Velocette – A nesting dinghy for fun sailing in anchorages

Jean-François Masset - Russ Whitford June 2022

This report is about the concept, the design, the construction and the first sailings of this nesting dinghy, including our thoughts and iterations at each step.

Russ :

I wanted to build a dinghy for sailing around anchorages by myself and occasionally with my wife, to add the pleasure of small boat sailing to our cruising programme, when we are at mooring with our First 42s7.

First specifications :

** A nesting dinghy to use for fun sailing, not a yacht tender (i.e. not a rowing or motoring dinghy). Length ≤ 3,6 m , Beam ~ 1,30 m, Load : main sailor 85 kg, max ~ 140 kg , Free standing rig with a sail of 6 to 7 m2.

** Freeboard can be reduced to save weight, don't mind getting wet. A hull with reduced rocker, finer entry and a hard chine for the aft 2/3 of the hull.

** With one sailor on board, the ability to plane in a good breeze and to enjoy an efficient hull in light air, just cruising along. The boat would not be sailed in rough seas or winds over about 18 knots.

** Strip planking construction is envisaged, with aiming a bare hull weight of about 30 kg.

Jean-François :

** **Displacement :** at first was an exchange with Russ about the nominal displacement to take into account with one sailor 85 kg on board => we estimated that 45 kg (for the fully equiped boat) + 85 kg (sailor) + margin 5 kg = 135 kg was a reliable starting point for the displacement of design. In addition, the dinghy should be able to sail with for a max displacement up to 200 kg.

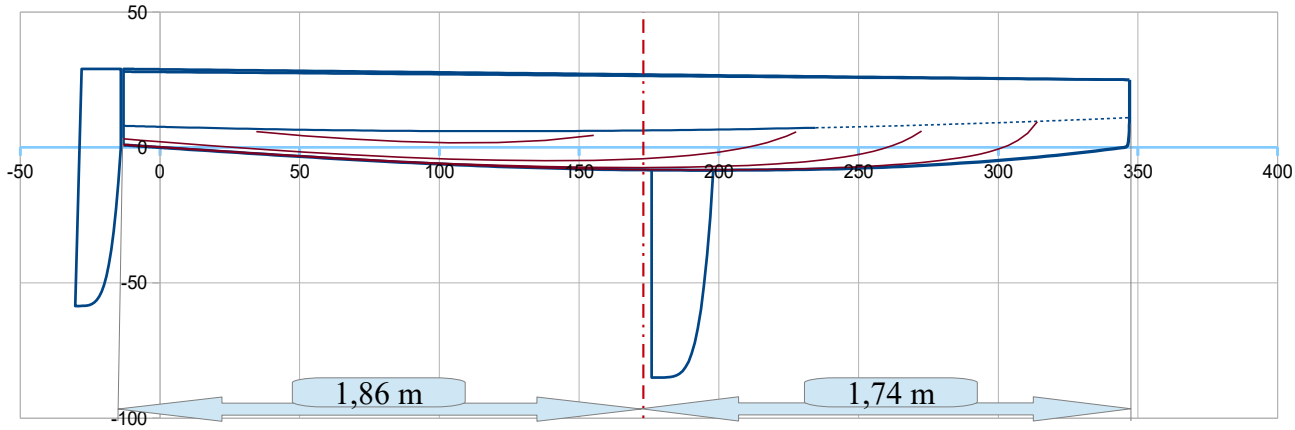
** **Nesting arrangement :** a second point was to fix the nesting arrangement, i.e. the possibility to reverse the front section with the bow toward the transom and to minimizie the overall height for a low volume storage by acting on the freeboards => we set the fore half length at 1,74 m and the aft half 1,86 m to allow an easy nesting compatible with reinforcement at the center bulkhead. And the fore freeboard is lower by 3 cm of the aft freeboard.

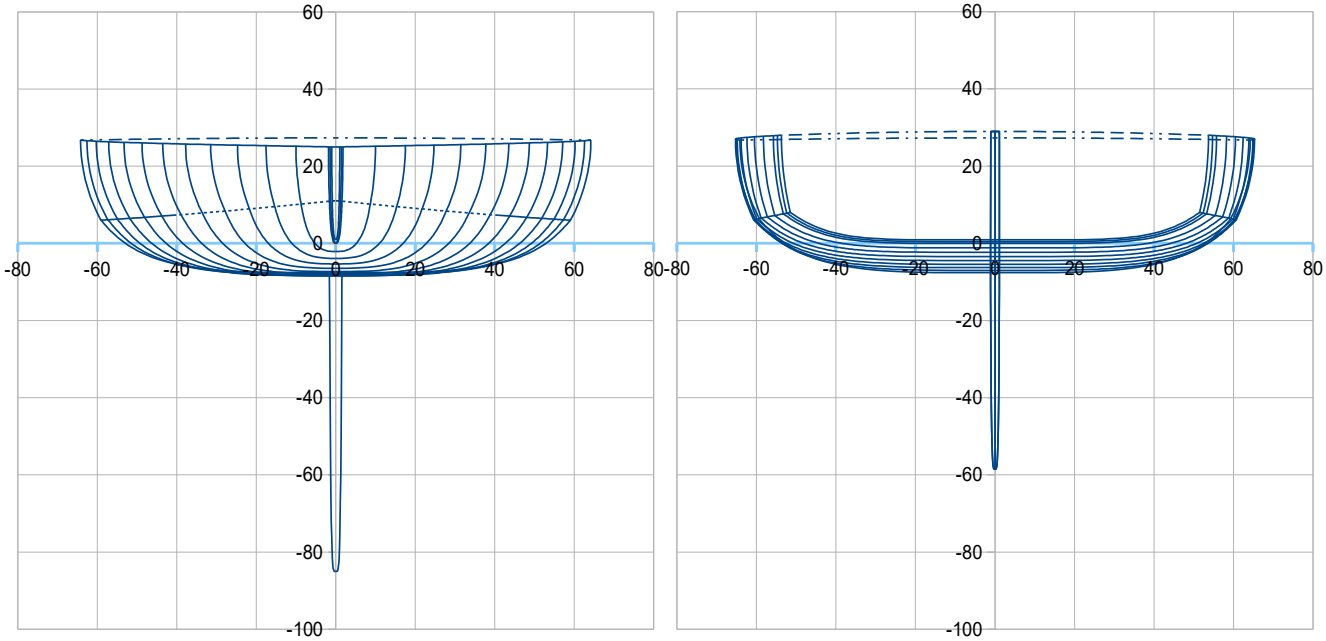
** **Stability :** another concern was the intrinsic stability. The high performance dinghies has usually narrower waterlines, but to a certain point the stability during a tack or a gybe, or due to a puff of wind, is very low and the risk of capsizing high, i.e. not really fun to sail without the context of a competition. We cannot found quantitative criteria to scale such stability, so to be on the safe side, we aimed a beam waterline Bwl about 10% wider than the ones we could guess from the existing equivalent dinghies (from their photos) => from observed Bwl in a range ~ 0,9 to 1,0 m, we finally fixed a Bwl of design (for Displacement 135 kg) at 1,07 m. Later on, I developed more on the intrinsic stability issue and proposed a standard in a thread on Boatdesign / Stability forum : About dinghy intrinsic stability : proposition for a standard assessment | Boat Design Net

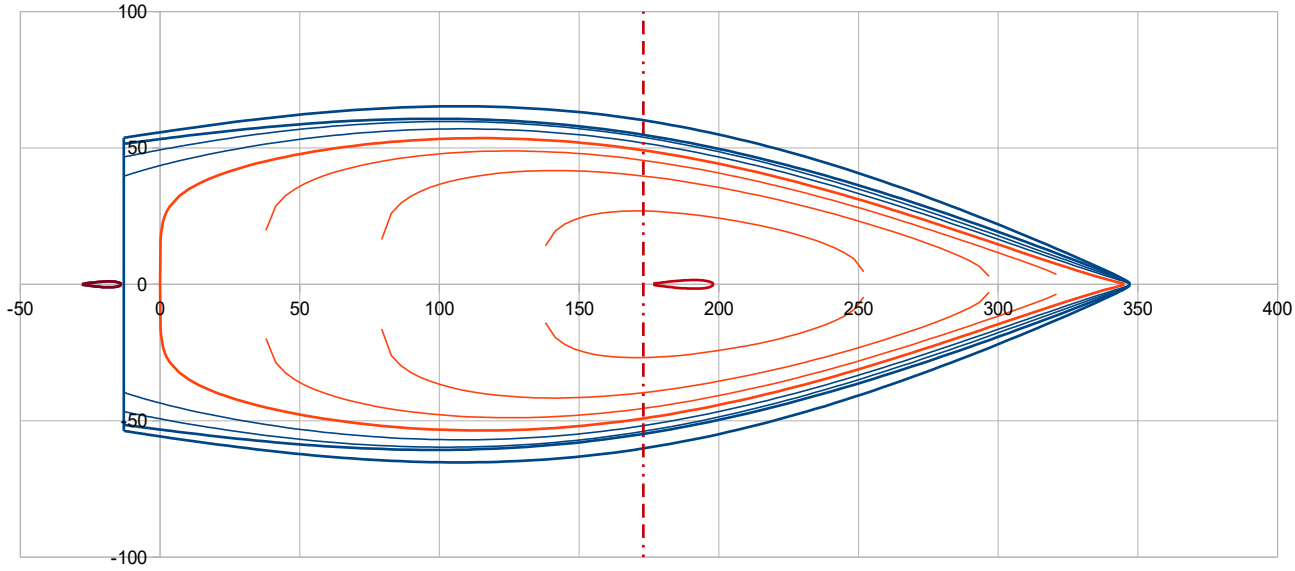
Alongside with the above exchanges, various versions of the hull were proposed and commented up to a final choice, successively : Dolfi 12 first approach V0, V1, V2, V3, V4, V3b and V3c finally adopted. You can find in the Annex 1 the design process with these successive versions and our comments at each step.

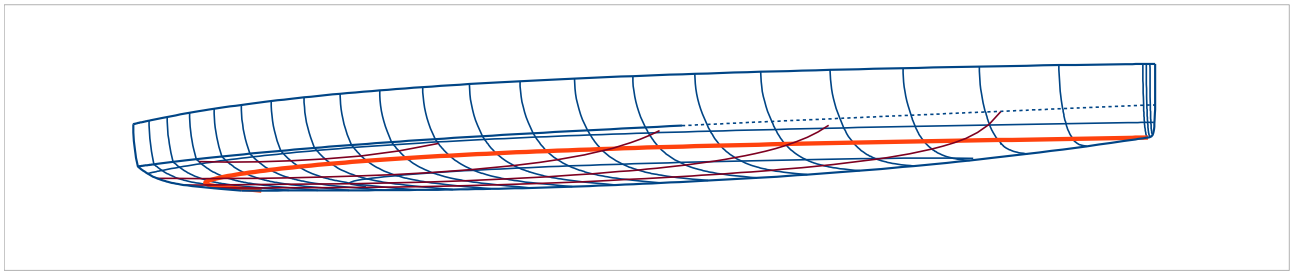
The linesplan of the adopted version, the Dolfi 12 V3c renamed Velocette

Lhull 3,60 m Bhull 1,31 m / Bwl 1,07 m Draft hull 0,084 / daggerboard 0,85 m D 135 kg
Aft freeboard aft : 0,28 m ; Bow freeboard : 0,25 m

