

Posted Messages and Frequently Asked Questions (FAQs)

Build Your Own Hydrofoil

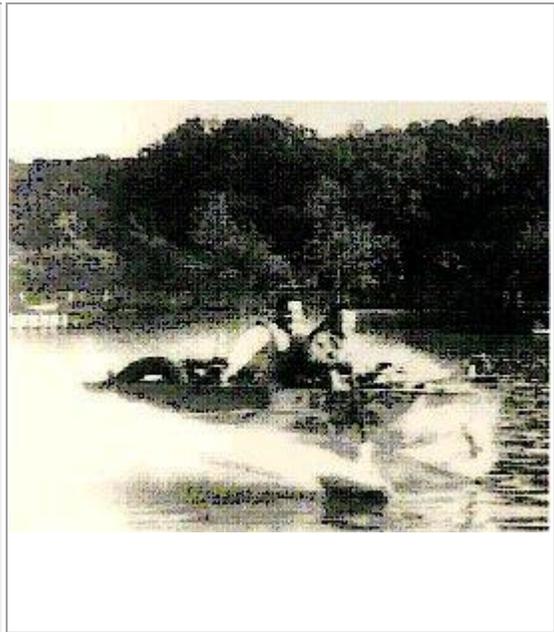
(Last Update 28 March 2011)

See also the FAQ page on [Student Projects](#) and visit the [IHS Links Page](#) for sources of design information

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Crash Recovery

[11 Sep 01] About 1970 I designed and built a hydrofoil called "Sabrefoil". The boat had a 40 HP Chrysler engine with a long shaft. The picture here shows me at the helm, and my father-in-law is hanging on. It rocketed me at about 30 - 35 MPH down the Fox River in Illinois. Of course I crashed, went through the windshield, broke my nose, almost drowned and came down with pneumonia a few weeks later. I probably shouldn't have gone that fast, tested in November, and used that much power on a small boat. The experience suppressed my compulsion to fly for a scant 30 years and now I'm ready to go again, this time with a more efficient design & less power. And that's what I am working on now. -- Ray Vellinga (rvell@hotmail.com)

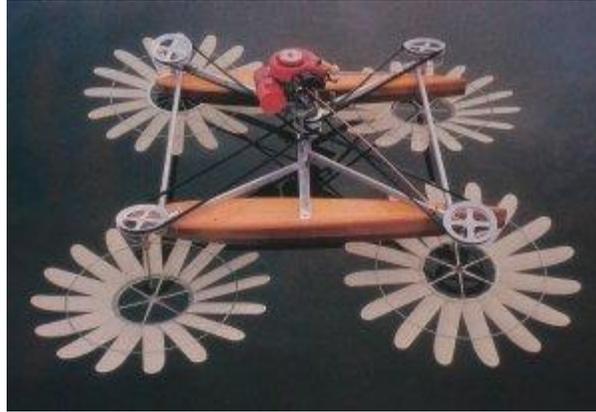


Rotating Foils?

[26 Jun 01] Has anyone ever built a low speed hydrofoil which uses autorotating foils to allow it to get out of the water at much lower speeds? Like an under water autogyro. Does this make sense or do I need to explain myself better? -- Toby (toby-peers@cableinet.co.uk)

Responses...

[26 Jun 01] An idea along the lines of what you propose has been demonstrated before on a working model. That was called the "Hydrocopter" and was developed by a Boeing engineer, since retired, named Francis Reynolds. If you are able to get hold of the following magazine you can read all about it: *US Boat and Ship Modeler*, Fall 1991, Volume 4, Number 16. Rather than being based on autogyro principles, the "Hydrocopter" model consisted of four powered rotor like disks mounted on inclined vertical shafts. Each shaft was connected to a centrally mounted internal combustion (chain saw) motor via drive belts and pulleys. The model floated on a catamaran hull structure while not underway. The model could in principle have hovered above the water on its rotors, but the concept was not intended simply for slow speed operation. I think the idea had a lot of potential and it is a pity nothing further has apparently become of it. Since I had come up with a similar concept to the "Hydrocopter" in the late 80's, I corresponded with Francis Reynolds after the magazine article was published and he provided me with additional details of his work. Unfortunately I have never had the opportunity to explore this concept further myself and regrettably I failed to maintain contact with Francis Reynolds since our initial correspondence in the early 90's. Perhaps you could write to us with further details of what you had intended to do with your idea? Did you want to experiment with such a



concept by building models? I am attaching a pair of images of the "Hydrocopter" extracted from the magazine article, one of the model floating in still water, the other of it underway. -- Martin Grimm, Naval Architect and Hydrofoil Enthusiast, Canberra, Australia
(seaflyte@alphalink.com)

