



Flying Dutchman Bulletin

Nr, 161 January 2014





EUROCUP 3 OKK – DUTCH NO 60TH ANNIVERSARY

Invitation for: OPEN DUTCH CHAMPIONSHIP

As president and on behalf of the Dutch Flying Dutchman Class Organisation we would like to invite all of you to compete against our DUTCH & WORLD CHAMPIONS – NED 26 –.

ROYAL YACHTCLUB

We are very proud to be able tell you that the organizing committee is the Royal Yacht Club Sneek (KWS) which has one of the finest race-committees in the Netherlands. Race-officer Piet van der Zwaag and his team members are very skilled and the KWS has hosted since 1934 the SNEEKWEEK, the biggest Dutch sailing event with more then 1000 entries and over 100.000 spectators in the first week of August.

DATE

The date is set for **16th, 17th and 18th of May 2014.**

VENUE

The venue is Sneekermeer, which is located in the Dutch province Friesland, in the North of Holland and famous for all it's lakes. KWS itself is located on "The Starteiland" and offers everything you could possibly need for a successful and relaxing Championship on the water. Because of its unique venue, spectators can watch the races from a short distance.



fast, faster, world champion 2013

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JUST ASPECT SOMETHING OUT OF THE ORDINARY



60 YEARS NFDO

The 2014 Open Dutch Championship will be something special. Besides the races, the Dutch NO, is celebrating their **60th anniversary**; so alongside the sailing there will be a spectacular social program. We would very much like to celebrate this party with all of our FD-friends. So we have a special proposal for foreigners.

BONAIRE

The Dutch 2014 celebrations already started in Bonaire.

The first Caribbean Championship on Dutch soil won by NED 4, Klaas Tilstra & Paul van der Pol (see report in the next Bulletin).



FEESTCIE

FEEST Means party and we have a committee that will make this party happen. Let us introduce them:

DURK SCHROOR NED-29

A member of the KWS who will make everything possible happen at his yachtclub.



WILLEKE ZANDSTRA NED-341

Known as the girl next to the tall Kestrelli. Who sailed here maiden FD-event in 2012 at the age of almost

RIK APPELO NED-21

The owner of a splendid BOB HOARE who convinced us that there can't be a 60th anniversary without old woodies.

RONALD STALMAN NED-18/341/21

Our VP-communications who is always willing to help out organizing something.

MANY OTHERS

Besides these four names there will be a dozen more who will help out with hosting this great event.

EVENT INFO

Just visit the Dutch-website to get all details about the event.

www.sailfd.com

WHY SHOULD YOU COME?

To pay respect to Conrad Guelcher & Uss van Essen who founded the class? To honor Clé Jelles who would have been proud to be part of this event?

Yes to all of the above, but also to have a fantastic event with 9 races. To become international Dutch-champion by beating Ard en Enno. To enjoy the great atmosphere of the FD-family.

But especially because this one will be **extraordinary**.

you've ain't seen nothing yet.



Flying Dutchman Bulletin
Periodical of the International Flying Dutchman Class

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Colofon

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Editor FD-Forum

Sjors Riemsdag

Dear Fellow Sailors,

In 2014 the FD is ruling the waves for already 60 years. Reason for celebration, but also the moment for some retrospective thoughts.

In the early days of the FD, regatta-sailing was an elite sport, which was definitely not affordable for all people. Nevertheless, Conrad Gülcher was striding to have sailing regattas within the reach of anybody with zest and joy in sailing, and not at least to bring the FD Class to many sailors interest. This is one of many reasons why the FD was a relatively simply design and much room was given to sailors to layout their boats to their personal wishes. Boats were also built for recreational daysailing with smaller gibs and simplified layouts.

The FD became a 'development' class and with many first-time features like sail-windows, trapeze etc. our class evolved to

the high-end racing dinghy as it is today. Maybe it is still 'developing', but not with much need, today it is a different world! Now every modern dinghy has windows, trapezes and many other features we all know from the FD. In that prospect the FD always took the leading part.

That our class still is very much alive you can read in this issue: two interesting articles about modern FD building and discussions and opinions about the future of our beloved boat.

But let us never forget the most important part of Conrad's plan: making sailing possible for a greater number of lovers, and thus increasing the number of 'FD family-members'.

So let us keep the message as simple as the boat and vice versa: **Join the Family and Sail FD!** Spread these words!

Happy sailing,





President's Letter

President IFDCO
Dr. Alberto Barenghi

Lecco, 29-11-2013

Dear friends,
as always, I thank you very much for your engagement in this strategic time in promoting and supporting the Class all over the World with your attendance to the IFDCO International activities.

Moreover, let me thank all the Officers involved in the Class management.

The FD sailing season 2013 will finish with the Dutch Antilles Championship in Bonaire, and we are already looking forward to the next year that will offer us beautiful challenges with the World Championship 2014 in Scotland, a rich series of Euro Cup events and the next World Championship in Sydney at the end of 2014. All those events will give us the chance to sail with our fleets and promote FD all over the World.

The year 2013 has been very important for the FD family to finalize the renewal of the Class, according to the new Bye - Laws since January 2013.

This new deal for the FD Class, began with the election of 3 new Officers during the last AGCM in Balatonfoldvar, as follows:

Edward Cox (AUS - 7)) as General Secretary,
Paul Hemker (USA - 3) as V.P. Technical and
Tony Lyall (GBR - 388) as V.P. Development.

On behalf of the entire FD family and the IFDCO GC I thank again Peter Doran and Peter Hinrichsen for their commitment and work over many years as General Secretary and V.P. Technical. We look forward thanking them in person and remembering their dedication at the next World Championship in Largs.

Now, as I already wrote in my previous letter, the topic "IFDCO strategies and restructuring", reflecting the views expressed by the membership and by us, and is the main topic to warrant the growth and promotion of FD to a new generation of sailors. It is the intention of the IFDCO General Committee to implement the view of the competitors meeting on all subjects, including the appointment of officers, in accordance with the IFDCO Foundation Rules. This may mean that Competitors Forum's will be more structured, because these are the means by which we communicate.

At the end of 2014 my deadline as President and the deadline of Fred Schaaf as Treasurer will finish. So, the IFDCO will have to appoint new Officers and we are looking forward to seeing

new IFDCO members making themselves available to be involved in the Class life and management.

I strongly believe that we have to improve the teamwork in the Management of the Class, largely by improving communications between us. This is required to ensure the continuity, reliability and growth of the Class, and to help all the national fleets to attend the major events. This is essential to the prosperity of the class is ensuring the continuous evolution and promotion of the FD.

Considering the financial crisis, we have to evaluate the expected attendance of teams to the Worlds and major events 2014. For this reason, I would suggest the FD sailors to send their Entries to the Worlds in Largs and Sydney, very much ahead of time, to allow the IFDCO and the Organizing Committee to predict the attendances and organize the best way of shipping.





President's Letter

A good feed-back for our Class is the number of new boats built in 2013, and the second hand boats market, that seems to show a great interest in and around the FD.

With regard to the IFDCO Sponsorship, the work is going ahead to finalize contacts with some brands, interested in a gentleman's agreement to supply our Class with services. The Registration of the IFDCO Logo, now done in The Nederland, Europe and USA should satisfy the common request by potential sponsors who want an exclusive contract for their products and services.

Of course, we need to renew the selling procedure of the FD Shop and promotion through the Class website and by recruiting new sponsors.

Actually, we are negotiating with the brand "Gottifredi & Maffioli", producers of ropes,

who have expressed their interest to supply a specific kit of tapered sheets and hal-yards which will be sold through the Class.

Another possibility is a contact with a Sailing Wear Company and should be the possibility of finding sponsors to support the shipping costs and those represent our important challenges.

With Frank Nooijen and Jan Lechler appointed as the FD people in charge for the Transportation, we will agree the best shipping solution.

So, the main goal is to implement Transport grants and Sponsorship to ensure a great attendance to the next World Championships in Largs and Sidney, as well as to the Euro Cup series.

In addition, the chance to charter boats for non-European teams needs, through the biggest national Class Secretaries in Europe is the best approach to enhance

our International participation, and I thank each Secretary for their kind availability.

In 2015, due to the global crisis, it was agreed that instead of a European Championship, it would be better to increase the attendance of teams to the EuroCup events, in order to avoid a split of the fleet and encourage the attendance to the Worlds in Sydney.

In 2016, to maintain the international status of the FD Class as the premier high performance one design dinghy, a strong World Championship will be organized in Steinhude (Germany). Further proposal for future venues has been presented by Russia, Italy, Slovenia and Nederland.

Those selection of venues which will promote large fleets and support the existing fleet, remains a challenge for the IFDCO Committee.





President's Letter

Anyway, the chance to continue the European Championship has not been abandoned forever; it will be considered, time by time, according to the attendance of the FD fleets to the major International events. Moreover, the IFDCO is always reviewing the decisions about the best location and timing for the future events, according to the needs of sailors, national fleets and an International presence of our Class.

With regard to the Communication system, our V.P. Communication Ronald Stalman, is very proactive. His role to develop the new Website with his Communications tools (Facebook, Twitter, Forum, etc.) as well as the FD Bulletin, is necessary for the FD promotion and was done a great job. As his terms ends in 2014 we, maybe, need to find someone for

that role as well after the Sydney Worlds. Ronald announced that he, for the moment, is not thinking about reappointing. For the future, we need continuity in this job, strategic for the Class image. So we hope someone will step up to maintain the progress Ronald has established to create.

With regard to the Technical Committee, I'm very satisfied and glad because they always perfectly update the Class Rules according to the progressive development of boats, riggings and sails, looking ahead to the future. Moreover, the efficiency and the quality control shown in every Championship, testify to the success of the technical strategy adopted by IFDCO to update the Rules and manage the measurements, in order to warranty every time high-quality control, safety and equity.

The actual technical topics already discussed in the last AGCM in Balatonfoldvar are : loose footed mainsail and electronic compass. With regard to those issues, the Technical Committee is going ahead to propose the proper amendments to the related Rules, that will be discussed and approved at the next AGCM in Largs. Finally, the proposal to test a bigger spinnaker, supported by some sailors, has started and we are looking forward to discuss the feed - back, on next the Competitor Meeting and AGCM in Largs

I wish all of you and your families Merry Christmas and a wonderful sailing season 2014.

Cheers,

Alberto

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a new generation of Flying Dutchman



A VIEW OF THE FUTURE FOR IFDCO



Ronald asked me to write a piece for the Bulletin, I am happy to do so, because I feel that we, the FD family, are involved in a growing process at the moment, which may take a while to complete. The class has almost been forced into a kind of a rebirth, in that we have taken a long hard look at the way our rules are written, both the Bye Laws and the Foundation Rules, which are pretty strict. When Conrad and his cohorts wrote the original rules they weren't messing about, but what was right then is no longer really fit for purpose now.

One can see what he was trying to do with those rules and he was almost certainly right to write them the way he did, but time and tide have moved on, the planet has spun for nearly 60 years since then, and things are going to need to Change in order for the Class to move forward as the membership seems to want it to.

Like all growing processes, there is bound to be effort

involved, hopefully not pain, but definitely effort on many people's part. We are going to have to find a new President, Alberto is retiring after 15 years devoted service to the class, he has seen a lot of changes and has steered IFDCO through all the political and physical challenges that have occurred during that period. Alberto is to be congratulated and thanked for his efforts; nonetheless he is still going to be around, enjoying his new boat and acting as a Consultant to the New Committee and President.



Fred Schaaf is also planning to leave the committee after having been the Treasurer for many years and has managed the "Money" pretty well during that period; he is also to be congratulated on his work over this time. We are going to need replacements for both of these guys; they

will both be hard acts to follow.



The General Secretary changed last year from



Peter Doran to Ed Cox, our Australian colleague who currently resides by the Italian Lakes, is doing very well as the "New Man". Paul Hemker has stepped up to the plate to replace Peter Hinrichsen as VP Technical, (we all know that Peter is impossible to replace, but Paul has the same pedigree). Tony Lyall is also joining the Committee as VP Development a very good addition to the Committees ranks.



A VIEW OF THE FUTURE FOR IFDCO

The Technical Sub Committee is actively discussing the loose footed mainsail and boom option, and the way to write an electronic compass rule to include self sufficient compasses, but not ones that require “outside access” i.e. GPS based compasses. have tried one in Largs.