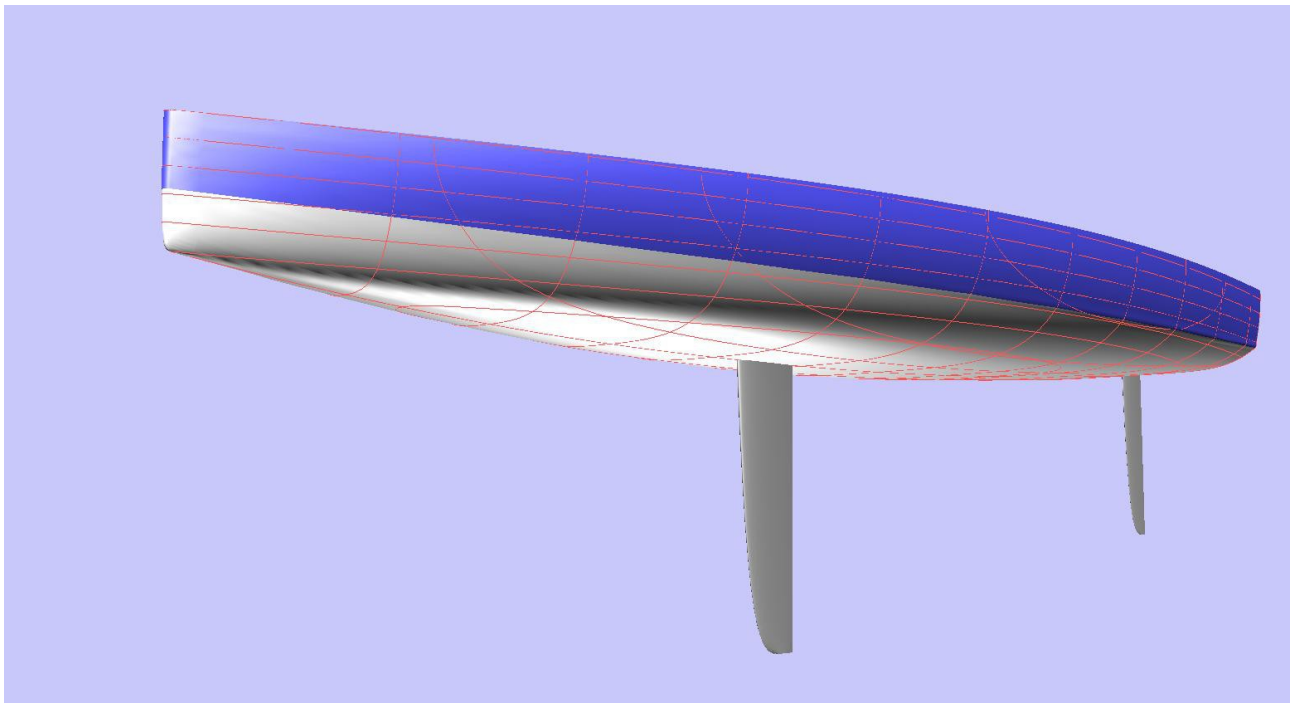


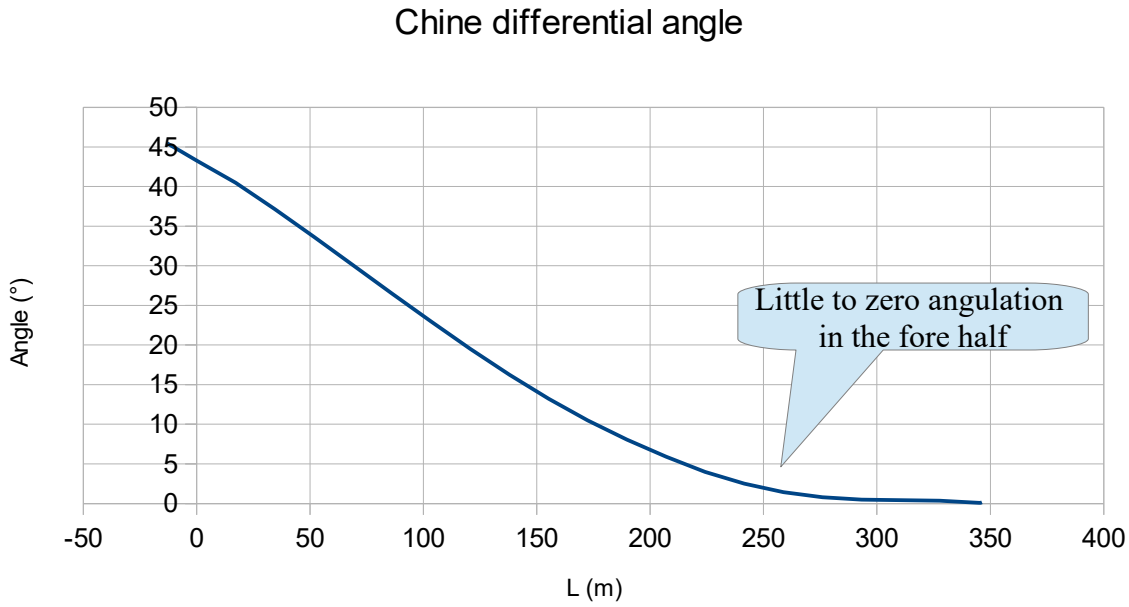






The 3D view, done by Alain Lebeau with Multisurf. The blue frontier shows the hard chine line vanishes in the fore half of the hull.





Hydrostatics data (for the design displacement 135 kg)

2. Data sum-up and results of hydrostatic and surfaces calculations

2.1 Hull

Loa (m)	**3,60**	**Lwl (m)**	**3,45**						
>> ft	*11,81*		*11,32*						
Bsheer (m)	**1,306**	**at X (% Lwl)**	**31,0**						
>> ft	*4,28*								
Bwl (m)	**1,072**	**at X (% Lwl)**	**33,0**	> Bwl / B	0,82				
>> ft	*3,52*					**Freeboards (m) >**	**Aft**	**Midship**	**Fore**
Tc (m)	**0,084**	**at X (%Lwl)**	**57,0**				**0,28**	**0,27**	**0,25**
>> ft	*0,28*					*>> ft*	*0,92*	*0,88*	*0,82*
Displacement at H0 (m3)		**0,12799**	**at LCB (m)**	**1,606**	**LCB (%Lwl)**		**46,56**	**at ZCB (m)**	**-0,031**
(kg)		**131,2**	*>> ft*	*5,27*				*>> inch*	*-1,22*
>> lbs		***289,2***	*with water mass / vol. of*		*1025*	*kg/m3*			
Cp (%)	**55,23**								
Sf (m2)	**2,60**	**at X (m)**	**1,416**	**X (%Lwl)**	**41,05**	>>> Xc – Xf (%Lwl)			5,51
>> ft2	*28,01*	*>> ft*	*4,65*						
Sw (m2)	**2,63**	>Sw/D^(2/3)	10,35						
>> ft2	*28,30*								
Shull (m2)	**4,99**	**at X (m)**	**1,451**	**Z (m)**	**0,026**				
>> ft2	*53,69*	*>> ft*	*4,76*	*>> ft*	*0,08*				
Sdeck (m2)	**3,54**	**at X (m)**	**1,349**						
>> ft2	*38,10*	*>> ft*	*4,43*						

2.2 Daggerboard

Volume (m3)	**0,00263**	**at X (m)**	**1,870**	**X (%Lwl)**	**54,20**	**Z (m)**	**-0,39**
Draft oa (m)	**0,85**		**Sw (m2)**	**0,29**		**Sxz (m2)**	**0,14**
>> ft	*2,79*		*>> ft2*	*3,14*		*>> ft2*	*1,51*
CLR (m)	**1,900**	**CLR (%Lwl)**	**55,08**	method : profile extended to the waterline, then 25% c at 45% draft oa			
>> ft	*6,23*						

2.3 Rudder

Number	**1**							
Volume (m3)	**0,00107**	**at X (m)**	**-0,214**	**X (%Lwl)**	**-6,19**	**Z (m)**	**-0,094**	
Sw (m2)	**0,15**	*>> ft*	*-0,70*			**Sxz (m2)**	**0,07**	per rudder
>> ft2	*1,64*					*>> ft2*	*0,79*	

2.4 Hull + Daggerboard + Rudder

Displacement at H0 (m3)	**0,13169**	**at LCB (m)**	**1,597**	**LCB (%Lwl)**	**46,29**	**ZCB (m)**	**-0,039**	
Disp. (kg)	**135,0**	*>> ft*	*0,49*			*>> ft*	*-0,13*	
>> lbs	*298*							
Sw (m2)	**3,07**	>Sw/D^(2/3)	11,87	Lwl/D^(1/3)	6,78			
>> ft2	*33,08*			*DLR*	*92*	*M(lbs/2240)/(Lwl(ft)/100)^3*		

The model at scale 1/6th (>>> L 0,72 m)

Russ : « The next step in the Velocette process was to build a 1/6th scale model, i.e. about two feet long, and being aboard our cruising boat Uproar in French Polynesia during the Covid confinment, the model was built entirely with just existing tools and materials.

Ocean blue to the rescue. Derek and Leslie on Ocean Blue own a CAD software company Caddie. We had been sailing with them for over a year in French Polynesia. Derek and Leslie graciously gave me the full version of their program. What's more, they spent countless hours teaching me how to use it. Some say you can't teach an old dog new tricks. But with Derek and Leslie's gentle efforts, I learned some CAD basics.

Paper sections from Caddie were glued to 1/8” balsa, cut out and fastened to a board. This would serve as a mold for the hull. As with the full size boat, section #6 was two pieces of thin plywood, screwed together. »

Russ : « Other sheets of balsa wood were cut into 1/4” strips. These were bent over the mold and edge glued together. The outside of the hull was sanded carefully and covered with a layer of thin fiberglass. The hull was then strong enough to remove from the mold. Centerboard trunk and forward deck were added and the inside was also fiberglassed. »

Russ : « I removed the screws from the double bulkhead #6. A thin razor saw sawed the hull in half. Yes, the forward half then nested perfectly into the stern half. The design concept was proven. »

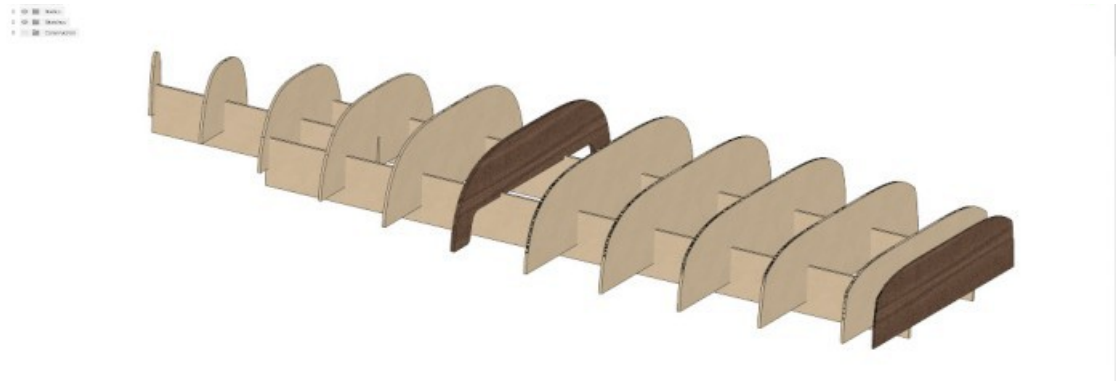
And the model sails !....

The building jig for the scale one construction :

Russ : « My searches brought me to www.danleeboatbuilding.co.uk . Dan has a unique method of cutting the wood parts out with a CNC mill and using a CNC jig to accurately assemble frames. It got me to thinking about using these techniques to help build Velocette. I discussed the project with Dan and he agreed to do the CAD design for the building jig. Dan took the CAD files for the boat and pulled off the sections, much like I did for the model. But Dan configured the sections and assembly rails to make an “egg crate” style building jig. It was designed to be CNC milled out of 1/2” MDF. All I needed was to find someone with a CNC router to cut the parts out.