[27 Jun 01] I've never seen something such as you describe, but I've run across quite a few human-powered hydrofoils which are designed for take-off speeds in the four to ten knot range. They use pedals and propellers to generate the thrust, and all are of a fixed wing design. I can share more details if you like, and I'd be interested in getting a better idea of what you're thinking with the "autorotating foils". -- Ron Drynan
(info@humanpoweredboats.com)

[4 Jul 01] I have made an autorotating pump, driven by the wave action, to circulate water. I can't think of any reason why the reverse shouldn't work, although I don't know of any work in the field. Sounds clever though. -- Nat Kobitz
(KobitzN@ctc.com)

[4 Jul 01] Hello again, I have been searching the internet for occurrences of "hydrocopter" as mentioned in my previous response and came across the following site which briefly makes reference to its possible application as a human powered vehicle:
<http://www.ihpva.org/pipermail/hpv-boats/2000q1/000142.html> --
Martin Grimm

Sportfoil Plans Wanted

[18 Jun 01] I am particularly interested in building my own SportFoil, but Michael Stevensen (Back Yard Boats) was sold out. Is it possible to advertise for a used set of plans for SportFoil somewhere at Your web site -- Regards Dag Jahnsen (dagjahns@online.no) Nesalleen 15, 3124 Tønsberg - Norway; Phone +47 3301 5005 - Mobile +47 920 20 912



Industrial Designer Wants to Correspond in German about Hydrofoils

[16 Feb 01] Ich bin Industrie-Designer und arbeite als Entwickler in der Vorentwicklung einer Firma in der Nahe von Koblenz. Ich entwickle seit Jahren nebenbei an Segelboote und Muskelkraftboote in Verbindung mit Tragflügeln. In erster Linie in Zeichnungen und Konzepte, da mir fuer die Umsetzung im Moment die Zeit fehlt. Trotzdem würde ich mich ueber Kontakte sehr freuen. -- UlrichPaul (u-u.paul@freenet.de)

English Translation...

My name is Paul Ulrich. I am an Industrial Designer working in the design development area of a firm near Koblenz in Germany. As a sideline, for many years I have been designing sailboats and human powered vessels with hydrofoils. These designs are mainly in way of concepts and sketches / drawings. I don't at the moment have sufficient spare time to translate these into complete designs. Nonetheless, I would most welcome anyone who wishes to contact me about these concepts.

Response...

[27 Apr 02] Mein Name ist Amminger Heinrich und ich baue an einem Boot, das sehr schnell segeln soll. Wenn Sie gute Vorschläge oder Ideen haben an deren Realisierung Sie interessiert sind, so habe ich immer Interesse an einer fruchtbringenden Diskussion. Würde mich über einen Kontakt freuen. -- Heinrich Amminger (amminger@knapp.com)

Hydrofoil Amphibian - Need Plans

[19 Nov 00] I am interested in amphibious hydrofoils. I read in in your website that [Bob Johnston](#) was involved. Are there any other principals who are still around? Also I was told by someone that they had seen a photo of what appeared to be a non-assault and perhaps commercial amphibious hydrofoil. I would appreciate any additional information you might be able to provide. We would like to retrofit a DUKW as a hydrofoil and it would be invaluable if I could contact any of the original engineers as well as the blueprints. -- Dan Clark (danielclark@ureach.com)

Sportfoil Plans Sold Out

[8 Sep 00] I'm afraid the Sportfoil plans are no longer available. We finally ran out of them a while ago, and it's not really practical to reprint. We still have the Interflight Hydroflier page on our web server (<http://www.stevproj.com/Carz/XBoats2.html>) as a point-of-interest for people. -- Michael Stevenson (mike@stevproj.com), [Back Yard Yacht Club](#) (BYYC)



