jun 99] The *HIGH POINT* is now moored at a pier in Astoria Oregon. I was curious if there was an active restoration project underway. I would appreciate any current information. -- Don Davis ([yosimon@teleport.com](mailto:yosimon@teleport.com))

#### **Response...**

[29 Jun 99] Captain Ronald Fraser, owner of the *HIGH POINT* died a while back. The ship is available for purchase from the executor of his estate. The *HIGH POINT* was sold by the Navy with the two diesel generators, crane, anchor windlass, most of the electronics including radar and gyro compass, water maker, toilets, and miscellaneous other items stripped from the ship. The first buyer removed the two gas turbines, and then sold the ship to Ron Fraser. Ron Fraser's goal was to get the *HIGH POINT* operational hullborne. With the diesel generators and gas turbines missing, the hydraulic pumps went with the prime movers, and thus was the major hurdle. Meanwhile, Ron bought an anchor windlass, diesel generators, and Incinolet toilets. He kept me appraised of the progress on *HIGH POINT*,



which was minimal except for the purchasing of various replacement items. I have not seen the ship since he had it towed to Portland from Tacoma so I can not personally describe the present condition. The caretaker of the ship at the present time is Ron's nephew. If you are interested in inspecting the ship, I will make arrangements for you with the executor. -- Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

### **HIGH POINT Update...**

[13 May 99] I was on the west coast last month where I met up with Will Knuth who is at this time tending *HIGH POINT* until a buyer can be found. I was able to get aboard and take an extensive tour. She is in very restorable condition. The layout is very usable as a live-aboard and with very little work the main deck could accommodate large windows and seating for sightseeing. The hullborne propulsion including engine and outdrive is intact and with one Detroit turning a prop I would guess very affordable to operate. the only thing that appears missing for foilborne operation are the turbines and I understand that these can be found reasonably priced compared to the LM2500. I know that this ship can be bought very cheap! I believe it would take less work to make her seaworthy enough to ferry than what it took us on *PEGASUS* (PHM 5 renamed). It would be a shame to see this fine ship scrapped! -- [Eliot James](#)

### **Hydrofoils For Military and Ferry Use, Lessons Learned...**

[28 Jan 99] I don't know if there has been any discussion lately on the simplicity of using hydrofoils on the same routes that the smaller commuter catamarans are running on. These routes are mainly lakes, bays and sounds. There are very few open-ocean routes. Hydrofoils are more expensive to build due to the complexity of the things, something that the naval architects and engineers have built into the systems. [By contrast], the basic offshore aluminum crew boat is a reliable, lightweight, fast, and durable machine. No one has ever set a usable life on the things. There are 30+ years old boats out there running every day. It is a vessel that has evolved to carry out its mission. As far as I know, there are no hydrofoils operating in US waters. I believe in submerged hydrofoils with automatic control systems. Retractable foils have always been a joke. Mainly because the vessels with retractable foils were built to go anyplace. If a ferry vessel's route normally has a maximum of 2'-3' chop, there is no need for a 6' gap between the keel and the water surface. If the water depth is sufficient over the entire ferry route there is no reason for retractable foils. The price of the boat can be reduced significantly. Short distance ferry routes don't call for a Boeing 737 interior in the cabin. Commercial quality would do just fine. Get rid of the carpeting and plush seating. Concentrate on maintainability, speed and maneuverability. Too much high class, expensive, unproved machinery has been installed in the past that has given the American built hydrofoils a "bad rap." *PLAINVIEW* and *HIGH POINT* are classic examples. I have often wondered if anybody ever sat down and figured out how much it cost per foilborne hour for the life of these vessels. Only a government could afford it. The *PEGASUS* class PHM was another boondoggle that cost the taxpayer a fortune to build, operate, and maintain. They were truly vessels without a mission. If some of that money could have been channeled into the private sector with an objective of building a hydrofoil passenger boat that would make money instead of spending money, we would have covered the world with US-built hydrofoils today. I hope you understand where I am coming from. Hydrofoils were my life for over ten years. I hate to see them die because of the bad reputation and the high cost of building one. Somebody will one day sit back and take a long look at where we have been and the knowledge that has been gained and come up with a viable, economical design. I hope so. I would hate to see everything that we have done in the past go down the tube. -- Ken Plyler ([Kfppfk@aol.com](mailto:Kfppfk@aol.com))