A sailing friend mentioned his friend, Chris Freymuth, had a CNC router table. Yes, Chris would cut the parts out for me. I visited his shop in Grafton, WI with several sheets of MDF and 1/2” marine plywood on top of Showflake. Chris expertly cut out the parts. The bulkhead #6 where the boat splits would be two pieces of 1/2” marine plywood along with the transom. They would remain part of the boat when removed from the jig. Kind of hard to describe but pictures will help. The only thing I needed to do was assemble the “puzzle” of MDF and plywood pieces on a straight, flat surface. Then I could build the boat. From Facebook Marketplace, I bought a section of that shuffleboard game often found in bars. This is an incredibly heavy hunk of hard maple, even heavier than a section of bowling alley. It provided the straight, flat surface needed. I used a laser level to check the assembled jig.

So far I didn't even have to lift a tool and I had a jig or mold set up to build the hull. Not only was it easy but the jig was perfectly fair and smooth. Computers get it right! »



Strip-planking, with Red Cedar planks of thickness ¼'' (6,35 mm) :

Russ : « From Home Depot, I was able to find some Western Red Cedar that surprisingly had no knots! I bought a dozen boards and a bargain price. Lisa and I set up the table saw with a special, thin blade and cut it all into ¼” strips.
Anyone who has seen a cedar strip canoe agrees they are a work of art. I wanted to use this construction technique not only for its beauty but to build a light, strong hull that could easily conform to the compound curves of the design. Building Strip-Planked Boats by Nick Schade is an excellent book to describe the techniques I used and served as my reference.
Strips of cedar are stapled in place to the building form and edge glued together. That's pretty much all that is involved. As the boat curves, the square strip edges must be beveled so they fit tightly. But construction does not need to be perfect. The inside and outside of the hull are fiberglassed for strength and waterproofing.
The 1/4" thick cedar strips conform quite easily to the curved mold. But they can start to twist when forced to bend in two different directions. Then strips need to be tapered along the length to lay flat. All of this requires the use of a sharp plane.
As strip edges butt against each other, it is very important to be sure they don't shift up or down. Any step in the joint must be smoothed out to the lowest spot to have a smooth hull. I would recommend using clamps or masking tape to hold the joints flush with each other while the glue dries. It will save a lot of work later on.
If one decides to build a strip-planked boat should give it a try. Canoe shapes, with their straighter lines, will be easier to build than Velocette. I would strongly suggest buying a CNC cut mold instead of making your own. It will eliminate a lot of work and ensure a smooth hull. Chesapeake Light Craft is a great source.
It only took a week to complete the strip planking. »

The last plank …

Long-board sanding for a perfectly smooth and fair surface before glassing.
Russ : « The fun is over when the long board comes out. I cut a 48” x 6”, 60 grit sanding belt into a long strip. This was glued to a piece of 1/4” plywood and two handles glued to the ends. The 1/4” plywood can flex a bit to conform to the hull shape. Again, the hull is sanded at angles to keep it fair and smooth. Some call the long board “torture board.” No question about it, this is hard work. I sanded by hand for 1 ½ days to fair the hull. It would have been so easy to just run a sander over the hull but this would not yield a perfectly smooth skin. »

Glassing , with a 6 oz glass

Russ : « Strip planked boats must be fiberglassed inside and out. The strips form the shape and provide a stiff core for the fiberglass skins. Without the fiberglass, the wood just isn't strong enough. Most builders don't even use waterproof glue to glue the strips together. Without fiberglass, the boat would just melt apart. But Titebond now makes a waterproof wood glue and I used it.
I used 6 oz fiberglass cloth and Mas Epoxy. The glass cloth has to be handled carefully, it is a loose weave and will distort and bunch up. Being loose weave, it will also conform to compound curves which is desirable. Lisa and I laid the cloth out carefully on the hull. Two pieces were necessary to span the width and they overlapped on the keel. Great for added strength where it is needed. The cloth is smoothed out with a dry paintbrush. Resin is poured in a puddle in the center of the hull and a plastic squeege is used to spread it around. It is easy to tell when the cloth is soaked with resin, it turns transparent. But too much resin adds weight without strength. When the glass is saturated, the squeege is used to scrape off as much excess resin as possible. After the resin cures, sand smooth and roll on a thin layer of resin to fill the weave of the cloth. I decided to add the mahogany rub rails while the hull was still on the mold. The rails would further stiffen the hull while it was held in shape. »

Russ : « Then came the moment of truth, We lifted the hull off the form. Looks like we now have a boat ! »

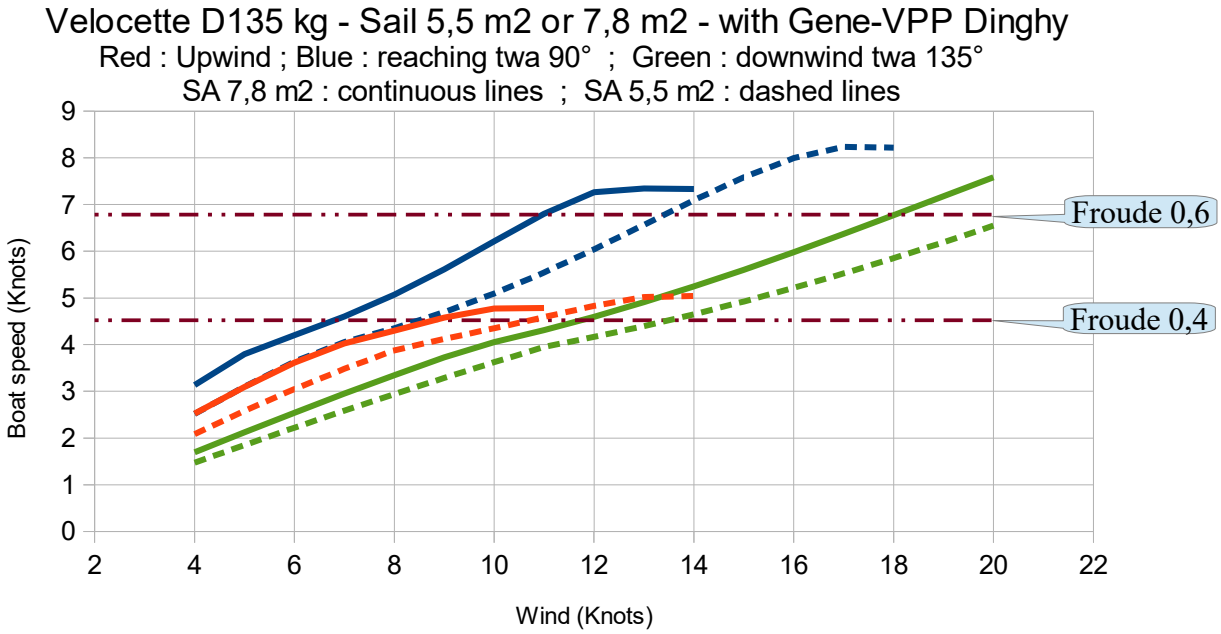
Tank test in a friend's indoor pool :

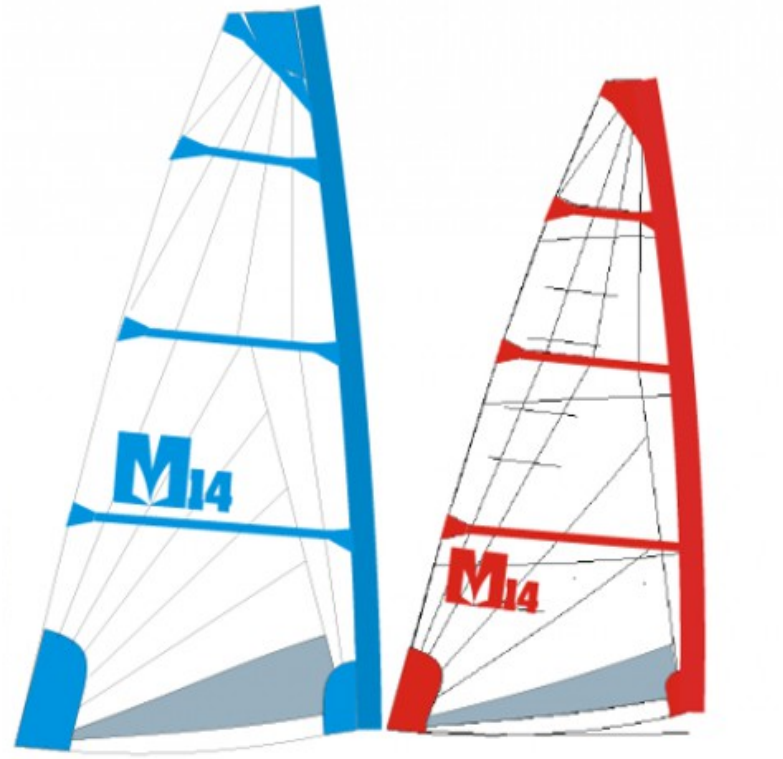
Russ : « We did a tank test of Velocette in a friend's indoor pool. I wanted to be sure the forward deck and aft double bottom would slope aft when the boat was empty and with crew. My son weighs about 100kg and was a good test crew. I used a laser level when the boat was in the tank to find waterline level in both conditions. I am confident now that these decks will drain aft. »

Decision for the sail and for the mast position :

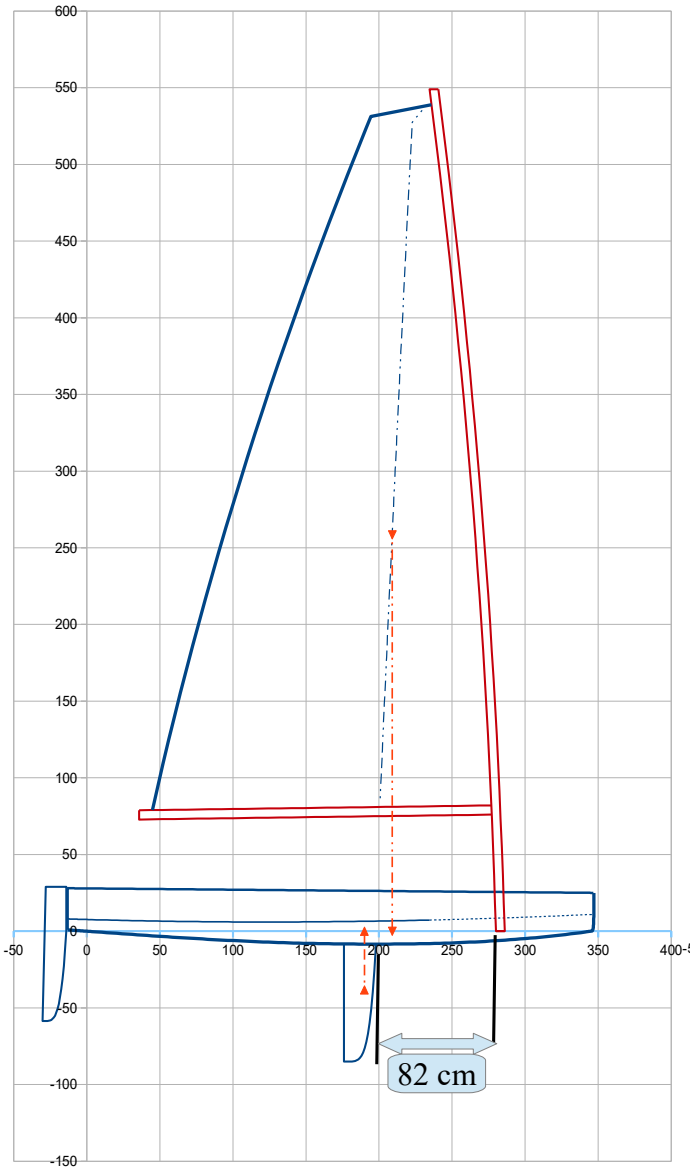
Russ : « I envisaged to use one the 3 sails proposed for the Melges 14 dinghy : they are well made, high tech sails and the boom is quite high which is confortable when tacking or gybing. I hesitated between the red one 5,5 m2 and the blue one 7,8 m2. I have a very strong 5.5m windsurfer mast and another one to use as the boom. I asked Jean-François a VPP and sailplans comparison ».