The larger spinnaker conversation is ongoing and we look forward getting some serious feedback from owners that have tried one in Largs.

Also, we are going to need folk to show interest in becoming involved with Race and Regatta Management, and maybe, Measurement and Regatta Inspection in the future.

It is fairly well known that after this “Financial Crisis” things will never be quite the same again. Those of us that were sailing during the Nineties and the early Norties i.e. 1991 to 2007 (that is many of us), enjoyed racing and regatta experiences, the like of which we will have to work very hard to emulate. In order to attempt to get back to that standard of sailing and regattas, we all, as class members will have to involve ourselves in that process and roll our sleeves up in ways that we maybe haven’t in the past.

Yacht Clubs that we want to sail at for our regattas seem to charge quite large sums to provide Regatta Management, however, in order to keep the good times rolling, we are going to have to muck in and get involved, probably more than in the past. We saw a classic example of a Club and its members “getting involved” in Hungary, the whole Balaton team worked very hard to make our regatta a success; Zsofia should be proud of what they did.



At Largs, in July, I’m fairly certain that Tony Lyall will have mobilised everybody who has ever sailed an FD in UK to get “stuck in” and help, we, the other class members should also help, and expect to in the future. In Sydney and Steinhuder Meer and wherever we go thereafter, because the level of service that we used to expect to “just happen”, won’t, unless we help the process along.



There is a well known European theory that the distance from Europe to UK is much further than UK to Europe, but actually, the distance is exactly the same, think of the ferry crossing as an adventure, and driving on the “wrong side of the road as a little test of your driving skills”!!

Thus, the moral of the story is much as we all enjoy being involved in the FD Family Worldwide, like all families it extracts a price for membership. It is not just your annual fees, but some effort on everybody’s part to make the family stronger and better.

I would like to make a final plea for assistance with Regatta Inspection and Measurement generally in the future. The smarter folks around the place will have noticed that quite a few members of the team are a bit grey haired or even



A VIEW OF THE FUTURE FOR IFDCO

white haired now, some of them have been around a long time and would like assistance with the Regatta Inspection process now, and into the future. We have a couple of newer team members, Tanja



Tanja always hiding herself when a camera is close



and Tony , both sailors with busy lives, who may become International Measurers in the near future, but we need more people to get involved, learn the processes and become team members for the future. Male or Female, all are welcome.

What I don't want to see at Regatta Inspection in July, is a team of white haired guys lifting boats on and off the weighing scales, so if you are younger and normally wear a trapeze harness you will be especially welcome at the measurement tent at Largs. We are expecting 60 boats and would like to "break the back" of regatta inspection in as short a time as we can, so if what I have written here means anything to you , then

come and give a hand, please.

One final point, in order to make the logistics for future regattas easier to plan, why don't we institute a little system of everybody who "intends to attend" the regatta sending the organisers an e-mail, say 12 or 6 months before the regatta. The e-mail should say: "This is me, This is my boat and I intend to come to your regatta".

Nobody will hold you to it, but it makes "doing the sums" much easier for the organisers if 70 or 80 or even 132 owners have said, "Yes we'd like to come".

I look forward to seeing you all in Largs, I just know that you will have carefully prepared your boats for Inspection, so they will just fly through the tent!

John Best, Chief Measurer

John.L.Best17@btconnect.com





INTERVIEW WITH by Ronald Stalman

In the Netherlands we are famous for always being runner up. It has happened in soccer, cycle cross and dozens of other sportcompetitions. Once in a while there is an instant success, but history never repeats it selves year after year. So once a great victory is clinched one has to step a champion or champions straight on their toes to capture the story. Here's the Interview with the 2013 World Champions Enno Kramer and Ard Geelkerken sailing FD NED26.

Guys, first of all tell is about the aftermath becoming Worlds Champions ...

Enno: We had a big party at our sailing club the evening we came back from Balaton. Then a mad day with lots of interviews but the day after that I was in the plane flying to a client in Venezuela, life was again back to normal.

Ard: next morning a little celebrating party @ Hittech. Afterwards back to business

In what mood did you travel to the Worlds in Hungary ...

Enno: We knew that it is a difficult venue and that performing well would be difficult, we would just try our best.

Ard: Balaton could have difficult circumstances, but previous worlds shown that the weather is always dif-

ferent than expected... this can give opportunities

The top 3 at our Worlds are always the usual suspects, were you sure that it would be the same this time ...

Enno: We were pretty sure Szabolcs and Andras would be good at their home waters and also expected the Bojsen Moller brothers to be good, we were not so sure about ourselves given that we have never been very good at lake Balaton. Ard; same comment.

Who were the dark horses attending ...

Enno; We also expected Kai Uwe Ludtke and Kai Schafers plus Aichholzer/Zingerle and the Vespasiani brothers to be at the front of the fleet.

Ard; With the unpredictable weather there where opportunities for light weather teams like Borowski and Bogumil

Talk us through the week as it happend day by day ...

Enno/Ard: For us the most important was that the weather changed when the regatta started, it became cold, rainy and significant a bit more windy than normal. We started off with two second places and led after day one. After that we just kept on scoring well every day. The Danes and Hungarians won most of

the races but we were never far behind and did not make any mistakes, we did not finish worse than fifth. After a very risky start we won race 8 and then it was between the Bojsen Moller brothers and us. They were two points ahead but already had two bad races.

And then victory ...

Enno: At the start we placed ourselves just to windward of Bojsen Moller and sailed very far forward, took more risk at the start than we usually do, the Danes had to stay in front of us and also had to go very far forward at the start. In the end they were over and we were not. It was a bit of an anti climax as they could not sail the last race.

Ard: The race committee did make the start a real thriller story, when putting the numbers on the blackboard, just before showing, the board was wiped out by the rain. We had to wait a long time to see who was black flagged.

Becoming World Champion must be special ...

Enno: yes

Ard: yes, it is real different than a second place

INTERVIEW WITH by Ronald Stalman



Help me out: How you can become a World Champion in the FD ...

Enno; Just try a bit harder than anyone else.

Ard : Make sure you learn every single race something to improve

Is equipment important ...

Enno; yes it is important but I think that approx. 50% of the fleet has equipment that is good enough to win the Worlds

Ard; Yes, make sure your material will not break during the race

Talk us through your boat lay-out ...

The boat layout is not so special, we try to keep the boat as simple as possible so that we can spend more time actually sailing instead of playing with the controls. The only two uncommon things are that we have the up haul for the spinnaker pole forward where the crew controls it and we have the extended gooseneck.

Why are parts, lines, cleats etc. placed where they are ...

Enno: The important thing is that everything works well, that lines do not rub over other lines and that lines go into the cleats

without that you have to look at it. In this way you also have a lot less maintenance as things wear less. It looks a lot like a standard Bogumil layout but there are several small but important differences

Is your boat lay out still the same as it was when you started in the current Bogumil ...

Enno: We changed the angle of a few cleats as it was a bit difficult to get the ropes in the cleats while hiking but apart from that it is exactly the same as when we put it together.

INTERVIEW WITH by Ronald Stalman

Ard: We did some investigation before we did the layout of the Bogumil. Most of this worked ok from the beginning.

Has the new boat been the gamechanger or would you've been at the same level in the Vels ...

Enno: We also won the Worlds in the old boat but the new boat is a little quicker so getting to the front is a bit easier than with the old boat.

Ard: This boat is different than the old boat, but both are quick.

How do you collect info of the venue ...

Enno: It differs, for Balaton we had info from the Dutch Yachting Federation, in Malcesine we collected it ourselves the week before while training with Bas and Marc van der Pol, before Altea we talked extensively with other people who had experience there.

Ard looking a bit around.

How do you enter the race

Enno: By filling in the entry form?

Ard: Enno fills in the form ;-)

If things didn't work out after the start how do you work your self up in the field ...

Enno: First thing is to get clear air usually this means you have to tack as soon as possible and then not to panic but just continue sailing as best as you can, working the wind-shifts and trying to stay out of luffing matches and pile ups at marks. If you are reaching in the middle of a big field it is much more important to stay as close to the leaders as you can than passing one or two boats or defending your position with a lot of luffing while the leaders sail away from you. You may not win the race but usually you can pull up to a place that is useful in the end.

Ard: sail your own race, with a bad start you loose approx. 50 meters compared to the pole position, when you finish within 50 meters of the first place, you are definitely within the top 10.





INTERVIEW WITH by Ronald Stalman

I thought the simple answer would be boat speed, how does one improve boat speed

...

Enno: The first thing is keep the boat absolutely upright at all times. Then have the important settings in the boat like genoa hal-yard, centre board position and lower shrouds marked so that when the wind changes you can go immediately to your pre determined settings and you immediately know that you will be quick.

Ard: Catching more puffs.

How do you prepare for a tack and how do you execute this ...

Enno: That will take a whole article in itself. Just come to the beginner training I will give next year.

Ard: looking around that you will not hit someone after the tack :-), then we just tack.

Same questions for arriving at the upper Mark ...

Enno We try to determine before the mark which way we will go after rounding the mark, where the next mark is, if it is downwind if we gybe or not.

Technically we pull on the preventer before the mark and make sure the spinnaker luff sheet is out of the cleat in preparation for the hoist. Then is it a matter of nicely pulling the boat to windward to help the rudder on rounding the mark. Ard: looking around, gibe/ not gibe, hoisting the spi.

Thanks for the interview guys and i'll wish you lot's of success in Largs and years to come.





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Photo: Christian Vogt



PACIFIC FLYING DUTCHMAN LLC by Ronald Stalman

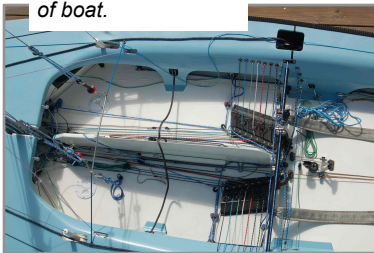
Interview with Duane Ehleringer; owner of Pacific Flying Dutchman LLC, manufactured in the United States, and driving force behind the newly designed FD from his company, website:

www.PacificFlyingDutchman.com

Tell us how you came to build FD's and what were the major points you considered in the redesign and production of the boat ...

I have a background in the construction industry of over 30 years. I understand engineering principles fairly well and consider myself creative when looking for solutions to an issue. I wanted a newer boat and was not able to locate one in the US market place. I consulted a few friends and then decided I had the skills to build the molds and produce a newer version of the FD.

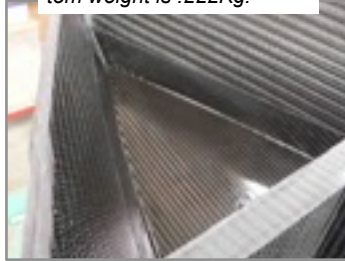
View of working area of boat.



Genoa deck attachment & roller furling mechanism.



Spinnaker entry tube bottom weight is .222Kg.



Storage unit on port side of v-bulkhead. Spinnaker tube on starboard side of v-bulkhead.



The major points of focus on the newer boat were to be:

- A much stiffer hull than currently available. I equate stiffness to more potential boat speed;
- Light weight in the bow and stern areas to reduce "pitching" moment;
- A foredeck capable of bearing a heavy crew at any point;
- A structural design that could transfer the heavy loads/stresses placed on a hull during more extreme conditions;
- Be responsive in light breeze;
- A Flying Dutchman that would be competitive and long lasting.

There are a lot of points to consider in the overall design of any boat. But most of these issues, I feel, are easily satisfied so long as quality of labor and materials are not compromised and tolerances of construction are maintained.

But there were also a couple of well known modern design parameters to follow:

Jigs are used to install all parts. All parts have tight tolerances.



1. The FD, as one engineer friend said, has a full spoon bow. A spoon bow keeps the bow up and can promote planning. The newer designs of the Flying Dutchman have station 9, the most forward measured station, as full as possible.



2. From there we focused on narrowing the boat to create a narrower stern area, to almost the minimum measurements for an FD, creating less wetted surface area.

The measurement tolerances in the class rules allows for a maximum difference in measurement of only 12.5 mm at the different measured stations, (1-7).



PACIFIC FLYING DUTCHMAN LLC by Ronald Stalman

This in addition with the other class measurement rules keeps all modern FD designs fairly similar and thus the outcome of a given regatta for the most part is determined by the knowledge and skills of the crew and skipper.