Roving, RAVE-ing Folksinger

[11 Jun 00] I'm researching foils now. I've done a lot of boatbuilding, primarily because I can afford boats that way, and because I enjoy it. Since I can't afford to buy my own Windrider *RAVE*, I guess I'll have to build a hydrofoil next. I was working on a planing sort of boat, sort of a trimaran built with windsurfer hulls, but my experience sailing a borrowed *RAVE* from Florida across the Gulf of Mexico to the Yucatan and on to Belize has got me started in the direction of a foiler craft. Hmm, I guess it's my way of saying thanks to share this story with you. The [entire Captain's Log](#) about my *RAVE* trip and also my [personal journal for this trip](#) are at part of the archives section of [my main site](#). Hope you find it interesting, I just buckled on my swash and went for a little trip. -- Brian Douglas, Folksinger (folksinger@iname.com)

Response...

[11 Jun 00] Your narrative is reminiscent of Dave Keiper's book [Hydrofoil Voyager](#) about his travels across the Pacific in his 31-foot hydrofoil sailing yacht *WILLIWAW*. You seem to have a similar seafaring spirit of adventure and appreciation for hydrofoils. I don't know if you have read this book; unfortunately it has gone out of print. Anyway, *WILLIWAW* would seem to be more suited to open ocean than *RAVE*; it might be possible to recreate this vessel from the original plans and design calculations, but it would be a major project. -- Barney C. Black (webmaster@foils.org)

Boat Plans

[5 May 00] I am looking for plans for a small outboard hydrofoil. -- Michel Bourgault (bourgaul@ntic.qc.ca)

Response...

[5 May 00] Look at <http://www.foils.org/popmags.htm>. Also, read the article at <http://www.foils.org/upright.htm>.

Which Foils Are Best to Use?

[29 Mar 00] I'd like to design a hydrofoil sailboat, and I need data about the foil profiles to use. This boat is not for business. I just want to build my own race boat with a friend and sail it as fast

as possible. I'd like to know whose profiles are frequently used for 5 to 20 knots speed (length ratio / thickness / profile name / symmetric or not) and at which angle to use them. The goal is not to lift the entire boat (surfing shaped hull) but to help it. --

(Francois.Rougier@matranortel.com)

Build a Sailing Hydrofoil

[12 Feb 00] I just came on your site because I'm researching foils now. I've done a lot of boatbuilding, primarily because I can afford boats that way, and because I enjoy it. Since I can't afford to buy a *RAVE*, I guess I'll have to build one next. I was working on a planing sort of boat, sort of a trimaran built with windsurfer hulls, but an experience with foils has got me started in this direction. -- Rusty Clauss (rustyclauss@erols.com) website: <http://www.pan.com/folksinger>

Wanted: Small Hydrofoil Sailboat Design

[4 Dec 99] I am very interested in Frédéric Monsonnec's sailing mini-foil, but he has not answered repeated requests for more information. Has anyone else built something like his trimaran? Specifically, a sailing hydrofoil that holds one person, and can be built cheaply? It looks like the outer foils pivot. Is this the case? I would appreciate information about cheap, car-toppable(if possible), home-built hydrofoiling one-or two-person sailing multihulls.

Response...

[4 Dec 99] David Keiper's 14 ft [STORMY PETREL](#) (now owned by [Buck Trippel](#)) and Donald Nigg's *FLYING FISH* (contact [AYRS](#) for info) come to mind. It couldn't hurt to contact [Dave Carlson](#), who successfully installed Dave Keiper's hydrofoil kit to his catamaran. Also, take a look at the *TRIAK* with hydrofoil option. *[Unfortunately, the Team Triak website has disappeared from the net. If anyone finds the site at a new URL please notify the IHS webmaster]* Suggest you also visit the IHS Photo Gallery page devoted to sailing craft, though admittedly this needs a lot of expansion (member and visitor contributions are solicited and appreciated... [send them in!](#)) -- Barney C. Black (webmaster@foils.org)

Home-Built Foil Test Bed For Sale

[11 Sep 99] 25' hydrofoil powered by a 454 marine power. Hull is home built. Used as test bed for new foil designs. Hull and engine has approx. 300hr. Information and pictures on request. -- David Thomas; 405 Dominion Rd.; Chester, Md 21619 USA; phone: 410-643-5180; fax 410-604-3317; email: dthomas@skipjack.bluecrab.org

Need Source of Hydrofoil Extrusions

[1 Oct 99] I am interested to know if there is a convenient source for small (4" to 6") hydrofoil extrusions for a pet project (6x6 amphibious hydrofoil). -- David Rauseo (rauseo@totalnetnh.net)

Response...