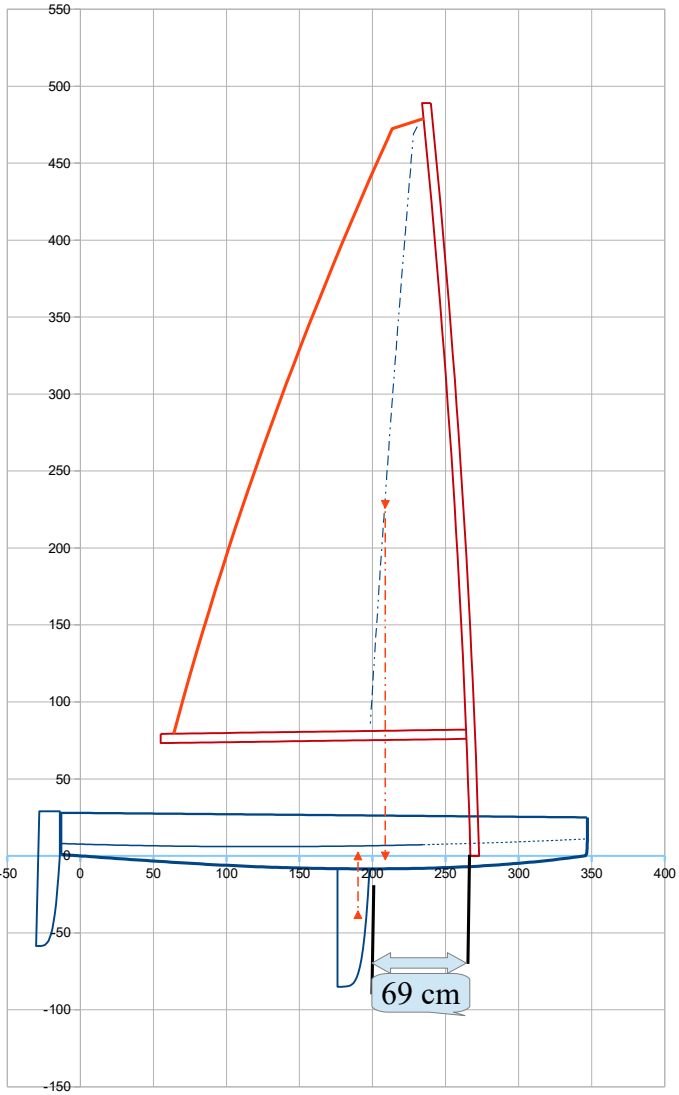
Jean-François : « A VPP comparison is done for D 135 kg of which 85 kg for the sailor just sit on the sheer line (Y 0,65m), and with the two sails 5,5 m2 and 7,8 m2 »





Blue sail : 7,80 m2 Luff 4,60 m Foot 2,32 m (?) **Red sail : 5,46 m2 Luff 4,0 m Foot 2,0 m**





Jean-François - comments of the VPP predictions :
« With the sail 7,8 m2, the speed is of course higher up to force 3 (10 Knots), of 0,5 to 1 knot. But upwind from 10 knots of wind, holding the dinghy becomes critical without either more hiking or partially spilling the sail. With the sail 5,5 m2, this occurs later, by 14 knots of wind. Idem by beam reaching, holding the dinghy is critical by 12 knots of wind with the sail 7,8 m2, and by about 17 knots of wind with the sail 5,5 m2.
As regard the transition to the planing, by beam reaching :
With the sail 7,8 m2, the semi planing can occur from 7 to 11 knots of wind. Then the full planing but needing more hiking moment.
With the sail 5,5 m2, the semi planing can occur from 9 to 13 knots of wind, then a full planing also possible with the available hiking, with a top speed of 8 knots possible by 16-17 Knots of wind. »

Jean-François - comments on the Lead and the mast position :
« The drawings takes into account as accurately as possible the sail shape (Luff and Foot, Luff curvature, square top), a Centre of Effort based on 33% Chord, and a Lead of > 5% Lwl (the Center of Lateral Resistance CLR being based on 25% chord of the daggerboard). That gives a mast foot placement proposed in the document attached, exactly : the length from the front edge of the daggerboard root chord to the rear point of the mast diameter.
For the Red sail >> 69 cm ; For the Blue sail >> 82 cm »

Russ : «Decision to use at first the sail 5,5 m2 and, for the mast foot, to made a box that will allow me to adjust in the range you have given, 69 to 82 cm. »

Sawing in two halfs, with the help of friends :

… and checking of the nesting arrangement :

With the double fore deck and the double aft bottom, ready for varnish :

Easily transported on the roof of our small car, on its way to the home boat :

… and finally installed on the deck of Tumultuous Uproar , bow part under the aft one :

Velocette first sailing :

Velocette christening with friends :

+ videos of the first sails

Russ comments on the first sails :

« First sail was by about 9-10 knots of wind. She sailed great, the helm balance was perfect, the mast position recommendation was spot on. The 5.5 m2 sail is perfect, she is a tender boat. I even capsized when I tacked without releasing the mainsheet. I just didn't move fast enough. Righting was easy and getting back in the boat wasn't difficult. She stayed on her side with no tendency to "turtle" or turn upside down. When righted, there wasn't a lot of excess water in the hull.
I was amazed how there is no bow rise or change in trim when she starts to plane. She just goes faster. I'm sure on a screaming reach, she will rise up even more. But performance is the feel I was looking for.

Sailing to weather was quite easy. My daggerboard is almost a meter long. I may even shorten it after some testing. The rudder was shorter than you designed but provides easy steering. I purchased a Dotan rudder head www.dotan.com. This is a remarkable device and works perfectly.

I'm very pleased with the sail shape. The luff curve matches the mast well. I will play with outhaul and downhaul more to adjust sail shape. I'm glad I did not buy the larger sail! She would be difficult in more wind with the 7.0 sail. »

« Second sail, by 10-12 knots of wind. I have sailed Velocette a few times and am getting the rigging the way I like it. The strong boom vang is very useful but the cunningham is less important. Seems the draft of the mainsail is too far forward.

Velocette is a delight to sail. The helm is very light and response is immediate to steering, sail trim and puffs of wind. These two videos are in about 10 to 12 knots of wind. I have had some hard puffs where she really gets up and planes! I find moving my weight slightly aft helps in strong puffs.

Hiking out is very difficult if not impossible. I did buy those large, foam cylinders to form a hiking ramp. But the distance from the hiking straps to the gunwales is too short. My legs are way too long to accomplish hiking unless I put hiking straps off center. But hiking, more than just leaning out, is not that necessary, even in strong puffs. I can lean back and mostly hold the boat down. I will experiment with this, it would be great to have total hiking power in strong puffs. But I need to be able to move back into the boat easily. A wide, flat gunwale is best for this, not possible with a nesting design.

« I sailed for several hours, having a great time! I let another cruiser sail her and he said he was smiling the entire time. I have also sailed with my wife, Lisa on board. She sails fine with two people but is a very wet boat. The open transom works just fine. Any water that comes in does flow out. When heeled over, some water stays in the leeward bilge but when flattening out, it drains. With any forward sailing it seems the water flows straight off the transom, raising the open transom over the flow. The only change I would make would be to raise the double bottom aft about 50mm. That would keep the boat more dry with two sailors.
Everyone who sees Velocette comments on what a beautiful, little boat she is.

I will block the mast a bit more upright for the next trials. There is a bit of weather helm but the helm is so light it isn't noticeable.

When I sail to weather, the end of the boom is right down on the traveler. Mast bend limits how tight I can sheet. It is probably the right amount of sheet tension and boom angle but I will try for a different feel. I have temporary blocks holding the mast base I can adjust.

The hull forefoot being out of the water certainly makes handling the boat much easier. There is no tendency for to be pushed around in waves or when the angle of heel changes. The boat steers very easily and tacks quickly.

The "seamless" planing was a bit disappointing at first. My Flying Dutchman made a big fuss about getting on plane and it was so exciting when it did. Velocette makes no fuss and just goes faster. One has to realize just how fast she goes in a puff to appreciate the design. I have observed other sailors. In lighter winds the entire bow is just touching the water. When planing, the waterline goes aft from the bow almost 0,5 m.

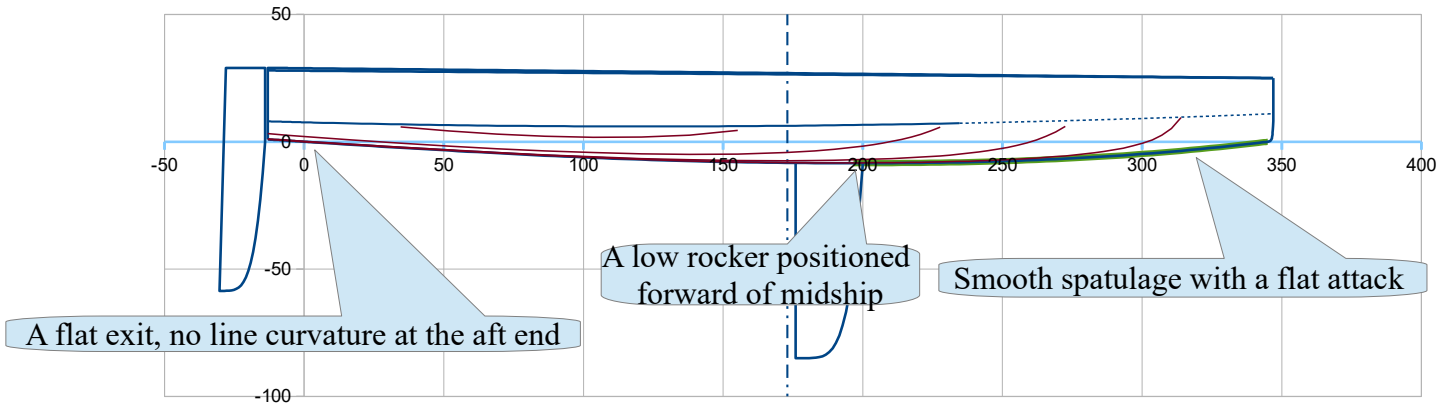
I am now sitting further aft in stronger winds. The hull has more beam aft which helps hiking. Also, the planing surface is further aft. It just helps to go faster and sail with less spray over the bow.