### **Response...**

[29 Jan 99] I read your comments and must reply in defense of *HIGH POINT* and *PLAINVIEW*. When *HIGH POINT* was designed, there was limited knowledge of hydrofoils. It was originally built as an active patrol craft, but the Navy soon realized that it should be in a prototype category. With the original intent, many systems were designed light weight yet meeting the military specifications. In addition, since the concept was new, ABS and Coast Guard had inputs on safety considerations, etc. I recall considerable communications with the different groups which even included the sanitary features of the galley. As for the foils, struts, and foilborne propulsion, tests in the tow tank provided data which was not correlated to any actual data. The engineers used conservatism and thus had designs which later proved more than adequate. Meanwhile, with limited operations, (You should recall all the time sitting at the pier during your duty on the ship.) many operational problems were detected, and redesigned and rebuilt to provide in many cases a safe operation. Other things learned were when the foils and pods were strain gauged to determine load paths, revised fairings to try to reduce erosions, Although the foilborne transmission system was bathed in sea water frequently, it turned out that the gears were very reliable. Mod I changed the seal system which helped. Toward the end, no gearbox problems were noted for a period of about 3 years. As for the *PLAINVIEW*, the increased size required another set of design solutions that pushed into unknown territory. The hydraulic system required a couple thousand horsepower for the operation of the foils. Industrial hydraulic pumps did not have the continuous rating which proved to be a nemeses and subsequent redesign. Again, many areas of research and development in improving *HIGH POINT* and *PLAINVIEW* and now used in other naval ships. In defense of the Jetfoil, I know that Boeing spent considerable time getting ABS and Coast Guard to accept alternatives in meeting their requirements. Some of the items that looks like frills in actually is based on ABS (American Bureau of Shipping) or Coast Guard requirements. For example, the seats need to be strong enough to withstand the g forces in crash landing. The cheapest was to use aircraft qualified seats. Coast Guard originally wanted a three man Pilot House crew. which Boeing successfully got Coast Guard to agree to two. For operations in other countries, Boeing had to certify that their requirements were also met. In summary, I hope I have changed your views on the earlier hydrofoils. The data collected has provided both engineering and operational information which are considered in new designs of all crafts, not just the hydrofoil ships. Meanwhile, with the experience, the regulatory agencies have changed their requirements. I'm sure the aluminum crew boats you talk of have benefited from the *HIGH POINT* and *PLAINVIEW* trials. -- Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

### **More About Lessons Learned...**

[30 Jan 99] I spent 3 1/2 years on *HIGH POINT*. Most of my time was watching from the sidelines while various engineers, the Supervisor of Shipbuilding (SUPSHIP), Puget Sound Naval Shipyard (PSNSY), Boeing, and many more people than I care to think about turned the boat into a lifetime project. I was the Chief Engineer when we sprang the first gearbox salt water leak off Neah Bay and motored home hullborne. I was also the guy that turned the propellers by hand until the bearings finally froze while waiting for someone to make a decision to tear it down or not. I also watched as the powers that be installed the new spade rudder below the forward foil using 1/4-20 bolts that failed the first time we tried it foilborne. The new spade rudder was installed because the trailing edge rudder did not work due to severe ventilation of the forward strut. I watched as the stellite cladding for the after foil and struts was hand formed by a blacksmith using an anvil, a rosebud torch and a hammer. The cladding was installed using 1/4-20 nylon screws. This was an engineered fix to eliminate the severe erosion of

the HY-80 caused by the propeller tip vortices. I was onboard during the testing of this installation. I was also under the boat, in drydock, during the inspection to determine why the cladding fell off. I was onboard when we tested the new stainless steel, five bladed propellers with paper thin blades. I was also under the boat, in drydock, to find out why they folded up like rose buds after only a few minutes of foilborne time. Sumi, I could go on and on but will not. I was assigned to *HIGH POINT* during construction, outfitting and trials. Our Type Commander was to be Commander, Amphibious Force Pacific. Our home port was to be San Diego. We never made it. I left the boat sitting on the barge under the Hammerhead Crane with gearboxes locked up. It had not run in months. Phase One was "in the mill," and HYSTU was on the verge of being formed. I went away probably in disgust and returned as the Chief Engineer on *TUCUMCARI* 18 months later. *TUCUMCARI* was the ship that I had dreamed *HIGH POINT* was going to be. It was the vessel that proved that there was life after *HIGH POINT*. *TUCUMCARI* never belonged to HYSTU. *TUCUMCARI* unfortunately died doing what it was designed to do. It "died with it's boots on," so to speak. It never ended up intact at a DOD Surplus Sale. I wish I could be more positive when talking about *HIGH POINT* and *PLAINVIEW*. Sorry. One good thing about the development of the *HIGH POINT* was the extruded aluminum panels that made up the hull plating. Unfortunately, no one is using the panel that I know of. -- Ken Plyler ([Kfppfk@aol.com](mailto:Kfppfk@aol.com))

### Response...

[30 Jan 99] If you read my original comments, I recognized your participation in the growing pains of *HIGH POINT*. You have precisely backed up my original comments. If it was not for all the engineering solutions of the various problems on *HIGH POINT*, the operational aspects of hydrofoils would still be floundering. In some cases, the solutions were cost constrained and were not approached in the manner that an engineer would really like to do. The trials on *HIGH POINT* provided proven design concepts which were incorporated in the design of an operational hydrofoil such as the *TUCUMCARI* and PHM series. This shows that the things learned from *HIGH POINT* did benefit the design of hydrofoil ships. How well I remember *HIGH POINT* being assigned to Amphibious Force Pacific. When Adm. James came to see the construction of *HIGH POINT*, Lt. Billerbeck questioned the Admiral of various aspects of Navy requirements. The reply from the Admiral was "Son, if I were you, I would throw away the book and do what you think needs to be done." As I originally stated, *HIGH POINT* was reassigned since it became apparent to the Navy that this new concept required work to make it reliable. I know that a new class of destroyers has been put in the same category to resolve engineering and operational problems. The Navy has been building destroyers for years, yet finds that a new class requires engineering evaluations to make it operationally feasible. For a new concept such as a hydrofoil ship, I feel that we did very well. I do not feel that you should compare the Ford Model T with the Ford Thunderbird other than they are both automobiles. -- Sumi Arima ([arimas1@juno.com](mailto:arimas1@juno.com))

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[Return to Posted Messages Bulletin Board](#)

[Back to Top of This Page](#)

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