[1 Oct 99] I don't know of anyone that offers foil extrusions for sale "off the shelf" for hobby purposes, but there are some potential sources. At least a few people have gotten spare foils for the Trampofoil water bike and have used them for other purposes. Evidently the price is reasonable. A fellow in Europe, [Chris Plaass](#) was preparing to order a foundry run of extrusions to be used by people for adding foils to daysailing catamarans. I have put him down for a copy of this email, but I do not know if he ever followed through with his plan. Finally, there were several articles in the handyman magazines back in the 1950s/60s on how to add hydrofoils made of wood and fiberglass to motorboats. You can find [info on some of this on our website](#). This might be a workable approach for you, at least for a prototype. -- Barney C. Black (webmaster@foils.org)

Best Lifting Shapes For a Hydrofoil Sailboat

[7 Aug 99] I am currently working on an experimental hydrofoil sailboat and would like some recommendations on the best lifting foil shapes for these types of boats. My boat is about 23 feet and will top out at about 200 lbs. I'm no engineer, so recommending an NACA foil number would be perfect. -- Richard B. Johnson (Richard.B.Johnson@kla-tencor.com)

Response...

[7 Aug 99] Well, if I were trying to set a speed record, I'm not at all convinced that a hydrofoil is the way to go. In my opinion, hydrofoils are niche vehicles, and the current speed record has passed beyond their niche. The only NACA airfoils that would be good hydrofoils are the 6-series. You would have to match their design lift coefficients to your requirements to pick the right one. But I wouldn't use a NACA airfoil, as there are more modern ones designed specifically for use in hydrofoils. Look for a book by Richard Eppler, "Airfoil Design and Data," Springer-Verlag, 1990. Now out of print, but your library can probably get a copy for you. His E817 is designed to have minimal cavitation for lift coefficients between 0.12 and 0.60, and is 11% thick. E818 is thinner at 9.4%, but has a much more critical leading edge shape. Whether you use an Eppler hydrofoil or a NACA airfoil section, you must be sure to build it to a high degree of accuracy. I would shoot for a tolerance of 0.01" and maybe 0.005" if you can achieve it. For speeds around 60 kt, subcavitating hydrofoils may not be possible, and you'll have to design a supercavitating hydrofoil. And if you do that, you may not be able to achieve the lift/drag ratios needed to get to 60 kt. I've sailed 60 mph in a landyacht, and you're going to need an extraordinarily efficient craft to do that on the water. For example, let's say you plan to hit 60 kt in a 30 kt wind. If you can achieve an L/D of 10 for everything that's in the water and an L/D of 4 for everything that's in the air, including the drag on the hull, you can just do it. Wind tunnel tests of a landyacht with a rigid wing sail, tested with no wheels, had a peak L/D of 4.4, so that is in the ballpark. But getting an L/D of 10 for the foils.... You may not be an engineer, but you will have to do some sophisticated engineering to achieve your goal. When I talked to Greg Ketterman about designing *LONGSHOT* (record breaking forerunner to the Hobie *TRIFOILER*), he said that a velocity prediction program was absolutely essential. -- Tom Speer (tspeer@tspeer.com); <http://www.tspeer.com>

A Small, Fun, Cheap Hydrofoil

[16 May 99, updated 17 Feb 03] I'm the "webmaster" of a little site : "[PK hydroptere de loisirs](#)" (with alta vista, key word: hydroptere) I have designed and built a little hydrofoil boat for only \$800! This is not a boat for speed record but for "the pleasure" ! -- Frédéric Monsonnec (frederic.monsonnec@wanadoo.fr)

[25 Aug 98] I have been working on [a hydrofoil sailboat design] project, off and on, for over 25 years... I came up with the basic superstructure in 1970-1 !! This is one of my life long loves. My goal is to see my craft "fly", and put my concepts into record breaking reality (I am not really interested in becoming a boat manufacturer. I don't know the potential market well enough to venture an opinion as to its marketability/ profitability). The few people I have discussed parts of this project with are impressed. Parts of it have already been "borrowed" over the years, as a result of those discussions, hence my wariness. But life is too short. I have renewed interest in bringing my craft to life. I am hoping that through this inquiry, perhaps I can connect with someone I can trust, and who will participate in some way... even that I haven't thought out. That's part of the fun of it all!! The physics are pretty easy, it's the human element that gets complicated! -- Tyler Ahlgren (tallgreen@earthlink.net)