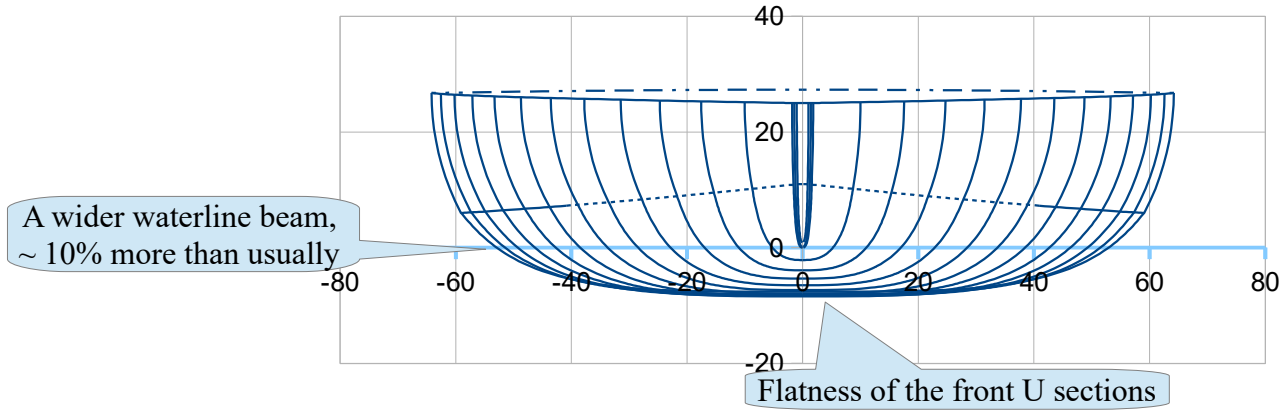
My double bottom placement is fine for one person. I took some young boys for a ride. I had them sit next to the daggerboard. Some water would stay in the aft hull unless I moved further aft. This is not a problem but again a higher double bottom would then be better when 2 on board »

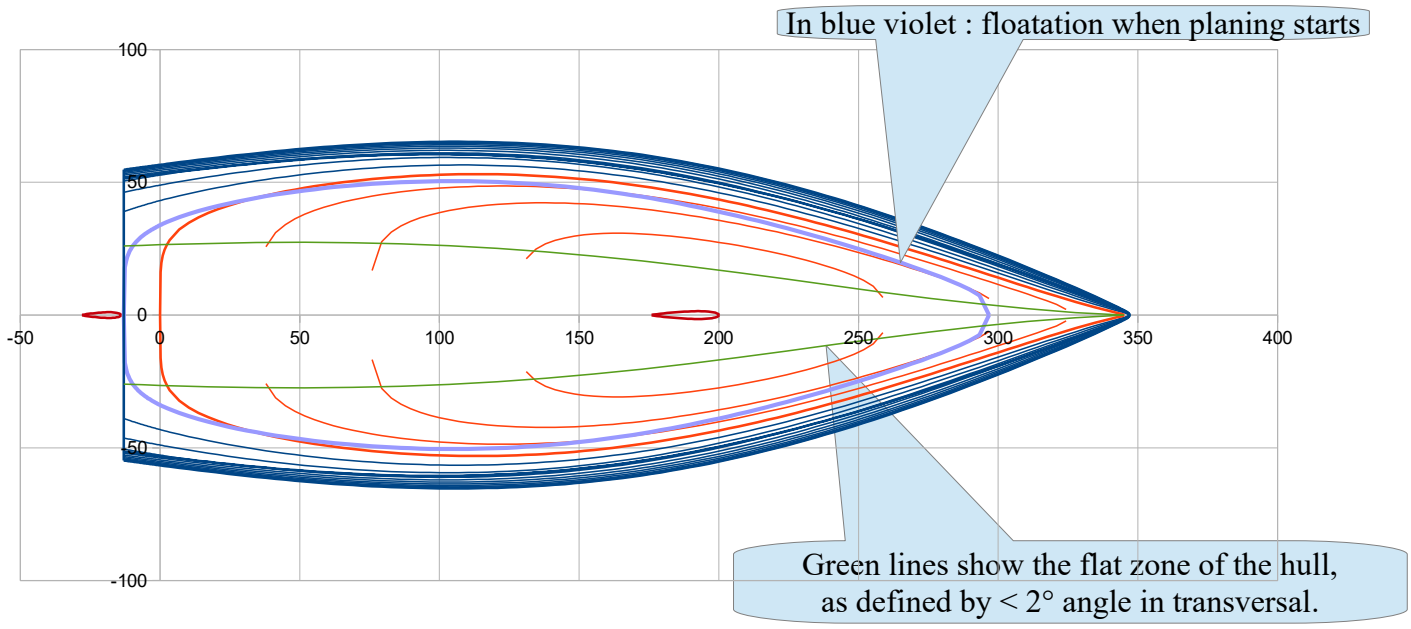
Jean-François - Tentative rationale : «Now that we have feedback experiences with it, I begin a tentative rationale of the design, with pre and post thoughts. Especially, about the good news which is its ability to go humpless through the planing mode, quasi without trim change / drag hump.

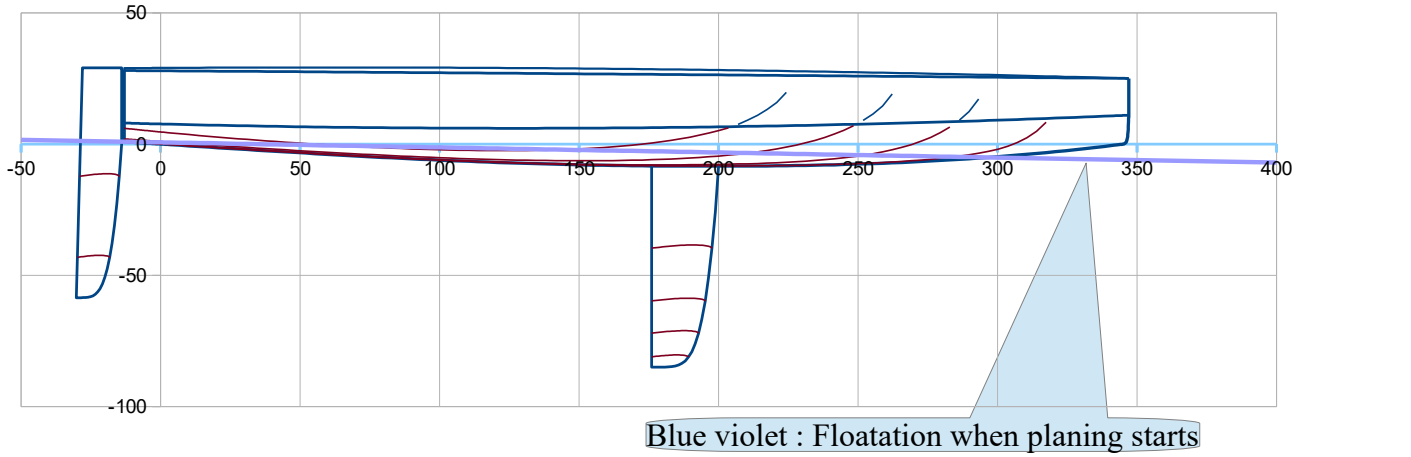
Design pre-choice : entry half angle < 15° and U shape fore sections. I also drew a fore keel line with no (or quasi, depending the load and the trim) bow forefoot in the water :

- pre thoughts : it was both to have a minimum of immersed volume in the fore sections so that the center of buoyancy can be more aft and close to the sailor position which is the main part of the displacement, and secondly to ease the tacks, no resistance to a yaw rotation from the hull front end.
- post thoughts : this also leads to a light « spatulage » shape of the front keel line with a flat front attack, and added with the U sections, that helps to initiate a dynamic lift very early, probably even before the hull speed itself is reached.









So, one should imagine in 3D the green flat surface (of the bottom view) with the keel line shape (of the elevation view) to identify the area where the dynamic lift pressure mostly acts. One can noticed that the green lines shape shows similarities with the shape of the 49er and 29er bottom hulls, designed by Julian Bethwaite and deemed to have also this humpless transition to planing. The floatation line shape (in the bottom view) when planing starts could justify to mention a similarity with a planing scow. When computed the remaining archimedian displacement within this configuration, that give about 60% of the total displacement, meaning that 40% of total weight is then supported by the dynamic lift.

Such very flat bottom crossed with a slightly wider waterline beam Bwl than usually has also 2 other advantages at the cost of a minor drawback, in my opinion :

- to reduce the rocker, so the wave drag,
- to give more intrinsic stability, to not fear capsize risk at any tacks or gybes.
- at the cost of more wetted surface, but this drawback is minor in % (because the daggerboard and of the rudder are constant non negligeable parts of the wetted surface) and can be partly neutralized by light wind and/or when sailing closed hauled : let's take heel ~ 10° and a nose-down trim ~ 0,5 – 1° and then you reduce the extra wetted due to the flat bottom option (the more the flat, the more the wetted surface reduction with heel).

For a fun but not edge racing dinghy, intrinsic stability is important, and every extra cm of waterline beam counts. »

Final thoughts :

Russ : « Apart from a slightly higher double bottom, I would not make a single change. I would also recommend this design for a single piece hull. The decking should then be complete with a foot well, similar to a Laser. A better deck shape would be with tank sides aft of the CB trunk and double bottom with open transom. But that would add to complication. Still, strip planking of the tank sides and double bottom would not be that difficult, could be similar to the Swift Solo dinghy. If I build another one piece boat, it will be build like that. Cedar strip planking is a satisfying and easy way to build a light and beautiful boat. »

More on my cruising thoughts on : Tumultuous Uproar (sailblogs.com)

Jean-François : « Its quite unsual to see a modern style dinghy build in strip-planking like it is done for a canoe, not only that can lead to a quite light boat (at around 53 kg fully equipped) but also she is beautiful to see, she catches eyes ! Within a not nesting version, with more hiking available moment thanks to ad hoc benches and a sail of say ~ 6,5 m2 intermediate between the red and the blue sail of the Melges 14 (for a 70 to 90 kg sailor), she would be a fun all around dinghy for all level sailors, intrinsic stability having been a design concern.»

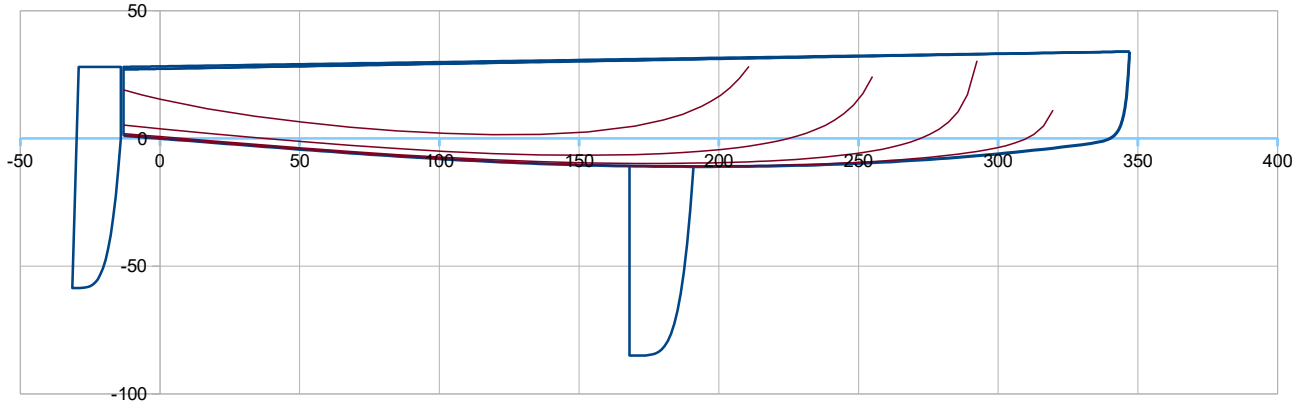
Contact : jfcmasset@outlook.fr

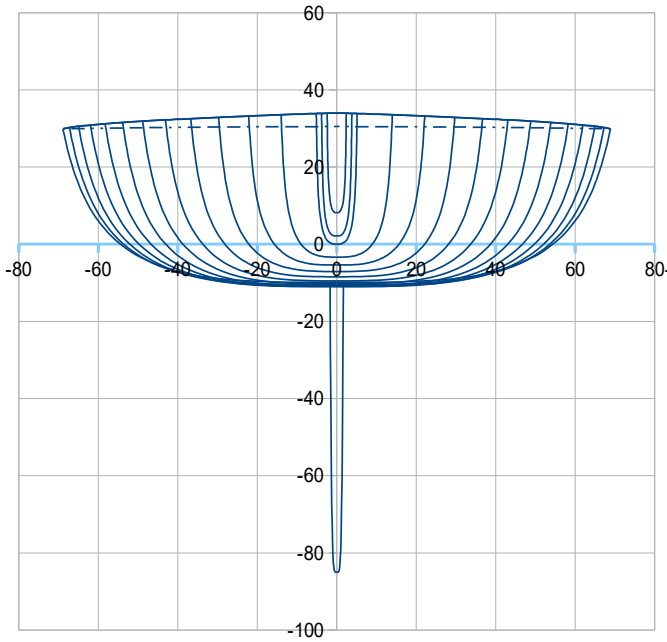
Velocette is presently exhibited in the ceiling rafters of a Bar-Restaurant near Carriacou Marina (Grenada) , waiting for the next season !