If the modern designs of the Flying Dutchman are fairly similar then how is your boat potentially better designed and/or what separates your design giving it any potential edge in competitive sailing ...

This can be a bit confusing, but let me explain; point-by-point, starting at the bow and working back to the stern of the boat.

- We chose a carbon fiber cloth sandwiched over foam core as the basis of the major components: the hull, deck, floor, forward centerline truss, and v-bulkhead. More specifically we chose a tri-axial weave carbon-fiber aerospace weave cloth. This high modulus cloth is ideal for boat hulls with stresses acting in many directions;
- In addition we use a closed-cell Divinycell foam core H100, a PVC foam with great shear values. We also incorporate unidirectional carbon-fiber cloth on both sides of the foam core down the centerline line of the hull;

The carbon-fiber covers both sides of the foam core. Enormous strength is achieved with this lamination.



- Forward of the v-bulkhead some basic changes have occurred. A true centerline truss was designed;

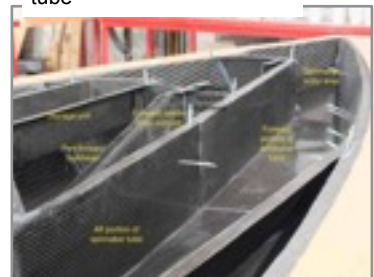


- Off this truss, port and starboard bulkheads have been incorporated (adding lateral stiffness and giving deck support, as well as resistance to wave impact). This centerline truss has been designed to help disburse the genoa hal-yard load created, support the hull and deck loads, and it is fully integrated with the V-bulkhead;
- The traditional round spinnaker tube has been changed to more of a rectangular design. This redesign uses less material/fabric since it uses a portion of the deck and a portion of the hull to complete the tube, reducing bow weight;
- This newer design also allowed the center of the tube to be enlarged. The center is larger in size than either end of the tube, which is beneficial because this is where most of the spinnaker is taken up and

stored. With the new box-shaped design, we were also able to make the spinnaker tube function as a support for the upper deck area. Additionally the spinnaker tube rests on the mid span forward bulkhead helping shorten up this support span, leading to better deck support;

- On the forward port side of the boat an optional storage unit has been created;

View of enlarged spinnaker tube



- This rests on the port forward bulkhead and additionally rests on and attaches to the V-bulkhead. The storage unit has a dual purpose, obviously a storage unit as well as developing a remarkable amount of stiffness and support for the deck. By the time one deducts the weight savings in the v-bulkhead materials removed (carbon fiber and foam core) and forward port bulkhead the gain in weight is negligible. Again, this is an option and can be eliminated if desired;
- Going aft from the v-bulkhead and under the mast step, a support made from several layers of foam core and unidirectional and tri-axial carbon-fiber cloth is BID (bidirectional) taped into the v-bulkhead, hull and centerboard trunk;

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- There are 4 layers of 15.7oz/yd² or 532 g/m² carbon-fiber cloth wrapping the centerboard trunk. An additional 2 layers of 15.7 oz/yd² or 532 g/m² carbon-fiber cloth are applied in the areas where the crew traverses the cockpit. These extra layers extend from the inside of the hull to the centerboard trunk and forward of the upper shroud attachment point. This is crucial for two reasons;
- (1) Additional support is provided for the impact of the large crew on the floor;
- (2) As tension is placed on the upper shrouds, both compression on the floor as well as loads in the hull are created. This is a point where deflection of the hull and floor is known to occur. I believe this combination of stiffening the floor and centerboard truck, as well as the placement of a carbon-fiber secondary bulkhead located between the floor and hull, work together to prevent such distortion;
- There is one other change in the floor that helps with the overall rigidity of the boat. The floor is flat; it does not roll up near the hull edge. The bonding of the hull to the flat floor with the addition of several secondary bulkheads makes for a very strong diaphragm. The adhesive we use for bonding all parts is Hysol 9460. The peel strength of this product is in excess of 3300lbs/in² or 232 kg/cm²;
- Aft of the centerboard is a centerline keelson between the floor and the hull, which is again BID taped to the centerboard trunk;

- A final point to bring to your attention is that the combination of all of the above structures bonded with strong adhesive work together to resist forward and aft bending loads.

Can you describe briefly how you produce/manufacture your FD ...

I use an infusion with vacuum-bagging process.



Simply put, the different materials are laid up in the mold. Then a plastic bag is applied and the air is drawn out with a vacuum pump. The vacuum pump is designed for 1 x 10⁻⁴ torr, which is a pretty serious vacuum (760 torr is one atmosphere).

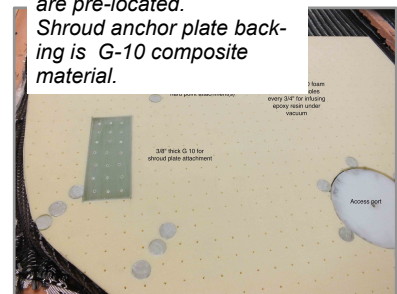


Then the epoxy resin is sucked into the part (into the voids where the air has been removed). Once initially cured, the part is then post cured for several days at an elevated temperature. Initially, there were a couple of issues we needed to overcome with this method. We enhanced our process, developed a couple of

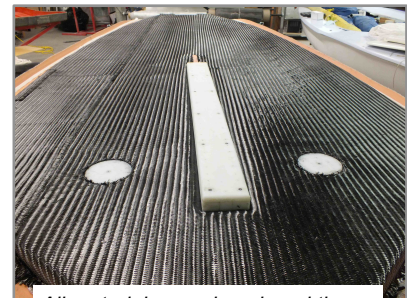
tricks, and done correctly produce the parts with the optimal ratio of epoxy resin since the resin replaces only the air voids created by the vacuum.

There are a few other items we do to help the manufacturing process along,

Hard points for hardware are pre-located. Shroud anchor plate backing is G-10 composite material.



1/8" x 3/4" diameter G-10 wafers are placed in the standard hard point locations as well as additional 3/8" thick G-10 for fastening the shroud bracket on the floor and support for the mast step, all prior to the lay-up.



All materials are placed, and then both infusion lines and vacuum lines are set in place. Release films and epoxy flow mediums are then laid in position. A layer of plastic film is then sealed to the edge of the mold. Vacuum is drawn on the part. Tested for leaks. Then infused with epoxy resin. After setting for 24 hours the part is then post cured at higher temperatures for several days.



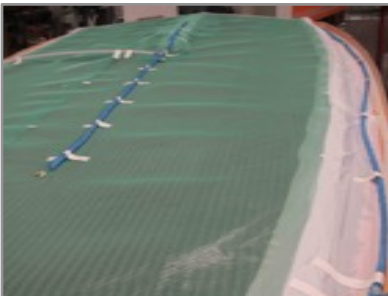
PACIFIC FLYING DUTCHMAN LLC by Ronald Stalman

Below is the result of this process. When bonded in place with a strong adhesive the end result is a very strong and stiff boat



Is your boat laid out any different than other manufacturers for skippers and crew ...

Not really, the rigging in the boat is current state-of-the-art



FD. We use good fittings and high-tech lines in the different systems. Custom rigging is an option.



*Samples of lines:
Genoa sheet*

Spinnaker sheet



Any feedback from, US sailors, Paul Scoffin?, Lin Robson?, or other parties ...

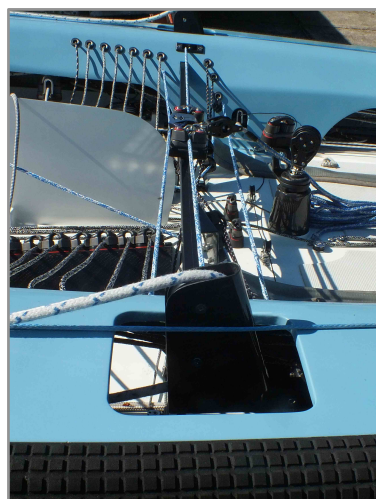
Both Paul Scoffin and Lin Robson have sailed the original prototype in major US regattas. One finished first, the 2010 US Nationals, and the other finished second in the same regatta in 2012. I received feedback from both sailors and have incorporated their thoughts into the most recent boat set up. These, along with other experienced FD'ers currently sailing the boat, all remark on the high degree of stiffness and responsiveness of the new boat.

How long does it take for you to complete a boat ...

It takes several months to complete a boat after it has been ordered and deposit received.

What is the price of a new boat in US-dollars without changes...

Presently the basic package without any spars (mast, boom, spinnaker pole) is approximately 25,000 US dollars.



This includes a completed boat with carbon-fiber centerboard and rudder, and control lines. Both consoles and mainsheet pedestal are exposed carbon fiber

with UV protection. We can rig, at the request of the buyer, any number of masts, booms, etc. at a reasonable cost. There seems to be a great number of opinions on the different spars.

Can you give us a brief summary of your philosophy in building boats ...

Build a boat that would be very competitive for not just a few years but for a lifetime. Provide the highest quality at a very competitive price.

Would you rather build a boat or sail it ...

My hat is off to all FD builders. There is a lot to building a quality FD. These boats have so much rigging and have to be designed to withstand such forces that by the time anyone finishes a boat there really is not much of a profit margin. I don't think anyone is getting rich off of building FD's. It is a labor of love. Saying all that, I do enjoy sailing an FD in 12-17 knots of wind on a warm sunny day.

What do you see as the future of FD sailing? Where are the boats headed ...

There are so many classes of sailboats out there that I am not sure where the FD is going in the US. The European fleet seems to be doing well, but I don't see that many younger sailors sailing the Flying Dutchman as needed to grow the fleet. There seems to be a regional surge of interest in the FD a bit more the past couple of years in the United States, but the focus needs to be towards getting the young sailors involved.



PACIFIC FLYING DUTCHMAN LLC by Ronald Stalman

The over-all cost of the FD does not help either, but neither is the Pacific Flying Dutchman a disposable boat. I sometimes wonder if it might help the fleet if the FD was invited to participate in the Olympics again. I am not sure of the pros or the cons of that consideration.

Any recommended changes to the FD ...

I am of the school that we do not need a larger spinnaker. The FD is a fun and easy boat to sail. It takes the coordination of both the crew and skipper with practice to make the boat sail competitively fast. By keeping a tight lid on the measurements the FD truly does test the sailing skills of its competitors. And I am of the belief anyone of the top Flying Dutchman sailors could successfully sail any large sailboat in the world today in competition. By sailing an FD, you learn to feel the effects

of the wind and waves on a boat in a manner that is not necessarily developed in other dinghies or larger boats.

Conclusive are we speaking of the Lindsay 2.0 or is it a total different design ...

My belief is the Lindsay FD hull design was and remains very fast and the boat structure was the stiffest of its time and obvious the most durable based on the number of Lindsay FD's still sailed competitively around the world today. I have the most respect for Mark Lindsay's hull design and accomplishments for both the FD class as well as the other boat designs he has been involved in. Greg Cole and I won the North Americas regatta several years ago in a Lindsay. I would say he had significant influence on our hull design. I also believe based upon today's superior building materials and practices our boat is much stiffer and

stronger but equally as balanced as the Lindsay in its day.