[20 Mar 98] I want to turn my cat into a high flying above the water speed machine. Please let me know where I could get more info in this area. -- Brent (brent@gator.net)

[20 Mar 98, updated 30 Oct 00] You have several options as follows:

- You can buy an add-on hydrofoil kit. These were to be available from DAK hydrofoils, but unfortunately the owner Dave Keiper died in 1998 before he could complete the design. The DAK website is still open at <http://www.wingo.com/dakh/> www.wingo.com/dakh. You may be able to buy the dies to have a foundry extrude Dave's foils; Contact Frank Keiper at dak.hydrofoils@home.com. A copy of Dave Keiper's recent files related to the proposed kits is available from IHS; [for details click here](#).
- You can design and install hydrofoils yourself, though this is an effort for a really dedicated hobbyist. There is [an article in the Winter 97-98 IHS Newsletter](#) by [Tom Lang](#) who did just this in the 1950s and sold the kits on the open market. The newsletter comes with IHS membership, \$20 per calendar year. There is lots of design info available through reprints and back issues of the [Amateur Yacht Research Society](#) and Multi-Hulls magazine.
- You can trade in your existing boat for one designed as a hydrofoil such as [Hobie TriFoiler](#) or [WindRider Rave](#).

-- Barney C. Black (webmaster@foils.org)

[14 Dec 97] I am looking for a picture/s of a Sea Scooter built in the late sixties. [Attached is a drawing](#) taken from a US patent number 3,456,609 by Peter Thomas and Mence Nott from 1969. The craft was actually built. I saw some foilborne video clips of the craft with one person riding it. I think they tried to market it and I don't know the outcome of this attempt. -- Amiram Steinberg, Naval Architect (amiram@netvision.net.il)

[26 Mar 98 updated 28 Mar 2011] I am looking for the plans to build the Solo Hydrofoil that was in the September 1967 issue of Popular Mechanics. It is a 1-man Hydrofoil; foam-filled fiberglass hull by Italian designer Renato Castellani. I now have about a 1/4 page [line drawing of this of this craft](#) that is just wild looking. Have others built this that you are aware of? Is there a more modern design? I'm dying to make one but no one seems to know of him or this craft. -- George Faulknor (georgefaulknor1@comcast.net)

[14 Nov 97] I have a 22 ft aluminum bay runner to which I am interested in installing foils. The boat is powered by two 75 hp Honda outboards. I commercial fish and wish to increase the boat's performance. Any information that you feel would be of help would be of help as I know nothing about foil design. -- Jerry Jones (boat@ix.netcom.com)

[25 Sep 97] IHS Member Malin Dixon is undertaking to design a small hydrofoil boat that is an alternative to a Rigid Inflatable Boat (RIB). Malin runs an electronics company in England and finds that the main thing he is short of is time to apply to this project. Is there an engineering graduates who would be interested in coming to work for Malin to get this off the ground (or water)? Is there a designer with a similar or compatible project in mind that would like to collaborate? If so, contact Malin Dixon by email for more information (gallery@foils.org).

[24 Aug 97] I am interested in getting some help with designing my first hydrofoil for personal use and should be capable of carrying two people and enough fuel to circumnavigate the mainland of Australia and out run anything else on the water. It would be best if it would be tri-hulled (for stability) and should be very small indeed! mark79@ibm.net

[15 Sep 97] I am trying to find plans to build a hydrofoil. I live in Juneau Alaska, and I am a marine mechanic. More efficient means of transportation for Southeast Alaska are desperately needed. I am talking about a motor craft, and I do have an existing hull to experiment with. It seems there is a lot of mystery around this kind of project; no one seems to know the basics. Is there a formula for weight to power to drag ratio? I don't know if I'm asking the right question. A basic foil design would be nice... I could fabricate it if I had plans and dimensions. -- Cary Taylor (CTaylor169@aol.com)