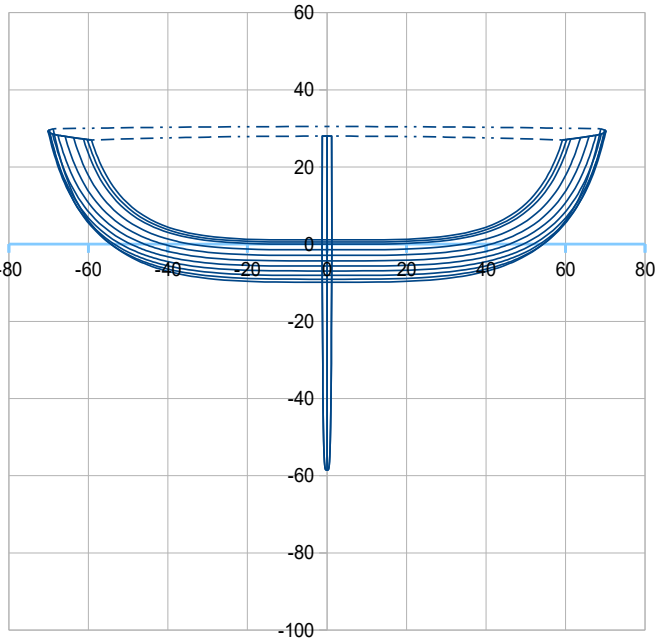
Annex 1 – The design process, from inception (V0 version) to the final version (V3c version)

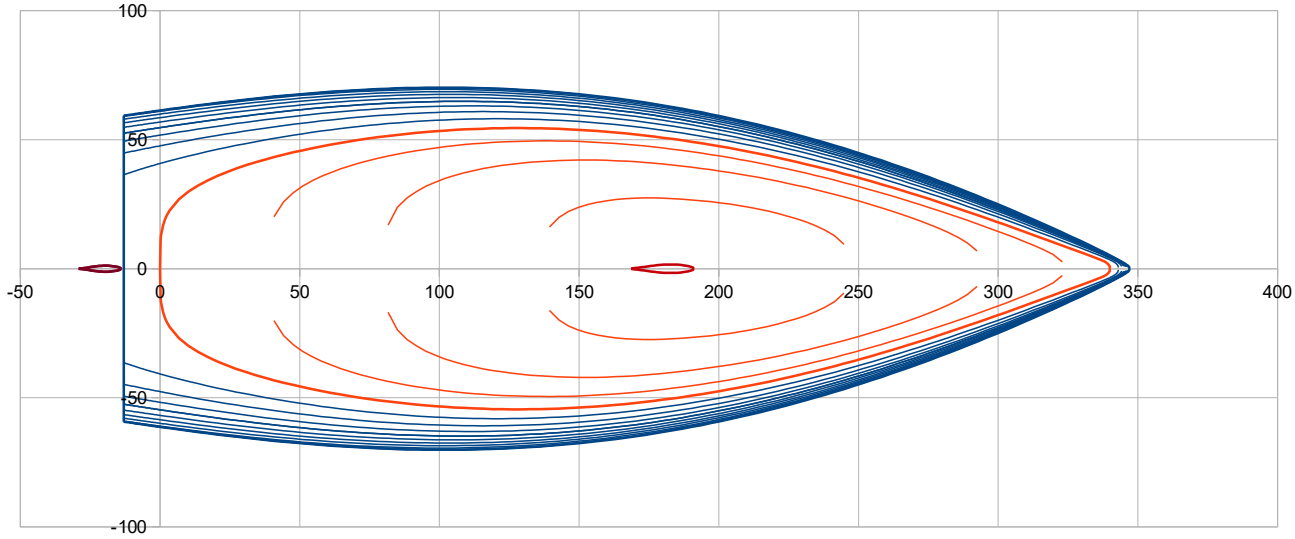
Dolfi 12 V0 (first approach) : Loa 3,60 m ; Lwl : 3,40 m ; Boa 1,40 m ; Bwl 1,09 m ; Draft 0,85 m

Linesplan with design waterline for displacement 180 kg









Russ comments on version V0 :

I'm not opposed to hard chines, especially aft. I know this is the current trend and may actually make construction easier. The construction will have less curve overall. It is not difficult to construct a chine with strip planking.

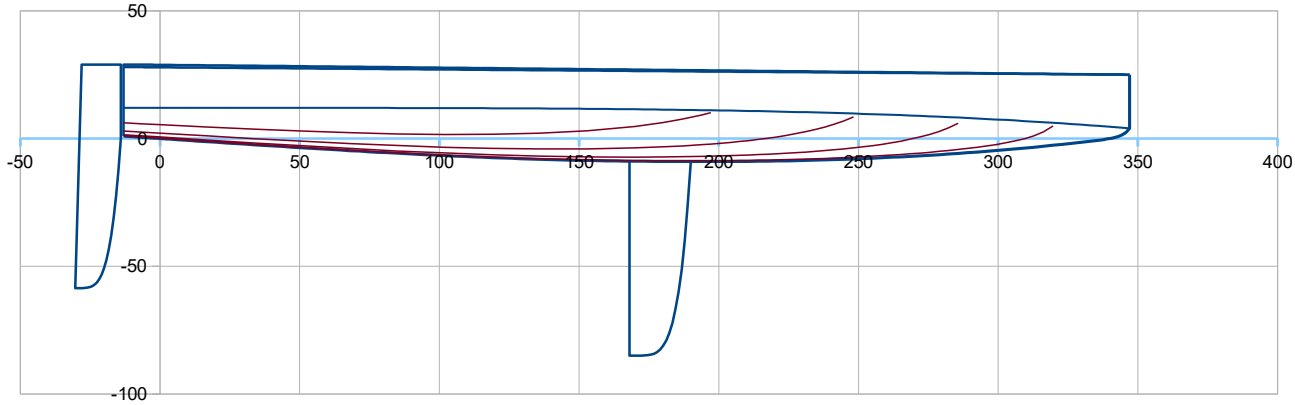
I would like less freeboard, primarily for storage requirements, especially for forward section. The forward section will nest in the aft section. I may build a double bottom in the aft section for self-bailing which would raise the nested height even further. Straighter sheer like the Truc 12 might make this easier. I like the bow profile of the Truc 12 also. https://www.inautia.com/boat-new-sailing-dinghy-crus-yacht-truc-12-4871411007145751577069705257455 7.html

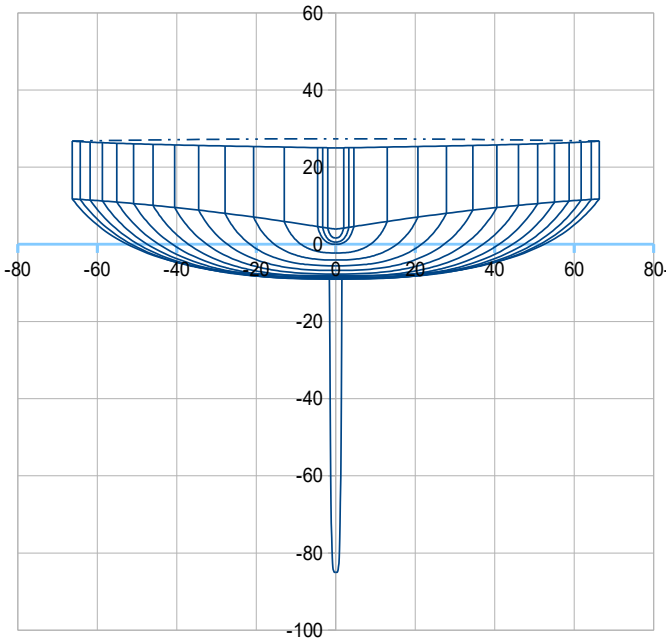
Design weight is for two crew. I will mostly sail alone. With my wife, I would sail in calmer conditions and almost always in flat water where we anchor Uproar (our cruising boat). So if buoyancy is a bit low for two crew, not a serious problem.

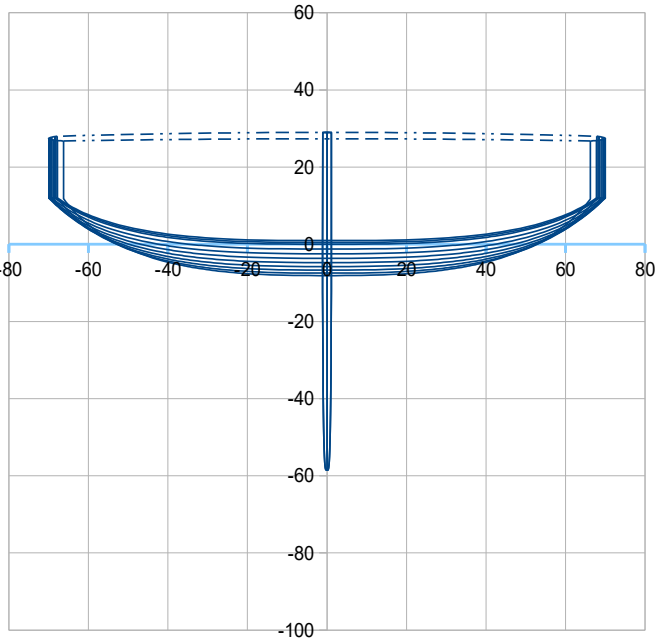
I like the sharper angle forward sections, currently on the NS12, 29er, etc. Again, if only one crew, is this possible?

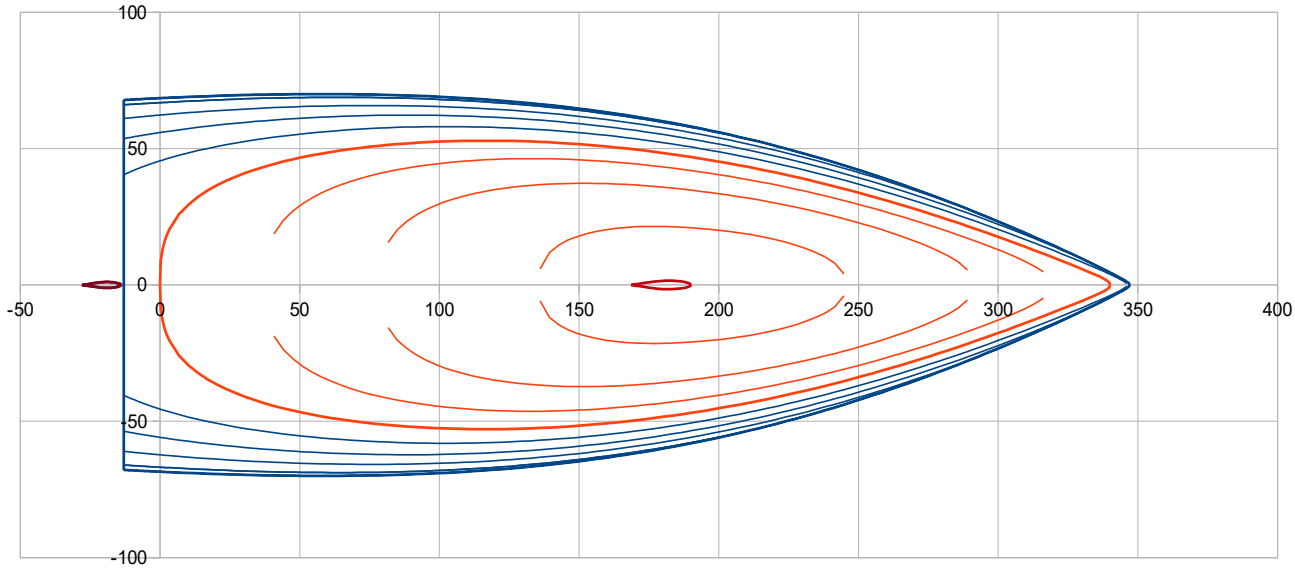
Dolfi 12 V1 : Loa 3,60 m ; Lwl : 3,40 m ; Boa 1,40 m ; Bwl 1,06 m ; Draft 0,85 m