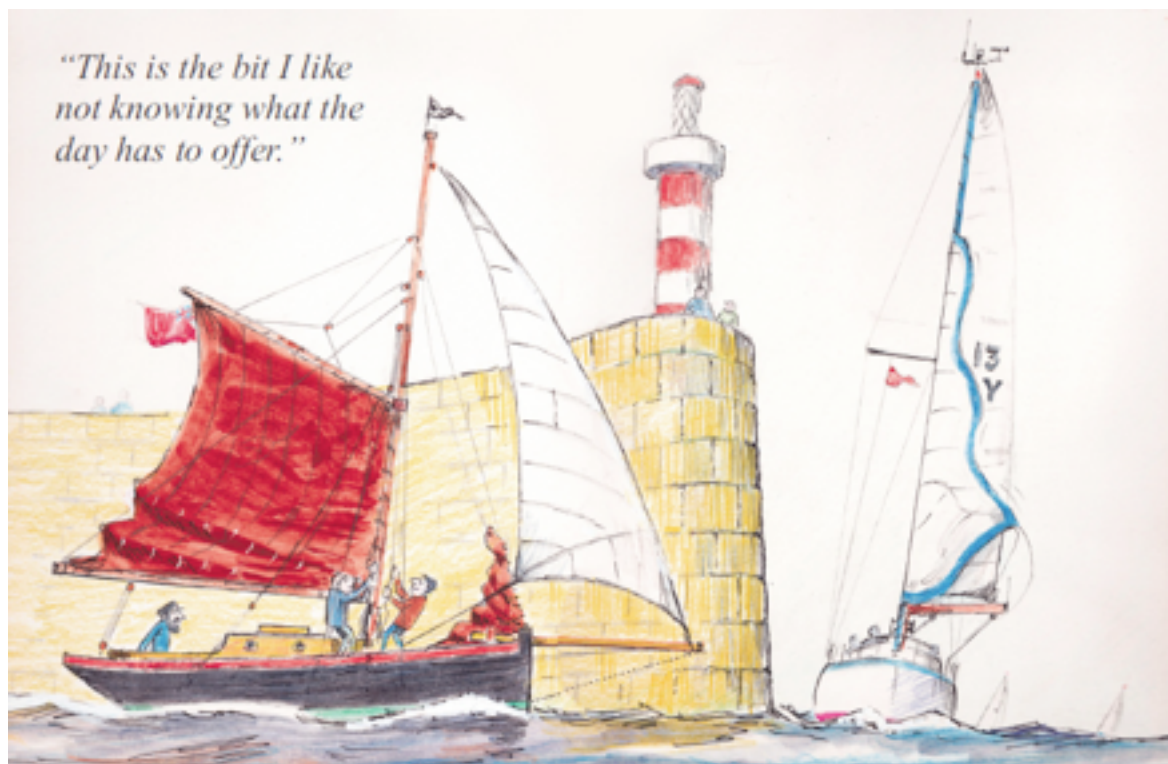
Are there any points/comments you want to finish up this interview with ...

I want to acknowledge a few fellow FD sailors who have contributed in large parts into this basic design. Greg Cole who is an aeronautical engineer helped enormously in the over all concept and design. Mike Meszaros has made innumerable contributions to the rigging. Doug Dommermuth on the hydrodynamics of boats.

You can also visit our site to receive more information, review this same article with enlarged photos for better details, and to view more pictures and as well as slideshows:

PacificFlyingDutchman.us

Thank You.





EUROCUP 2014

EUROCUP 1

Traditionally we kick off in Spain.

Date 20th – 22th March.



The Yacht club also suggested to extend the program with training possibilities in the week before the event. They will facilitate this training as well.

ALTEA training possibility

Date 17th – 19th March.

If you are interested in the Altea training facilities sent Jan Lechler an email about your attendance.

He will get back to you if it is a "go".

For detailed Yacht club information visit the club website



The National FD-Secretary (photo) of Spain is Enrique Egea Moreno, email:

eegea@activitas.es , phone 91 405 85 37

EUROCUP 2

For the 2nd Eurocup event we go to Italy.

Criterium di Pasque, Marina di Carrara.

Date 18th – 20th April.



EUROCUP 3, page 2 & 3

EUROCUP 4 KIELERWOCHE

This German event is on the series list every year so far.

Date 26th – 29th June.



Könige der „Fliegenden Holländer“:
Kilian König (re.) und Johannes Brack
holten schon fünf Tagessiege.

Last year de GER-113, Kilian König and Johannes Brack clinched the title.

With an impressive serie they made the headlines in the Kielerwoche news bulletin as in the local paper as well.

EUROCUP 5

This Austrian event is on the series list this year once again.

Date 15th – 17th August.



When the Austrian Nationals visit this venue we always schedule this event.

The Yacht club atmosphere is tremendous and they have places to stay for the night.

This year the Lake Garda event is scheduled before the Austrian Nationals so on your way back a stop here works perfect.



CARIBBEAN CHAMPIONSHIP by Ronald Stalman

Full story in the next Bulletin -

The first event of 2014 is already history. And it's the one just a few of us who gave their promise to attend showed up. I was one of them. And though I had to sail it as a guest crew. I can tell you all that you missed out a golden opportunity to sail in the most perfect conditions.



10 boats showed up, while almost thirty signed the petition to get Rob Taal - AHO 3 - sweating his ass off to make it happen. So after Hungary when the final word was out that it was a go for this event - though not supported by the IFDCO - Rob started his part of the job to make it happen.



By the end of June it was clear that all the promises made to show up were not kept. Many thanks for that on behalf of the once who already booked their flights and places to stay! Thanks to the stubbornness of Ernst Greten - GER 12 - and the perseverance of Ronald Stalman, Rob could continue his effort to make it happen.



The atmosphere was perfect. Sailing conditions more than perfect - wind 15+ knots, air temperature 28+C and water temperature 27+C -. So it was all more than worth our while to be there. The social program - supported by the air temperature in the evening's - was outstanding and the Sylvester eve party till early in the morning was memorable.

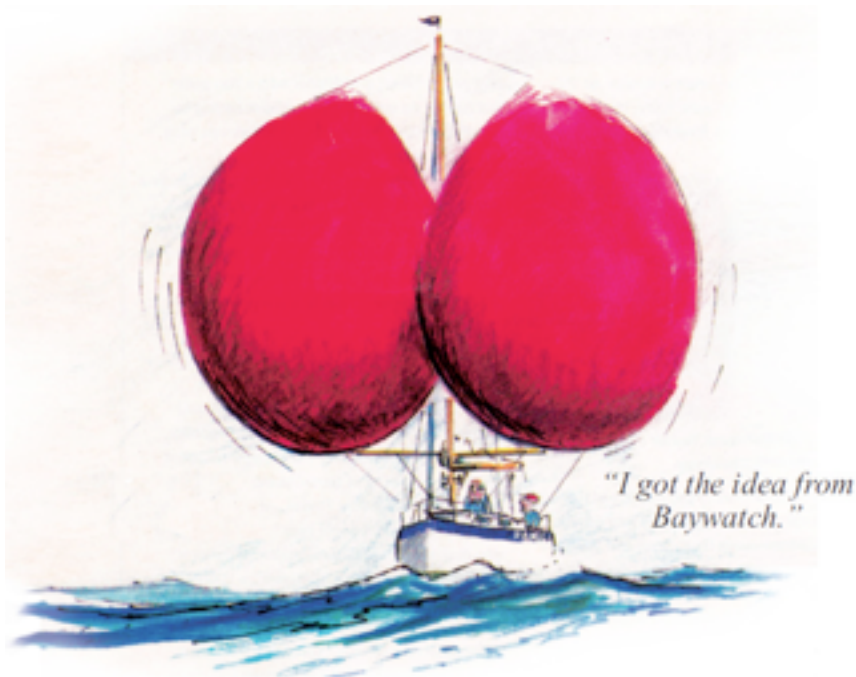


And I as VP-Communications can tell you know that the choice of a venue is more favorable for advertising the class than going somewhere where maybe 1 or 2 new FD's show up!

venue issue next Bulletin



MAKE IT BIG?



Sexy or just big our new kite?

In the 2012 Worlds Report (B159) there was this small paragraph:

However, immediately after that Edward Cox suggested we should consider a bigger spinnaker and this proposal met with considerable support, a show of hands suggested 50% in favour. It was therefore suggested that Edward and Killian should conduct some tests with 505 size spinnakers and write an article for the Bulletin. This was a topic of interesting discussion during the week with some very enthusiastic supporters but also many more conservative sailors expressing doubts.

Ed Cox (AUS7), our general secretary, didn't waste any time and as soon as he was installed in Italy he started sailing the bigger kite. He just took off with the suggested 505 spinnaker.

As soon as he flew the kite he shared his experiences with all of us on our [forum](#).



But the discussion of a bigger spinnaker is not only adopted to increase sails and make it more attractive or even spectacular for younger sailors.

What must and should be added to the discussion is that inside the event sailing community and also inside ISAF the discussion is raised to sail just up and down courses. This would be a drastic game-changer for the FD-class.

The latter discussion about changing the courses has started since it is as hard to find race-management as it is for IFDCO to get class-management. Sailing up and down courses is much easier to handle for the race-manager and it could lower event costs.

During the 2013 season and especially at the Worlds the spinnaker topic was discussed more often in the boat-park. And at the competitors forum JB stated that it was one of the "to be" discussed changes. So he asked everybody to raise their hands if we should give it a go. The answer was a 60-40% "yes".

At the Worlds the class-management has compromised themselves to write down a story with all things to be added to the discussion:

- does our mast support the bigger kite;
- must we enlarge the pole;
- is the spiro still in the right place;
- should we allow 2 spinnakers at races;
- other to be considered facts.

And should we just adopt a kite that is already on sale (the 505-kite) or should we look at a better shape of our kites?

So there is no simple yes or no to the question and we should consider all the pros and cons.

So the editor asked around in the fleet and here are several thoughts



MAKE IT BIG? by Ed Cox

Whether the FD adopts the bigger spinnaker is really a question of whether the increase will adversely change the boat or our racing. No one seriously suggests the bigger spinnaker is not more fun, or faster in the majority of conditions. We all know that the boat will be quicker on the tight reach, you are planning earlier and the bow lifts more when planning. In light wind it is faster, easier to trim in waves and you can sail deeper. The advantages of a deeper kite to the 505 dimensions are also unexplored and more testing is required to see if different shapes work in medium breeze going straight downwind.

So let's consider the common myths out in the boat park (mostly spread by people who have not tested the bigger spinnaker yet).

Masts reliability. Will we break more masts with the big spinnaker?

In fact the opposite is true because the halyard exit need not be raised and the spiro can be lowered. With the spiro lowered the load from the pole on a shy reach is closer to the vang and lowers, thus better supported. So the loads on a shy reach will be better supported provided we don't move the spinnaker halyard.

I am not saying no one will ever break a mast with the bigger kite, but bear in mind most failures I saw in the 2013 season were caused by poor fit out or not enough reinforcing where holes are cut in masts.

No changes to the existing carbon masts are required for the bigger kite, except perhaps to

lower the spiro. The carbon masts we use are strong enough.

Triangle courses.

The simple answer is we sail the course we want to and the FD can keep doing the traditional triangle course with the bigger kite. Under 15 knots there will be no change. On windier days with the bigger kite a triangle is still possible, we simply need to move the gybe mark in 5 to 10 degrees from the traditional 45 degree course. I also remind the sceptics out there that the gybe angles on both legs are rarely even anyway, and sometimes the wind shifts so we can only carry a spinnaker on one of the legs.

Additionally, it should be observed that the 505 still does a triangle course, it is just that they often do the run first and the triangle second.

Will it favour heavy crews.

The simple answer is NO, when looked at across the average of all conditions we race in. We should all remember that the lighter crews have an advantage in marginal trapezing conditions when the big crews are sitting in down the reach. So I think this balances out.

Will the boat be harder to sail.

My experience is to the contrary, but we all need to try the bigger kite for ourselves. I would particularly congratulate the German class on their approach to the current test rule. The reports published on the German website from their tests tell the story. Read for yourself.

My impression is that it is no harder to sail, and in many respects easier. In reality the boat is moving faster which changes the apparent wind more, and as a consequence the load on the spinnaker sheets is less. The bow lifts more when planning and the boat is stable.

Perhaps the only time it will be harder to sail will be coming out of a slow gybe on a windy day, but that is always true if you have a bad shy to shy gybe.

That only sailmakers will benefit from the change.

What is proposed is a staggered change with 1 or 2 years notice in advance. So people can plan their next spinnaker purchase for the changing rule. For those crews who rarely buy new spinnakers there will be the option of a second hand kite from the 505 class, which is a good cheap option.

That there is no evidence the change will increase our numbers, we may even lose some older sailors.

This is a difficult issue and one which requires careful management of the change. We do not want to lose any of our existing fleet, but on the other hand we need to attract younger sailors and keep the boat developing in a positive way.

As mentioned above, there will not be a sudden change which makes half the fleet uncompetitive, but a gradual phasing in with 1 to 2 years notice. This will allow a smooth transition and minimise the costs of the change.



MAKE IT BIG?

From the publicity point of view, it is hoped that a bigger spinnaker and better downwind performance in planning conditions will attract more younger teams. Whether it is a fair or not, some sailors are attracted to high performance dinghies with more downwind performance, like the 505 (I am excluding the skiff classes from my comparison).