[18 Sep 97; updated 23 Nov 00] Our experience with home-built hydrofoils has led us to the conclusion that low wing loading is VERY preferable. Most builders go for low drag, which means small foils, which leads to high loads. I took a look at the DAK site, <http://www.wingo.com/dakh>, and it does have some good looking foils. Another site you should look at is ours! We have a set of plans for building a small powered hydrofoil (which may be smaller than you want). At any rate, you should look at different approaches to narrow down what you want to build. Our Sportfoil plans are viewable at: <http://www.stevproj.com/SpecPurp.html>. [*As of mid-2000, Sportfoil plans are sold out, with no plans to reprint them - Ed.*] Our latest, but not available, hydrofoil project is at: <http://www.stevproj.com/XBoats.html>. Building a pretty good sport hydrofoil is not really magic. You should be able to have a lot of fun, but don't let the preponderance of technicalities weigh your project down. --Mike Stevenson (mailback@stevproj.com)

[18 Sep 97] I have found that most people who call/ Email are enthusiasts or would-be designers / builders; that is they want to build a hydrofoil, not buy one. When asked the cost I answer that the conversion of a 24 foot outdrive-powered craft such as [I did to create] [TALARIA III](#) would be about US\$20,000. Not expensive, in boating terms, but beyond the casual hobbyist's budget. The callers are usually deterred when they find out it requires an autopilot. If so, I suggest the Hobie *TRIFOILER* mechanical submerged foil concept or the Russian and Florida model boat hydrofoil surface piercing design concepts as approaches to consider. The bulk of the questions are usually about the hydrofoils, an area where I have little knowledge; my background is better in the fields of automatic control, hydraulics, analog electronics, and software. I am pleased talk with anyone who I can be of help to. Regarding the sale of kits/conversions, the market interest has not so far been sufficient, i.e. no one has expressed an interest in buying a kit [to duplicate the *TALARIA* conversion]. -- Harry Larsen (talaria@foils.org)

[18 Aug 98] *TALARIA III*'s price is US\$35,000, delivered in Seattle. It includes a trailer modified for launching [TALARIA III](#). I have had a few persons in the Seattle Washington USA area or visitors stop by to see the boat. If mutually convenient I can take them for a ride. (It is kept on a trailer). -- Harry Larsen (talaria@foils.org)

I am currently thinking of building a 2 man craft capable of traveling through the afternoon chop of Peconic Bay on Long Island. I work with aluminum, and have access to CNC Router and many other shop tools. Please contact me if you could help. -- Chris Marotta (WCREEK@msn.com)

I have for several years, been very interested in designing, discussing, and building a prototype. I looking forward to meeting your members and learning more about the organization. -- Bill Hodge (bill.hodge@daytonoh.ncr.com)

[29 May 97] I'm interested in designing and building a high speed single or two seater hydrofoil and need as much info as I can get. I'm still in the concept stage and would like to discuss ideas with other hydrofoil designers/builders. -- Neil Morris (morrisn@ihug.co.nz)

[10 Aug 97, updated 11 Sep 01] If you are talking about a motor powered craft, you can get plans and components for this project from Hydrofoils Inc.; PO Box 6006; Lake Worth FL 33466; 561-964-6399 voice or fax; web page, www.hydrofoil.com. Also, check out the Back Yard Yacht Club's *SPORTFOIL* (plans US\$15), P.O. Box K; Del Mar CA 92014, 619-481-3111, e-mail: byycord@stevproj.com. [*As of mid-2001, Sportfoil plans are sold out, with no plans to reprint them - Ed.*] If you are talking about a sailing vessel with hydrofoils, contact DAK Hydrofoils, 123 South Pacific Street, Cape Girardeau MO 63703, phone: 573-651-6582, (web site: www.wingo.com/dakh/). [*Unfortunately Dave Keiper died, and DAK hydrofoils is no more. The website is still active, though. Dave's brother Frank answers his email at dak.hydrofoils@home.com. - Ed.*] Another contact for sailing hydrofoils is Dr. Sam Bradfield. He can be reached at: Prof. S. Bradfield; Hydrosail, Inc.; 3040 South AIA Highway # 154 F; Melbourne Beach FL 32951, email: hydrosail@aol.com. -- Barney C. Black(webmaster@foils.org)

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