Linesplan with design waterline for displacement 135 kg





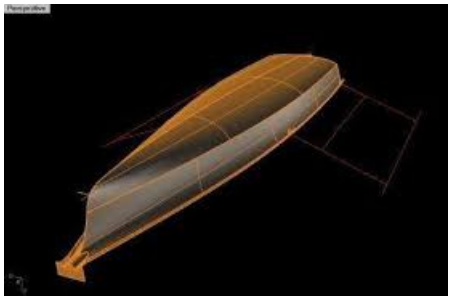


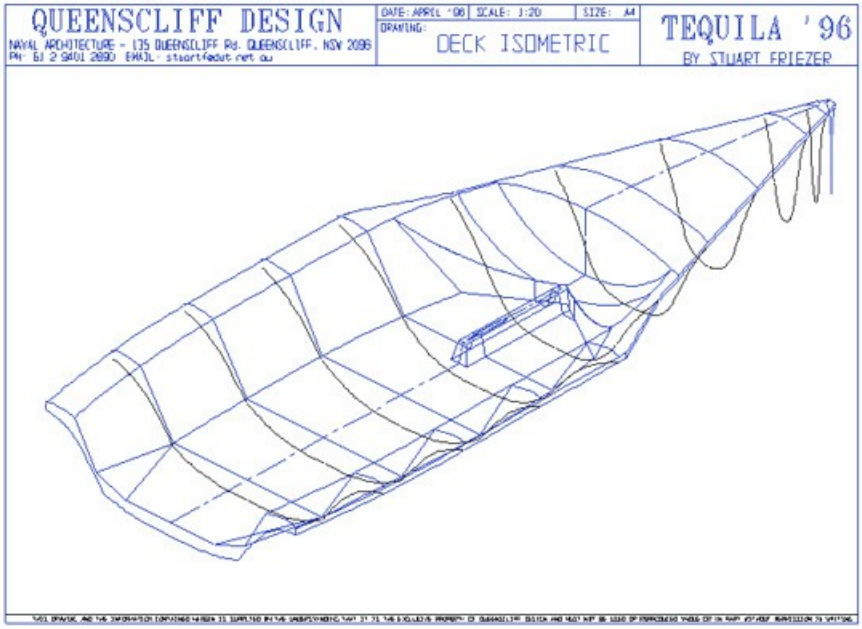


Russ comments for V1 :

The nesting I had in mind reverses the front section with the bow toward the transom, inside the aft section. The transom doesn't need to be so wide to accommodate nesting. The split would have to be such that the fore half length approximately 1,740m and aft half 1,860 to allow easy nesting with reinforcement at the center bulkhead. Gunwales would be external to hull, not like Truc12. I may consider making the gunwales in the hiking area on both sides of the hull for comfort! This I would work out with the scale model or via CAD. This would also dictate that the daggerboard be in the fore section, just forward of the split bulkhead. I anticipate building an adjustable mast step with wedges to adjust mast rake and fore/aft position. I do not like excessive weather helm. I set my boats up to be quite neutral.

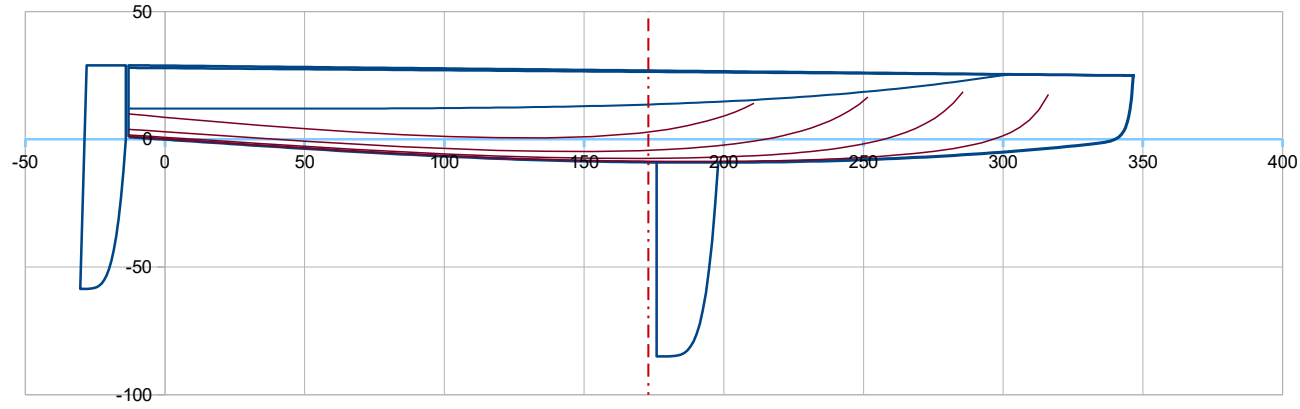
Since beam at transom does not have to accommodate nesting, should it be narrower or would V! have higher performance? I do like the sheer (x,z) V1. Is it possible to have the hard chine start about half-way back from the bow and have smooth chine in the bow section? Visually, this would look better, or perhaps soft chine all around is best. Again, open to your ideas. I have seen designs like the NS14 and Bieker Eaton 12 like this.

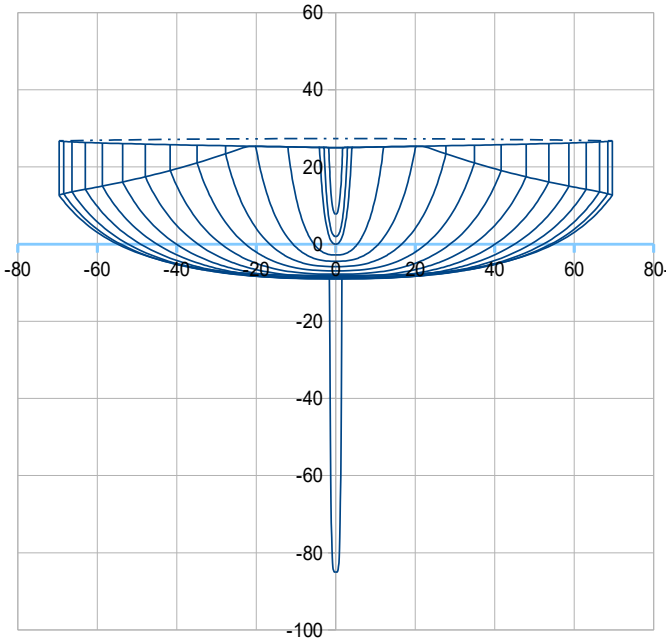


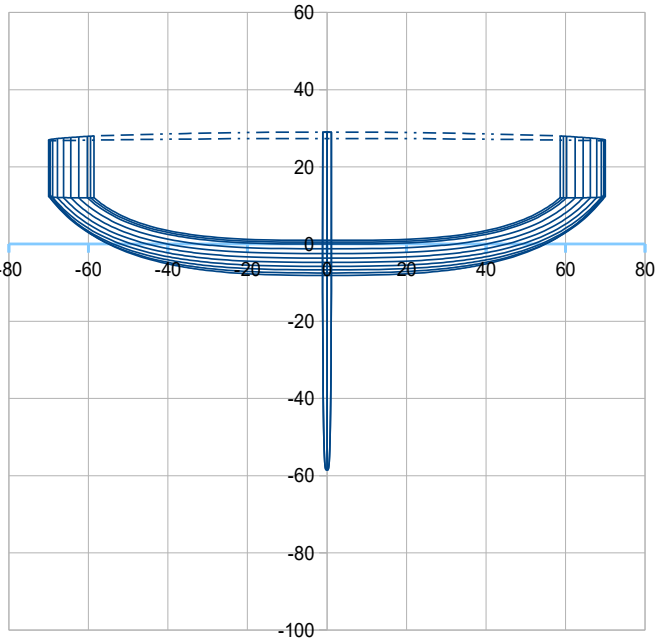


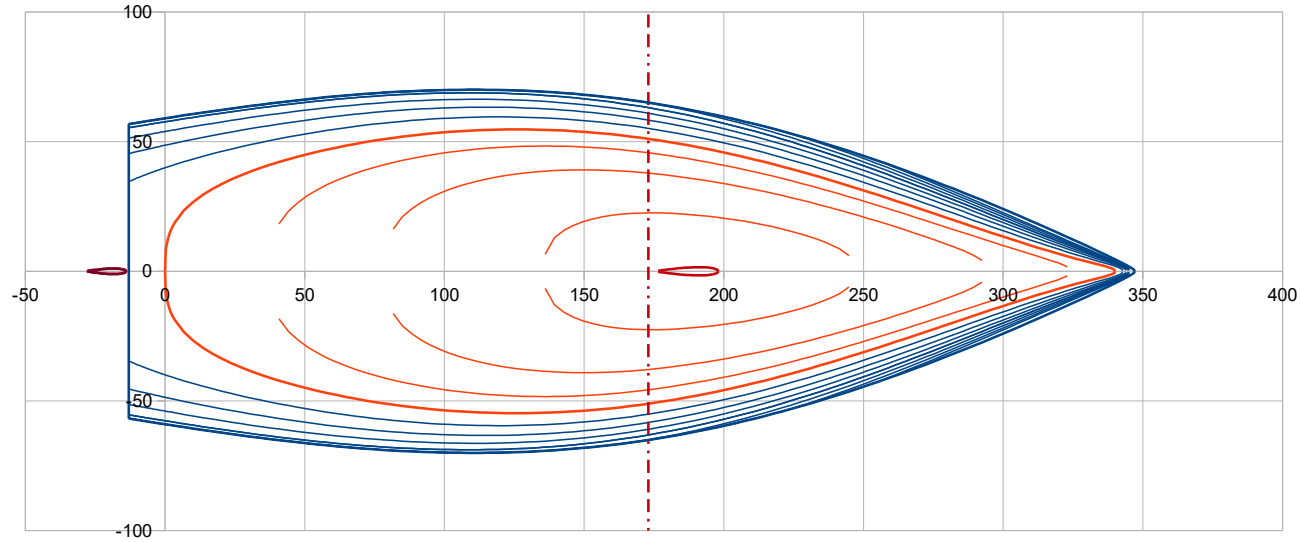
Dolfi 12 V2 : Loa 3,60 m ; Lwl : 3,40 m ; Boa 1,40 m ; Bwl 1,10 m ; Draft 0,85 m

Linesplan with design waterline for displacement 135 kg









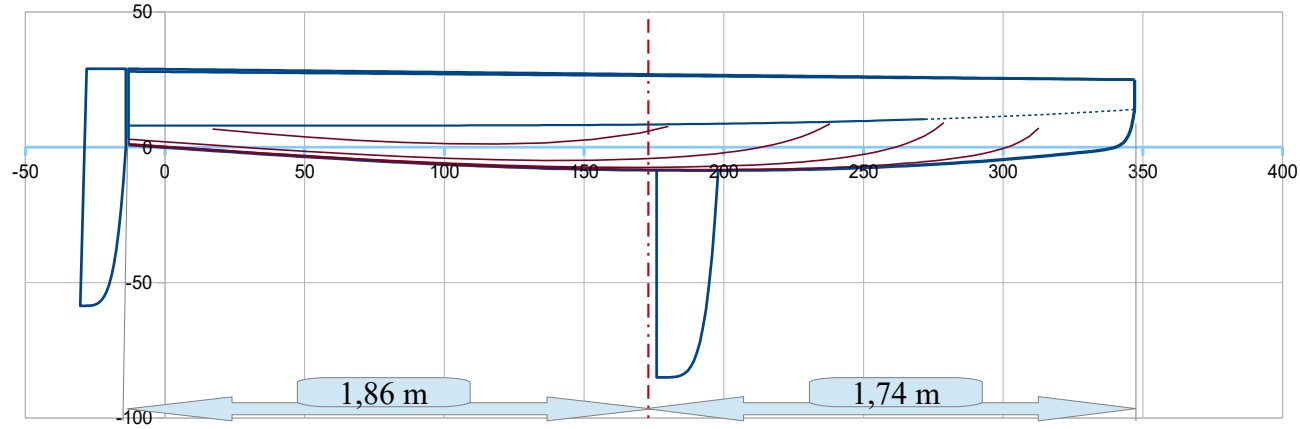
Russ comments on V2 :
If it is too difficult to have a “disappearing chine,” I think the round hull would work just fine. I don’t want to add a feature that does not add to performance or have another function. I do like the plumb bow of the Truc 12 and believe it will be quite easy to construct. A rounded hull would work just fine for me and probably be more beautiful.