By way of contrast, we as a class should look at the positive affect of the switch to our current spinnaker and to the carbon mast. Both are examples of gradual developments which have improved the FD's performance without making half the fleet uncompetitive or disillusioned. Many argued against both changes in prior years, but I have never met anyone who now advocates a return to aluminium masts and a smaller kite! From a personal point of view, one of the reasons I came

to the FD class was that it had embraced the carbon mast earlier than other international classes. When I race my FD in a mixed fleet and talk to sailors from other dinghy (non-skiff) classes the feed back I continually get is, the FD is a great boat and fast up wind, but the kite is small and they could be faster downwind like the 505.

Before just say no without any research and development, say yes to the possible innovation.

Ed Cox

Dirk Bogumil's contribution to a bigger kite...

Two hearts are pounding in my chest. At first I'm the vice-president of the German FD-class and one of my jobs is it to sure the longevity, pay-ability and normal easy handling of the boats. But otherwise I also mustn't forget the development of the class. I have to get my personal interests to the end of the line of the interests of the whole FD-class. My mind is, we have to test the bigger kite and if it is better, faster and not harder to sail with the new kite and also we have not to change a lot of things in the boat and on the rig, we have to take the new bigger kite. But if it is impossible to sail with the bigger kite for small crews or to sail normal rich courses and if we need a lot of money for refitting of the boats I'm against the new kite.

FLYING 2015 DOWNUNDER



MAKE IT BIG?

John Best's contribution to a bigger kite...

In recent years we have discussed the bigger spinnaker option, and the most obvious "stock" replacement spinnaker is the new 5o5 spinnaker, it would almost certainly be a bit cheaper to adopt an existing spinnaker rather than develop our own new shape. There are, of course technical issues attached to any change. Initially, the existing masts are expensive enough as they are and it makes good financial/technical sense to leave the spinnaker halyard top exit block exactly where it is, and move the Spiro type fitting down the mast to level with the gooseneck. This ought to knock a few € off the price, because the Carbon engineering around that area of the mast will get simpler. This makes heaps of sense to any engineer, it puts all the lower mast push /pull loads acting in one place so there will be minimum mast distortion sideways or along the centre-line, the potential mast inversion issue is lessened as well. It means that the gooseneck area gets a bit "busier" but it would be a neat solution and allows us to easily lower the Spi pole to give the bigger spinnaker more room to fly and breathe.

Now, the three sail reaching issue, one of the greatest joys of sailing FD's has always been screaming three sail reaches, while James and I used to enjoy sailing the FD upwind, because

with his size and weight we were fast, once I had learnt to sail an FD upwind, that is. We did however, get to really enjoy those three sail reaches enormously, so my view is that we should try not to fall into the regatta management expediency of sailing only Windward / Leeward courses only.

I have sailed a fair few of those in Asymmetric boats, specifically RS 800 and the Laser SB 3 Sportsboat with it's huge 43 sq metre asymmetric spinnaker. It was fun, but not as much fun as an FD on a three sail reach, not in a million years, I only stopped sailing FD's because my knees gave out, not because I was bored.

My view, try to stick to a triangular course, maybe deepen the reaches if it gets windy, keep the present course geometry until the forecast wind hits 15 knots or so, then just deepen the reaches by 10 or 15 degrees. It is entirely possible to have a mix of courses at a championship anyway. Maybe if the breeze is cranking we sail Windward /Leewards, but if it is a nice 12 to 15 knots we sail what we have now.

This aspect of sailing with the new spinnaker is the most interesting for me, how much will it make us change the way we sail Our beautiful boat, so we need to get front / middle and near the

rear of the fleet sailors to get out there and try it, the new larger spinnaker that is. Personally, I 'd like to see it happen, but that we just get a bit more flexible about how we sail the boat.

Hungarian contribution to a bigger kite...

At the 2013 World Championship we were informed on plans regarding the use of a larger spinnaker. No further details have been spread since then, including publicly declared internet voting.

As for our views, such a change would result in a substantial increase in general costs as both mast and spinnaker pole should be redesigned along with the sails. Moreover, wind range that properly suits FD would suffer unnecessary limitations as well as competition options. We strongly believe that such an initiative would badly affect the pleasure of sailing FD.

Another point of consideration of its effect on less experienced competitors due to a higher probability of capsize and more difficulties in handling, resulting in an even bigger gaps within fleets. Therefore, the Hungarian fleet strictly sticks to current measurement regulations.

Smooth sailing.

Hungarian FD Association



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MAKE IT BIG? NED-311 CONTRIBUTION

Through the grapevine, rumors have reached me that certain members of the IFDCO are concocting proposals to change the FD. Perhaps these rumors are just that, rumors, and hence totally unfounded. In that case this letter is not worth the paper it is written on. On the other hand if it is true that where there is smoke there is fire, this calls for a timely reaction. So, just in case, here is my reaction.

Apparently the proposals are to 'modernize' both the rudder and the spinnaker and to prepare changes to the class rule to facilitate these actions. To put it bluntly, I think that both proposals are singularly lousy ideas.

Let's start with the rudder. I am not sure what changes the people who propose this have in mind but presumably the blade of the rudder is to be replaced by one with a better hydrodynamic performance. Do we need such a new rudder? I don't think so. The present rudder is sturdy, no breakages have occurred recently as far as I know. Does the present rudder function poorly? Does it show unwanted tendencies to stall, does it fail to make the boat turn left or right when we want it to turn left or right? Not to my knowledge. So why change? At best it will set sailors who go along with the change back financially, by the better part of €1000. What will be gained? Perhaps the new rudder owners will find themselves sailing marginally faster. Those who don't go along, per-

haps because they do not have money to burn, will consequently be at an unfair disadvantage. So the whole idea only makes the boat more costly and decreases fairness in competition. It does not solve any problem, it just creates one. I say, 'if it ain't broke don't fix it'.

Now for the 'modernized' spinnaker. Basically the same arguments just put forward against changing the rudder apply to the spinnaker. Money wasted on something we don't need and a less fair competition. But in addition there are some technical issues. Older boats often have rather narrow spinnaker chutes. It already requires some hefty pulling to get the kite down and back into its burrow on these boats. With a bigger sail this may easily become an all but impossible task.

A costly rebuilding session may be needed. Also, a higher aspect kite implies a lower boom. As a consequence the spinnaker pole will be dangling uncomfortably below the boom on points of sail where the spinnaker is not used. Not very ergonomic for the crew when tacking to say the least. Finally, a bigger kite invariably means that the boat will be even harder to handle for light-weight crews.

Apparently the argument for these changes is two-fold: first, the FD is purportedly a 'development class' and therefore in need of regular 'modernization' and second it needs to be kept attractive for new, young, sail-

ors. Nonsense. Of course the FD is *not* a development class; those classes have a very free set of rules that allow for a wealth of experiments to be conducted, all within the existing rule structure. The FD is a one design class. Changing the rules all the time to allow for new gadgets is not the hallmark of a development class. Development classes are for example the Moth or the international 14. Do FD sailors really like to be mentioned in one breath with these floating freak shows? I doubt it. The FD's forte is, quite contrary, its tradition; it distinguishesable forestay angle, it's absurdly large and outdated but very characteristic genoa, etc. Let's keep it that way, so far it has survived 60 years of competition by the modernizers. Finally, there is the issue of attractiveness to young sailors. In my experience these youngsters tend to buy second hand, somewhat older, boats. They often have limited budgets. If the changes are to be adopted they face the fact that their newly acquired boat is out of date the second they buy it. I don't think these guys will be overjoyed when immediately faced with a costly refit. As it stands the FD with its countless fittings and controls is already a rather intimidating machine.

In all, to summarize, I have to say: 'forget it, cut the crap, let's get real, let's get sailing'.

AMSTERDAM, Tom Hijmans
(helmsman NED 311)

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2013 Match–Race Berlin by Ronald Stalman

For the 6th consecutive year the Berlin Match–Race has been sailed on the weekend of 9 & 10 November.

And this years edition was totally different from the 5 series before. Because there was a lot of wind. Windspeed up to 25 knots. So it was good that only the best of the best got an invitation. Because that is what it is all about getting an invitation by Jens Schreiber the driving force behind this fantastic 1 day event.

I always ask myself how Jens gets people so crazy that they want to travel up to 8 hours? To get a dysfunctional FD to sail a course with only 2 marks and a length of a quarter of a mile? And why there are still people in the dark and don't know about the event at all. It can't be because the event is lacking atmosphere! It isn't be-

cause there is always bad food and no bear!
No none of that at all it is because it is the best fun event of the year.

It starts on friday evening 19.00 hours in the clubhouse. Everyone involved attending the meeting to get familiar with the rules of the next day. Rules so totally different from our normal FD–racing. Because it is boat to boat match–racing the next day. A sailing discipline were you are chasing your opponent. Try to let him score penalties. Where you don't want him to get to the starting line. Lengthen the course by not picking the good shifts and beats, but just try to defend that the other boat get to the marks and finish–gate first.

On the next day the racing starts punctually at 9 am. It is always cold. The boat is someone else's boat you probably

never sailed or seen before. Decent FD's but unfamiliar handling. And if you haven't been in the gym enough lifting and pulling weights you could be in serious trouble! Like mr. Kramer knows all about after the selection races. Yes even a world champion is a sitting duck in this event.

This years among them were: the world champion team, the Borrowski–brothers, the Bahr–family, the Bojsies, the Austrians, the bass–player and his crew and 4 more teams. Want to know all about the event, names & numbers and the atmosphere? Just visit the facebook page of the Dahme Jacht Club Berlin.

And Jens always is able to find sponsors, without them it is a mission impossible. One of them is Werkzeugbau Muschke making Fivestars–blocks and more (see below)

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- Winschen
- Ruderanlagen
- Poller, versenkbar
- Rodkicker

Achtung: Alle Beschläge im Internet

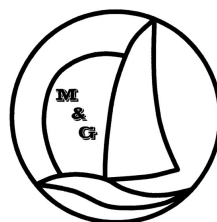
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INTERVIEW WITH DIRK BOGUMIL by Ronald Stalman

Website:

www.bogumil-yachtservice.de



Tell us about yourself ...

I was born in Rostock and since 1985 I'm living in Berlin. I have a 17 years old daughter. Next year I will overstep the magic 50 years - border.

From 1983 - 1989 I studied political economics and I worked from 1990 to 2003 in several banks as a consultant for business financing. In 2005 I founded my company Bogumil Yachtservice with the takeover of the FD-moulds from Uwe Steingroß.

Since 2008 I'm a managing director and partner of the BBG Bootsbau Berlin GmbH.

My sailing career...

I started my sailing career in 1972 in an old wooden "Optimist". In the former GDR I sailed "Cadet", "420", "470" and for a short time "FD". After sailing of a long time in the "Pirat"-class (from 1989 - 2005) I started my FD-career in 2005 with the participation

at the World Championship in Hungary. In all classes I won a lot of titles and medals at German, European and World championships.

My FD-building...

In 2005 I worked a lot of time together with Uwe Steingroß.

I helped to issue his second and third Steingroß FD-hulls.

We worked very hard, because we had only a short time before the beginning of the 2005 worlds. One day in the evening Uwe asked me, to take over the FD-building in my hands. I didn't have a job in this time and after the 2005 worlds I was agreed with his proposal.

All FD-hulls were built in the BBG Bootsbau Berlin GmbH and the fitting out of the boats are in my workshop, because the BBG is a classic boatyard and not a yacht service.

Since 2005 I have built 18 boats. At the moment I'm building the boat no. 19 and 20. Building of FD's is handwork and so you need good boat-builders and a lot of time.





INTERVIEW WITH DIRK BOGUMIL by Ronald Stalman

The boat-builders has to work very exactly and they need a long experience because it is very difficult to handle the modern materials carbon, honeycomb, Kevlar, epoxy-resin etc. All parts of my boats are building under vacuum (hull, double bottom, deck, rudder and centerboard). Also for fitting out of the boats I need a lot of time, because a FD has a lot of special fittings.

Tough parts...

The tough parts of constructing FD's are the centerboard case, the shroud fittings in the hull and the weight distribution. I learned the hard way in the first years of FD-building and without my job in the BBG it would be impossible to build more FD's. But now I'm thinking I'm on the right way with my boats.

After each regatta my boat comes in my workshop and if I have a new idea or I saw a mistake, I modify just my boat. All my new findings are come in in the next new boat.

Significant alterations...

This is very difficult question. I'm thinking, the FD-hull is a very good construction. A FD is fast, long-living and looks modern and very nice. It is possible to build a very stiff and light hull with the new modern materials (carbon, Kevlar, honeycomb, epoxy-resin etc.). But what is the best way? Maybe, is it better to build a more stiffer hull for flat water conditions or a

more softer hull for short and hard waves? I'm thinking it is impossible to build the optimum boat for all conditions and crews. Anytime it is compromise between the numerous possibilities.

Bigger kite...

Two hearts are pounding in my chest. At first I'm the vice-president of the German FD-class and one of my jobs is it to sure the longevity, pay-ability and normal easy handling of the boats. But otherwise I also mustn't forget the development of the class. I have to get my personal interests to the end of the line of the interests of the whole FD-class. My mind is, we have to test the bigger kite and if it is better, faster and not harder to sail with the new kite and also we have not to change a lot of things in the boat and on the rig, we have to take the new bigger kite.

But if it is impossible to sail with the bigger kite for small crews or to sail normal rich courses and if we need a lot of money for refitting of the boats I'm against the new kite.

Famous last words...

Every time in my childhood and youth it was a dream of me to build my sailing boats by myself. This dream come true in 2005 with the building of FD's. The FD is best classic two person trapeze jolly on the world and I hope we all will sail this nice boat for a long long time. A lot of new boat classes are coming and going, but the FD are living since over 60 years and I hope the FD will be living the next 60 years.





CHARTER BOATS by Ed Cox



Expressions of interest are sought from any non-European FD sailor who wishes to charter a boat for the upcoming FD worlds in Largs.

At the AGCM in 2013 a decision was made that:

The national secretaries of Germany, the Netherlands and Italy are each to be approached to provide either their class promotional boats or appropriate charter boats to be made available at European

World Championships to support and assist non-European competitors who cannot ship their boats in a container from their home country. The approval for each charter is to be on a case by case basis.

On a case by case basis the IFDCO will give a financial subsidy to non-European sailors to charter a boat for a European World Championship where it is not possible for them to send a container from their home country. The amount of the charter subsidy is to be equivalent to the amount which would otherwise be provided to part of a container.

There are no suitable charter boats available within the UK, so any boats must come from either Europe and transport will need to be arranged on the limited number of double trailers. As the number of boats will be limited, it is requested that all interested persons submit a request by email to the [IFDCO](#)

[Secretary](#) at eghcox@16wardell.com.au by 14 February 2014. Once all expressions of interest are collected and the number of available boats are known, a decision will be made on boat allocations and the IFDCO subsidy.

If any European sailor wishes to charter their boat to a foreign team, could they please advise the IFDCO Secretary of the boats details (including age of hull, builder, condition, mast foils).

This scheme is intended to support non-European teams attend the worlds. Many sailors outside Europe find it difficult to travel to world champions because of the cost of shipping their boat and the difficulty of filling a container with 4-6 boats. It is in the interests of the FD class as a whole that international participation from other continents is encouraged and supported with the maximum participation from different parts of the world. Your support and assistance with the charter scheme is requested.



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NATIONAL NEWS by Julian Bridges



2013 International Flying Dutchman class British championships, hosted by as part of Bassenthwaite Week.

The British Section of the International FD class enjoyed the great hospitality and atmosphere of Bassenthwaite Week for their 2013 National Championships. The event was won by Jon Williams and Alex Rogers with six firsts from the eight races.

The first two races were sailed in a savagely gusty and shifty force five, which saw the majority of the fleet swimming, and with several retirements. The probable shape of the event became apparent as Strang and

Alex took two firsts from Glyn Sheffield and Chris Rutter who were sailing their brand new Bogumil boat.

Sunday was marginally more civilised, although the breeze was still all over the place, completely with powerful lake district gusts. Tony Lyall and Colin Burns, sailing a brand new Mader, got second in the first race, while Julian Bridges and Jack Wild in their thirty year old wooden boat got the second in the afternoon, after a swim in the morning.

Monday morning saw the class AGM, mainly discussing the 2014 Flying Dutchman World Championships, which will be

hosted in Largs next July. This was followed by a long distance race utilising the whole three miles of Bassenthwaite lake, in a lighter and steadier wind. Glyn and Chris and Julian and Jack were overlapped at the far end of the lake after a long run down, before a long battle back, during which Rosie and Neil Pye used the shifts better than anyone else to record their first Nationals race win, from Strang and Alex.

Another two firsts for Strang and Alex won them the event on Tuesday with, while Glyn and Chris and Julian and Jack shared the seconds and thirds. The breeze was lighter, still shifty, and with over 100 boats of all classes from FDs to Mirrors, the lake was a fine sight in the sunshine, although avoiding competitors in other classes kept everyone on their toes.

The final act on Wednesday saw the race postponed for coffee and cake while the majestic Skiddaw was reflected in the glassy surface of the lake. Eventually a light and very fluky breeze meandered its way across the water, allowing a slow and tense race to start. This time Julian and Jack worked the shifts and puffs to lead Glyn and Chris home.

Julian Bridges





Dr. Gizmo

The mystery of how hydrofoils work

Dr. Gizmo's Physics Chat Corner

I suspect that, secretly, you all watched some of the action during the last installment of the America's Cup finals. Maybe you think this regatta was the epitome of sailboat racing. On the other hand, you may well see the whole circus as a most abominable demonstration of commercialization and a disgrace to the sport. Regardless of your, and in fact my, opinion on the merit of this event, we cannot deny the fact that from a technical point of view the cup final introduced a new and interesting novelty. It was for the first time that such large boats competed in a match race while successfully using hydrofoils. Moreover, the foils had been added almost as an afterthought.

Let's have a close look at how these foils work. In fact, it seems miraculous that the huge monsters, which look more like oil-rigs¹ than like sailboats, can maintain a stable level flight one meter above the water for most of the time, with such low-tech hydrofoils which offer lim-

ited possibilities for adjustments. What's the secret?

The basics are simple. The hydrofoil works the same as an airplane wing (airfoil): for a given shape, angle of attack, and camber the (air)hydrofoil creates an upward force perpendicular to its direction of motion, the lift force. This lift increases with speed and, crucially, is directly proportional to the density of the medium through which the foil is moving. Because the density of water is roughly thousand times bigger than that of air, a hydrofoil can create a lot of lift at modest speeds and the foil can remain rather small. A few square meters of foil area suffice to lift a seven ton monster completely out of the water at speeds as 'low' as 25 knots.

So far so good, so what's the mystery? Imagine the boat is traveling at a speed where the foil provides just enough lift to balance the weight of the boat. As soon as the hull leaves the water the water resistance is dramatically decreased (this is the whole point of deploying the foils in the first place). The reduced drag means that the boat accelerates and the result is that the lift generated by the foils also becomes

bigger. So as the foiling boat speeds up the foils can quickly generate a few tons more lift than is needed to keep the boat levitated. The result is an uncontrolled upward launch of the boat, which only stops when the foils themselves pop out of the water, at which point the lift suddenly drops to zero. After this the boat will fall back into the water, probably in a highly uncontrolled manner resulting in pitching, capsizing or both. Not a nice perspective at these speeds. The whole mechanism seems intrinsically unstable.

In reality the above sketched scenario is not observed. Apparently there is some stabilizing mechanism at work which causes the boat to be levitated to a fixed distance above the water. So what is it? The short answer is that we are saved by the fact that the lift generated by the foil becomes smaller, and its resistance bigger, as it gets closer to the surface. This means that the faster the boat moves, the foils move up closer to the surface up to the point where the reduction in lift is just sufficient to provide an exact balance between lift-force and boat weight.



Dr. Gizmo

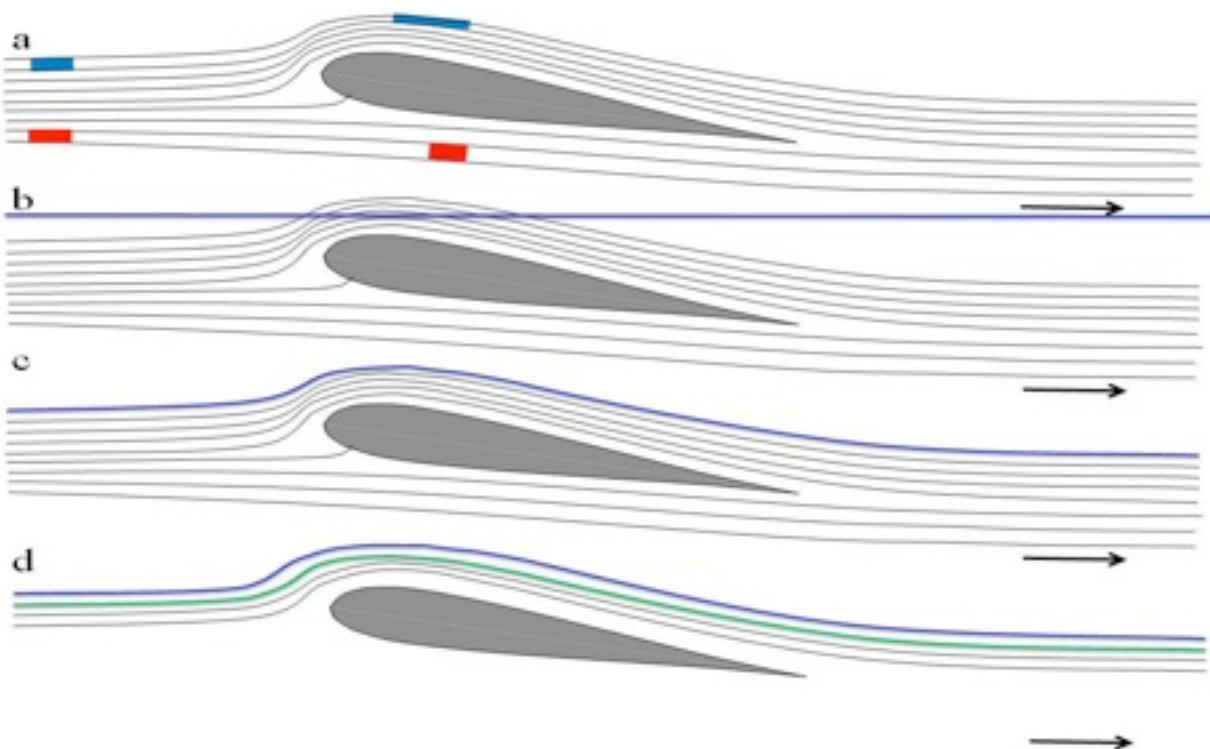
This phenomenon was clearly observable in the videos of the America's cup: when sailing upwind at lower speeds, the hulls of the boats were just barely out of the water. When the boats were reaching, the speeds increased and concomitantly the boats lifted further out of the water.

To wrap up this story let me try to explain why the lift is reduced as the foil approaches the water surface.

Let us recap the basics of airfoil theory. The lift force on a moving air(hydro)foil originates from the pressure difference between the top

and bottom surfaces. In turn, this pressure difference is due to the difference in flow speed of the fluid above and below the foil (faster motion = lower pressure, slower motion = higher pressure). This can be visualized with the help of streamlines as is shown in the top panel (a) of the figure above. These streamlines (just a few of them are shown) indicate the path that a water particle will follow. In this figure, the little blue rectangle at the left is a small 'chunk' of water squeezed in between two adjacent streamlines. A short time later this same chunk of water has arrived

overhead of the airfoil. At this position the streamlines are closer together and, consequently, the chunk becomes narrower and therefore longer. If we imagine the water flow as a conveyor belt of such chunks of water it is clear that where the streamlines are closer together, the chunks of water have to be moving faster to make room for the next chunk. Obviously, below the foil the converse is true, the streamlines move apart and the chunks slow down (red rectangles). So this explains the speed difference responsible for the pressure jump across the foil.





Dr. Gizmo

Panel a in the figure depicts the situation for a foil which is submerged deep beneath the water surface. What happens if the foil is located just a small distance under the surface? Let's look at panel b. Here the blue line indicates the position of the water surface in the absence of the foil. The situation shown here is clearly nonsense: some of the streamlines are above the surface. So let's change the figure to the situation shown in panel c. Here we have drawn the same streamlines as in fig. 1 a but the water surface now coincides with the top-streamline. The surface bulges up together with this streamline. Still something is

wrong: along the upper streamline there is still a pressure drop just above the foil by the same argument as given above in the description of panel a but this cannot be right. We know that the pressure at the surface must be equal to the atmospheric pressure everywhere. Finally in panel d we show what really happens. There is still a bump in the water surface but now the streamlines are drawn in such a manner that their distance remains constant close to the surface (the blue and the green streamline are at a constant distance). This implies that some of the streamlines which were above the surface in the

deep water case have now been deflected from passing above the foil to below it. The result is that the pressure drop above the foil is reduced and, likewise, the pressure increase below it has become less. So the total lift force generated by the foil in shallow water is less than in the deeply submerged case. In summary: at any speed there is a foil-depth at which the lift exactly balances the boat weight. The submersion depth of the foil will self-adjust to this stable position. All the sailors have to do is sit back, relax in their cockpits and enjoy the smooth ride.

Improve boatspeed shape your own foils

One of the easiest ways to improve boatspeed is to acquire a new set of foils, the center- or daggerboards being more important than the rudder.

Why use wood for foils?

Although materials such as PVC foam are being used now in some high performance classes, wood is still the most widely used material. Why wood?

Wood is relatively inexpensive and most people have

some idea of how to work with it. It takes adhesives and finishes as well. Additionally wood has excellent stiffness to weight ratio. Exactly what good foils require, as well as outstanding fatigue resistance. But it needs a protection moisture to keep it dry. Microscopically, wood is like closely packed bundle of parallel drinking straws. This is what gives wood its stiffness and high bending strength. Wood is nature's own undirectional material. For foils it is most

important to have straight grain with no knots and the wood should be ideally be kiln dried for the best stiffness and dimensional stability. The stiffest wood foils have straight grain and certain woods are selected for fewest defects, Western Red Cedar and Spruce being obvious examples. Plywood is generally less effective since up to half the plies usually have grain orientated in a direction which is of little use in contributing to a stiff foil.



Foils construction guide

Foil Design

Ways In Which Different Woods Are Used

There are four basic designs used today:

1. Relies on the wood to provide all the strength and stiffness required. Here a relatively strong, stiff and heavy timber such as a mahogany is usually selected. For some cases plywood may be adequate but will never be as stiff.
2. Uses the same wood as in (i) but the entire surface is sheathed with a lightweight woven glass fabric reinforcement (usually a single layer). This will give considerably enhanced resistance to surface damage and abrasion and a little extra stiffness though the improvement in stiffness will not be significant.
3. Uses a combination of a low density wood such as obeche, cedar or spruce together with mahogany to achieve an overall weight reduction without a significant loss of stiffness. These foils must be sheathed with woven glass to strengthen the lighter wood particularly.
4. Uses the wood predominantly as a 'core' material, which is sheathed with load-bearing fibre skins such as E-glass, or better still carbon, to provide the strength and stiffness required. The wood in this case can be a very light type such as obeche, yellow pine, spruce or even balsa but Western Red cedar is probably most widely used. More dinghy classes now permit this type of construction. Where mahogany has been traditionally used, changing from a tropical hardwood is preferable on both ecological grounds and for ease of shaping. It can also be kept reasonably inexpensive if glass and not carbon is used as the main reinforcement.

Which Wood?

Table 1
A Comparison of the Stiffness (given by Youngs Modulus E, Parallel to the Grain) with Density, for a Range of Wood Species

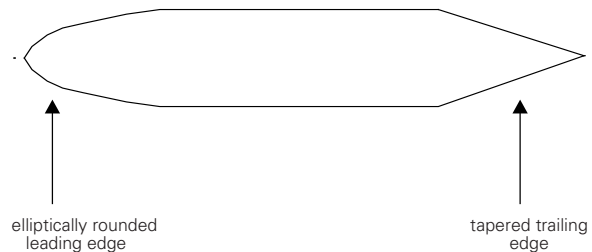
Wood Type	Youngs Modulus E, parallel to grain (N/mm ²)	Density (kg/m ³)	Specific Stiffness (stiffness per unit weight)
Balsa	4391	170	25.8
Western Red Cedar	8403	320	26.3
White Pine	9387	350	26.8
Spruce	11880	370	29.7
Kyaha Mahogany	11430	480	23.8

It can be seen that, in general, the heavier the wood, the greater the stiffness. Stiffness per unit weight (specific stiffness) becomes a 'constant' figure (approx.) and therefore this allows one to predict a wood's stiffness if its density is known.

Section Shape

Some classes have a rule restriction on streamlining which limits the amount of edge fairing and bevelling, keeping most of the section parallel-sided:

Fig 1 - A Parallel-sided Foil

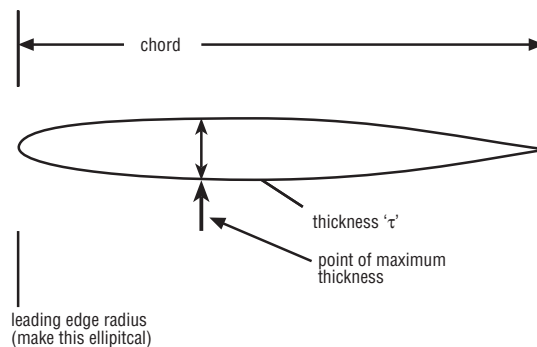


eg: Mirror, 420, 470, Enterprise, GP14

This type is by far the easiest to shape and most classes allow a fully laminated structure for maximum stiffness. However, a few classes still restrict the owner to using plywood which although not the most efficient, does help to obtain symmetrical shaping.

The fully streamlined section is the most efficient and satisfying to construct since there are many variations that can be tried within the class thickness restrictions. Generally it is best to use the thickest section which the rules permit. Other design considerations relating to section are: leading edge radius, trailing edge dimensions, thickness taper and section characteristics:

Fig 2 - A Streamlined Section Foil



eg: 505, Merlin-Rocket, National 12, International Moth, Graduate

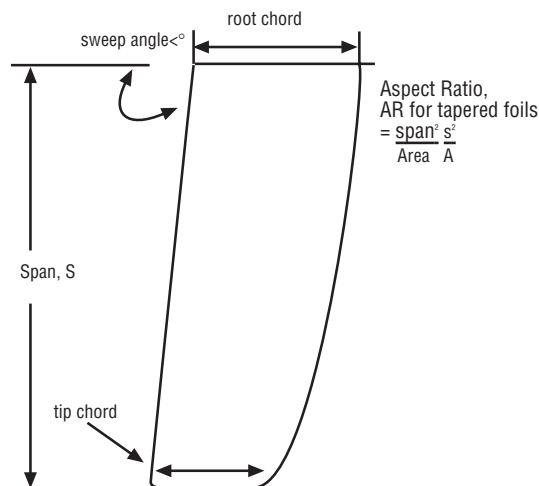
Use NACA-00 Series sections, a typical one being NACA-00-08 (8% thickness to chord ratio). Plot the shape for various stations down the span from the data given. Transfer on to graph paper and then to templates made from Formica, 4mm plywood or hardboard. You will require about 3 or 4 of templates per centreboard. These can be kept for future reference to either check the section periodically or to make a copy.

Plan Shape

Plan shapes can sometimes vary within class measurement parameters but if it is unrestricted the best are generally elliptical. Other considerations which can affect performance are aspect ratio, plan taper, area, tip shape and sweep:

Foils construction guide

Fig 3 - Some Foil Parameters



Full information on foil design can be found in reference books on foil design.

Materials

Epoxy Adhesives

All wood used, whether high or low density types, should be laminated in 38mm - 50mm strips glued with an epoxy adhesive. Appropriate SP Products are SP 106, SP 320, Ampreg 21 or Spabond 370 systems, using the appropriate Fast hardener and thickened with SP Microfibres. Spabond 370 being the exception as it is pre-thickened. Epoxy has qualities which make it far superior to other glues such as urea-formaldehyde or resorcinol as it is non-shrinking, gap-filling, clear, tough, and does not require pressure to give a good bond. To ensure the best bond for all woods, especially softwoods, glueing faces should be either unplanned or roughened before applying adhesive.

Epoxy Laminating Resins

Epoxy rather than polyester systems are essential for laminating as they have the necessary adhesion and toughness. Either Ampreg 21 for laminating or SP 320 is suitable, the latter being far preferable if a clear finish is required. Both systems give excellent fibre wet-out, adequate working time and the appropriate mechanical properties. Use standard hardener with Ampreg 21 and slow hardener with SP 320. Avoid using a fast hardener if possible unless you are skilled at using the products and appreciate the short pot life and working time available.

Reinforcement Fibres

The following types of fabrics and styles are appropriate:

- (i) Plain sheathed foils
 - woven E-glass, usually 165g - 200g/m²
 - eg: RE165T (165 g/m²) or RE210 D (210 g/m²)

Either RE165T or RE210D is suitable for clear sheathing.

- (ii) Foils requiring structural sheathing
 - unidirectional carbon, 200 g/m² - 300 g/m²
 - eg: UT-C 200/400 (200g/m²) UT-C 300/400 (300g/m²)
 - unidirectional E-glass
 - eg: UT-E250 (250g/m²)

These foils also require a woven E-glass (one of the aforementioned) over the outer surface.

Why Unidirectional Fibres Are Necessary

Although wood is a stiff material for its weight (high specific stiffness) and somewhat better in this respect than glass, even the most dense timber is not superior to carbon which has the highest specific stiffness of all available fibres in boatbuilding.

Table 2

Relative Stiffness Values of Wood vs. Synthetic Fibres

Material	Specific Stiffness (Youngs modulus, E)
Kyaha mahogany	23.8
Western Red Cedar	26.3
E-glass	18.7
R-glass	22.1
Carbon	71.5

Carbon is approximately three times stiffer than wood on a weight basis, so it is worth substituting carbon for wood where necessary. The necessary stiffness down the span can be built up by using an appropriate number of layers (laminations) of unidirectional glass or carbon. Those with an engineering background could work this out from first principles but to help everybody (including the author) an example has been prepared of what can be achieved using different woods and different reinforcements (see Appendix).

Stiffness across the chord can be achieved by using a woven glass reinforcement where 50% of the woven fibres (weft) will be orientated at 90° to the main axis of the span so these fibres run transversely across the chord towards the trailing edge.

Procedure for Making a Fully Reinforced Foil

Preparation Of The Board

Cut the wood to 38 - 50mm wide strips and arrange to laminate together. Make sure each individual strip cut is turned 'end-to-end' and alternatively 'upside-down'. This arrangement will counter any tendency for an individual strip to warp. Glue the strips together with epoxy adhesive. When cured pass the laminated board through a thicknesser (after removing excess cured glue with a 'Surform' and hand grinder). At this stage refer to section covering "Leading and trailing edges".

Establish the plan shape and other design parameters. Scribe a centreline around the entire edge and work to a set of construction lines pencilled or scribed identically on each face and edges (see

Foils construction guide

Fig 4). These are set out to encompass the desired section shape (see Fig 5).

Shape using a plane (electric or hand plane or both) to remove the required amount of wood.

Shaping the Wood Blank

Figure 4 - Stage 1 - Marking Out

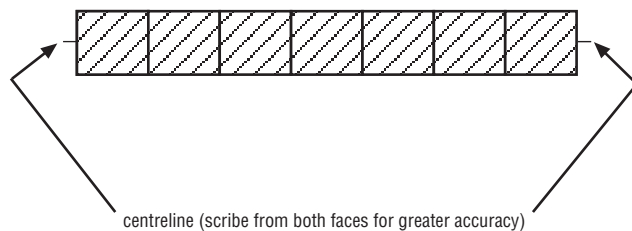


Figure 5 - Stage 2 - Basic Shaping

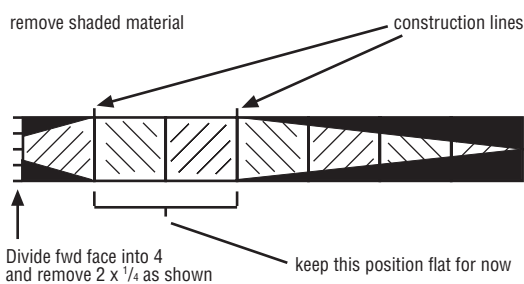
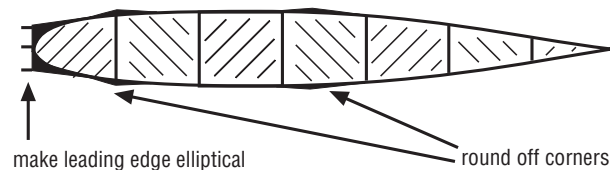


Figure 6 - Stage 3 - Rounding Off

Check section at each stage with template



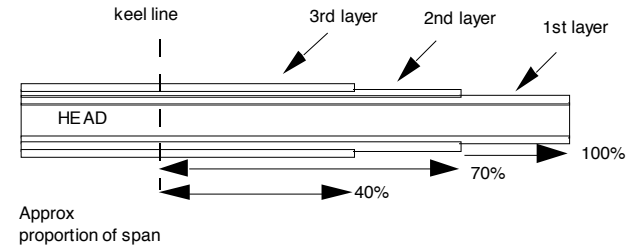
Leave 1mm width on the trailing edge of sheathed boards and up to 3-4mm on boards not sheathed.

Do the final shaping (see Fig 6) with spoke shave and 80 grit paper across the chord. Fair in any obvious 'flat' areas. Check regularly the profile of the stations along the length of the foil against the templates.

Sheathing

Use the unidirectional fibres first, either in 100mm wide tapes confined to the area of maximum thickness or laid over the whole chord. Either two or three will be required over a low density wood core. If using narrow tapes it is best to remove some wood with a block plane to create a 'trough' in which the tapes can lie without creating any unfairness.

Fig. 7 - Plan for Laminating Unidirectional Glass or Carbon Fibres onto the Shaped Wood.



Sheathing Stage

Stage 1: 1st and 2nd (or 3rd) layers of unidirectional fibres (depending on stiffness required)

Stage 2: Overlaying with woven glass

Stage 1 Procedures

- Lay the shaped wood board flat and clean the surface with SP Fast Epoxy Solvent
- Using a brush or foam roller coat the entire surface with epoxy first using a Fast hardener mix, allow to cure then sand thoroughly with 80 grit paper. When laminating with glass (either UD types or woven) aim to:
 - Use the minimum amount of resin - do not float the fibres on the resin
 - Ensure a thorough wet-out of the fibres
 - Eliminate all trapped air with good consolidation technique using bristle or paddle rollers.
- Laminate the UD fibres one side at a time using nylon peel ply to finish. Before the resin has hardened fully turn the board over and repeat the process. Details of using Peel Ply can be found in SP information guide on "Sheathing wood with glass fibre reinforcement."
- When cured, trim off round the edge with scissors and fair up with an epoxy filler mix (S'Fill 400 or S'Fair 600 are the easiest to use). Allow to cure and then sand with 60-80 grit paper. Recheck each station section with templates.

Stage 2 Procedures

The next stage is common to 'plain-sheathed' foils and involves laminating the woven glass reinforcement.

- Clamp the board by the head in a Black & Decker Workmate or vice so that the full length of the shaped section is accessible with the leading edge horizontal and uppermost. Forget about the head at this point, just work on the rest. The board is presented this way to enable you to wrap the glass easily around the leading edge in order to preserve the chord shape and give the required surface reinforcement. This method also helps to achieve a hard-wearing trailing edge (see later section on leading and trailing edges).



Foils construction guide

- (b) Drape the glass over the leading edge dry and trim roughly to size with scissors. Leave about 50 mm spare all round.
- (c) Roll on epoxy resin (using the appropriate speed hardener) to fully wet out the woven glass and snip off excess glass whilst wet.
- (d) Lay peel ply into the laminate. Leave at least 24 hours, re move board from the vice and then laminate the head area overlapping the cloth by 50 mm. Use peel ply again.
- (e) Leave to cure at least 12 hours then remove the peel ply, skim with epoxy filler and sand when cured. Check profile.
- (f) Apply one or two coats of resin (with fast hardener) to seal the filler and provide a smooth, hard glossy surface.

Leading And Trailing Edges

These techniques can be used singly or in combination:

- For a solid epoxy leading and trailing edge, cut a groove in the 'blank' once the plan shape has been cut out. Use a 3 - 6 mm diameter router and set it to cut a trough 5 - 8 mm deep around the periphery of the underwater portion of the foil. Fill the groove with epoxy thickened with colloidal silica and graphite powder but use an unthickened mix to prime the wood first. A hot air gun is useful here to warm the wood and achieve better epoxy penetration into the wood. When hard, fair off using a "Surform" tool first then 80 grit paper. When the board is fully shaped the epoxy leading and trailing edges will become apparent. This technique is useful whether the foil is sheathed or not.
- Another technique applies only to creating a trailing edge. When laying the woven fabric let the cloth extend 2 - 4 mm over the edge and allow the resin to gel slightly before trimming off. Fill the enclosed 'groove' with an epoxy mix thickened with colloidal silica when hard.
- The forward bottom edge can be very vulnerable - We recommend cutting off 10 - 15 mm at 45° after sheathing and recreating the shape from a filled epoxy, shaped and faired into the remainder.

Finishing Systems

Once the board is shaped and/or sheathed the following can apply:

If a clear finish is required 'flow coat' with SP 320 epoxy with Fast hardener working on one side at a time. In this case do not use epoxy filler over the glass as it will be visible. Build up to a good thickness of 2 - 3 coats before sanding and polishing (or use a 2 pack polyurethane varnish - SP Ultravar 2000 for the final coat).

If a painted or white pigmented finish is required use SP Hibuild 302 undercoat (white) first then a 2 pack polyurethane paint system for a hard finish. Alternatively flow coat using SP 320 epoxy resin system with SP white epoxy pigment incorporated. When hard wet sand with 180 grit down to 320 grade. Finally wet sand using 400 to 800 wet abrasive for a smooth finish. This latter method gives the most durable surface finish which can most easily be repaired.

Suggested Reading

Theory of Wing Sections - Abbott & von Doenhoff - Abbott 1959
The Design of Sailing Yachts - Pierre Gutelle - Nautical Books - 1984

Sheathing Wood with Glassfibre Reinforcement - an SP Technical Information Guide

For further information contact SP Technical Services

Appendix

Designing the Stiffest Foils

Exactly what and how much reinforcement material to use to build a stiff centreboard has always resulted in a bit of guesswork and using retrieved information based on experience of what works. However with the help of Finite Element Analysis it is possible to predict the effect on stiffness of using different materials. The objectives in this exercise were to examine the effect of changing the wood core and the amount, type and distribution of the reinforcement on stiffness, weight and cost.

Achieving a higher level of performance obviously has a cost since more expensive materials are used, so the stiffness criterion of tip deflection under a given realistic load, has been linked to the cost of the materials used (wood, resin and reinforcement) and actual weight for each example.

Calculations relate to a centreboard using the following materials and with the following parameters:

Wood core:	Brazilian mahogany or Western Red Cedar (WR Cedar)
Reinforcements:	Unidirectional fibres - carbon (200g/m ²) UT-C 200/400 - glass (250g/m ²) UT-E250/500 Woven fibres - glass (210g/m ²) RE210D
Resin:	Ampreg 21 epoxy laminating system
Wood core thickness:	23mm (constant thickness down span)
Root chord width:	36.3 cm
Tip chord width:	18.8 cm
Span (from keel to tip):	100 cm
Plan shape:	roughly elliptical
Distribution of UD fibres	100% of span (keel line to tip) 70% and
effective in calculation:	40% of span respectively
Applied load:	1000N (approx 100 kg) distributed along the span of the board in proportion to the chord. This is diagrammatically represented.

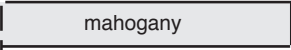
The Test Examples

The following compares the stiffness of an unsheathed solid mahogany board (Example 1) with ones using a core of lightweight cedar sheathed with three complete layers of unidirectional glass (Example 2) or three layers of carbon (Example 3). As an exercise we then compare the effect of reducing and redistributing the carbon more effectively (Example 4) and the effect of adding an additional complete layer (Example 5) on the stiffness (tip deflection under

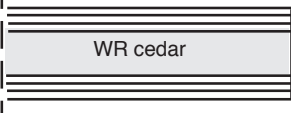


Foils construction guide

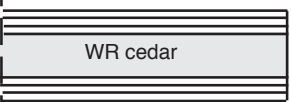
load), weight and material cost. The material cost includes the cost of the stock wood, resin and reinforcement based on current retail prices and assumes zero wastage. An additional 15% would be realistic for waste. Reinforcement cost includes an overall covering of lightweight woven E-glass (RE210D) in all cases except the bare mahogany example where no coating cost has been included in the calculations. All costs and weights also cover materials used in the head portion of the board which was estimated at approximately 0.07 sqm area.

	Tip Defl. (cm)	Board Weight (kg)	Approx Material Cost
Example 1 - Mahogany, no sheathing, no finishing resins			
	9.1	3.44	Base Line

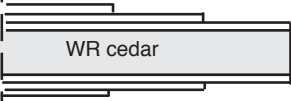
Example 2 - WR Cedar + 3 layers UD glass to 100% of span

	6.6	3.45	+29%
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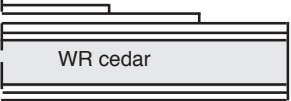
Example 3 - WR Cedar + 3 layers UD carbon to 100% span

	2.8	3.45	+221%
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Example 4 - WR Cedar + 3 layers UD carbon to 40%, 70%, 100% span respectively

	3.0	2.78	+167%
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Example 5 - WR Cedar + 4 layers UD carbon to 40%, 70%, 2 x 100% span respectively

	2.3	3.60	+237%
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Conclusions

If high stiffness and light weight are required then selecting a low density wood core and sheathing it with unidirectional fibres is the best way to achieve this objective. The cost of glass sheathing can be largely offset by changing from an expensive wood (Brazilian mahogany which is widely available) to a relatively cheap wood (Western Red cedar). It gives a useful gain in stiffness (+ 27.5%) for no weight gain. If carbon is substituted for glass then stiffness increases dramatically (+ 69.2%) with a corresponding rise in cost (+ 178.4%). Weight does not change. Reducing the amount of carbon used and redistributing it away from the tip to areas where it will be more effective can reduce the cost rise to + 124.3% without a significant loss of stiffness (+67.0%). However this results in a significant weight reduction of 19.2% over the original mahogany unsheathed board. This is probably the optimum design. The effect of adding another full layer of carbon to each face gives the anticipated stiffness benefit over the last example of an additional 23.3% but with an extra 29.5% in weight and 26.3% extra cost of materials.

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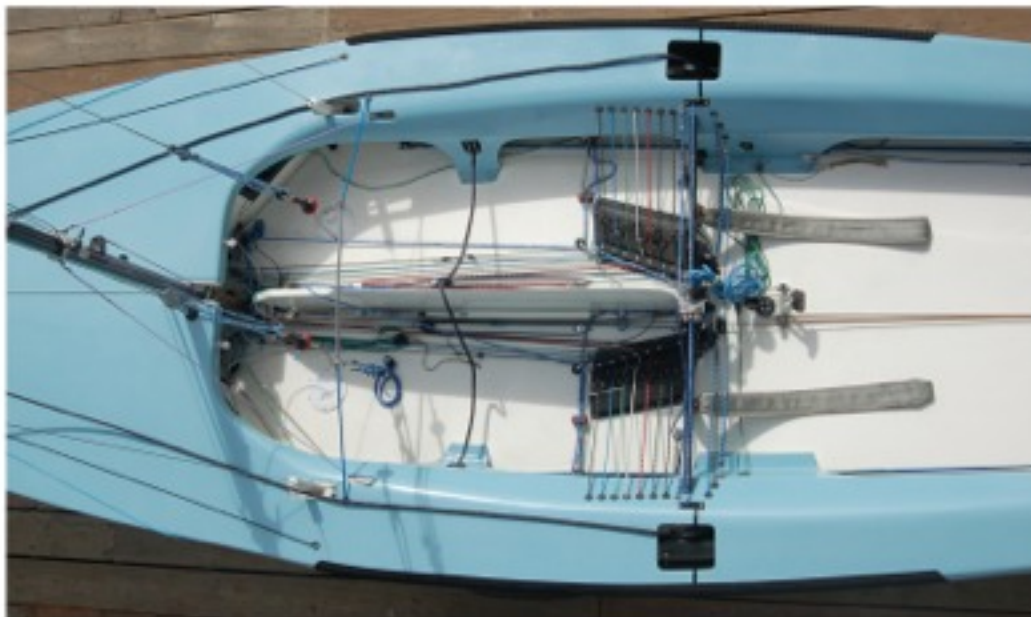


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