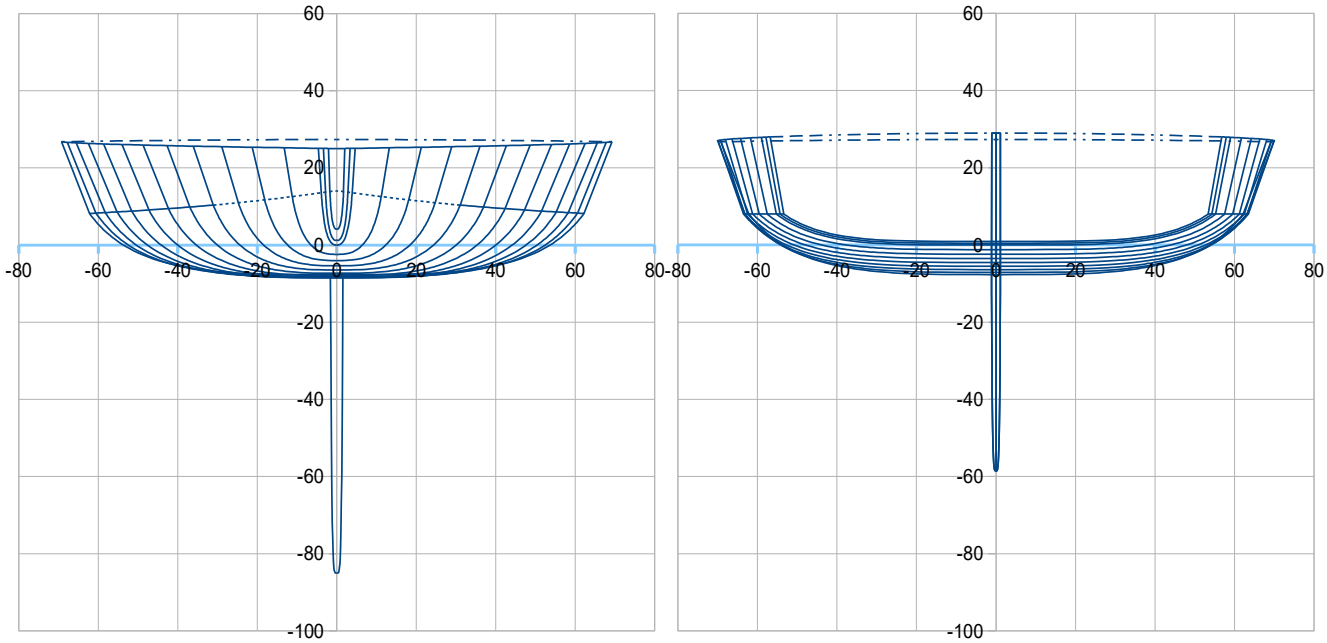
Jean-François answer, leading to V3 and V4 versions :
Finally I was able to adapt my application to generate a chine of which angulation decreases towards the front half and almost disappears after the C8 station. And I build a curve of control of this angulation which allows me to adjust this effect at best. So I deduced a Hard Chine version V3 attached. That said, I agree with you that a Round Bilge version V4 (attached) can also offer all around attractive performance. Two recent successful designs are respectively with and without hard chine : the RS Aero and the Melges 14.

The 2 versions V3 and V4 have quasi the same hydrostatics features and share the same intrinsic stability GM1°: I detailed my approach on that point, checking this metacentric height GM1° for 3 typical loading (55 kg, 85 kg, 140 kg), with in mind to propose you something always easily stable to have fun without worry. By contrast with some narrow waterline designs in search of edged performance, which are really challenging to master, I don't think it worth if not in the context of a competition.

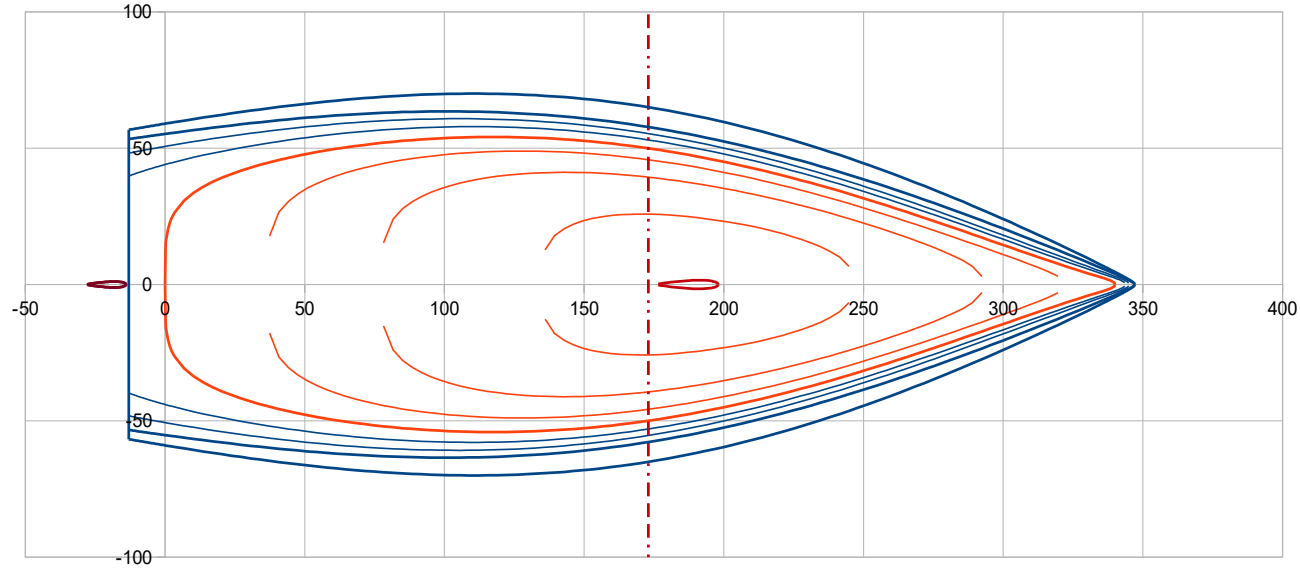
And of course, I still pay attention to the softness and regularity of the curvatures to ease the strip-planking building at best, and indicate the nesting split position as your spec.

Dolfi 12 V3 : Loa 3,60 m ; Lwl : 3,40 m ; Boa 1,40 m ; Bwl 1,08 m ; Draft 0,85 m
Linesplan with design waterline for displacement 135 kg



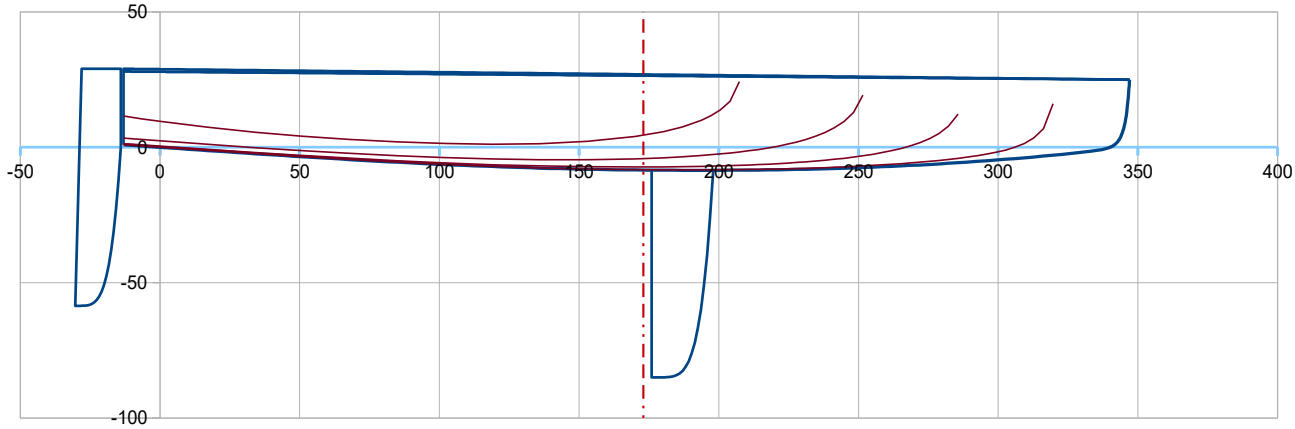


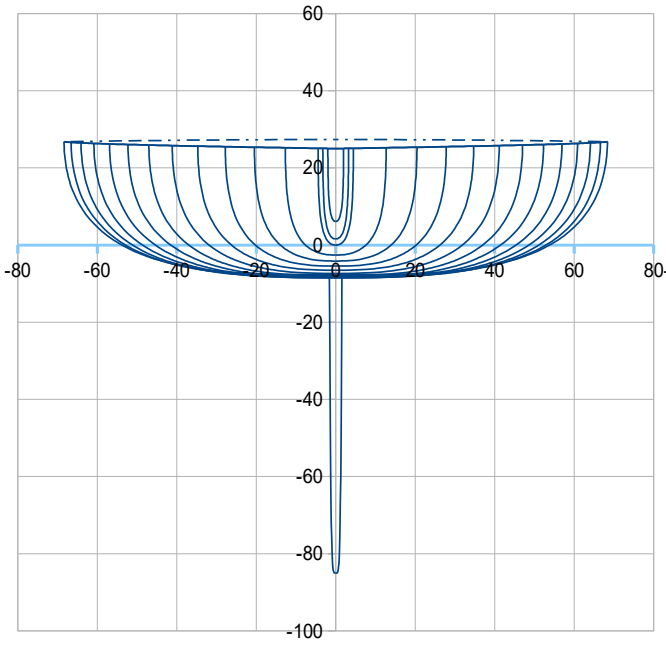
>>> the hard chine of angulation decreases towards the front half and vanishes in the fore sections.

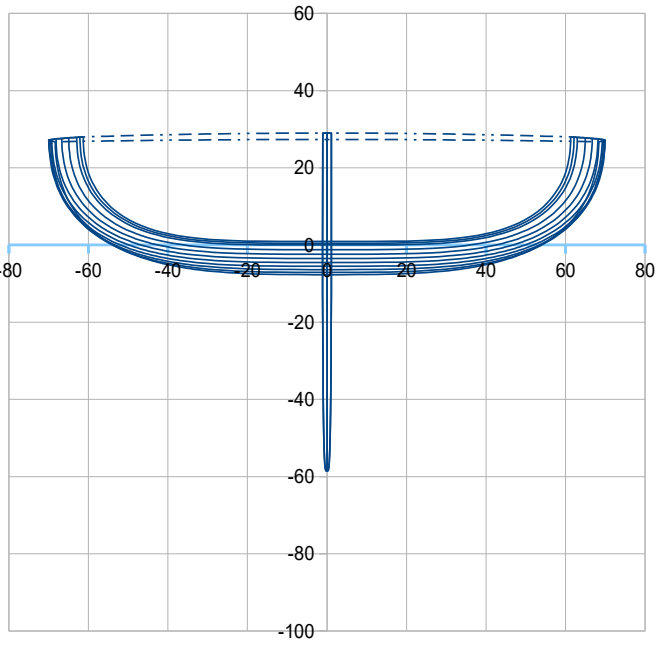


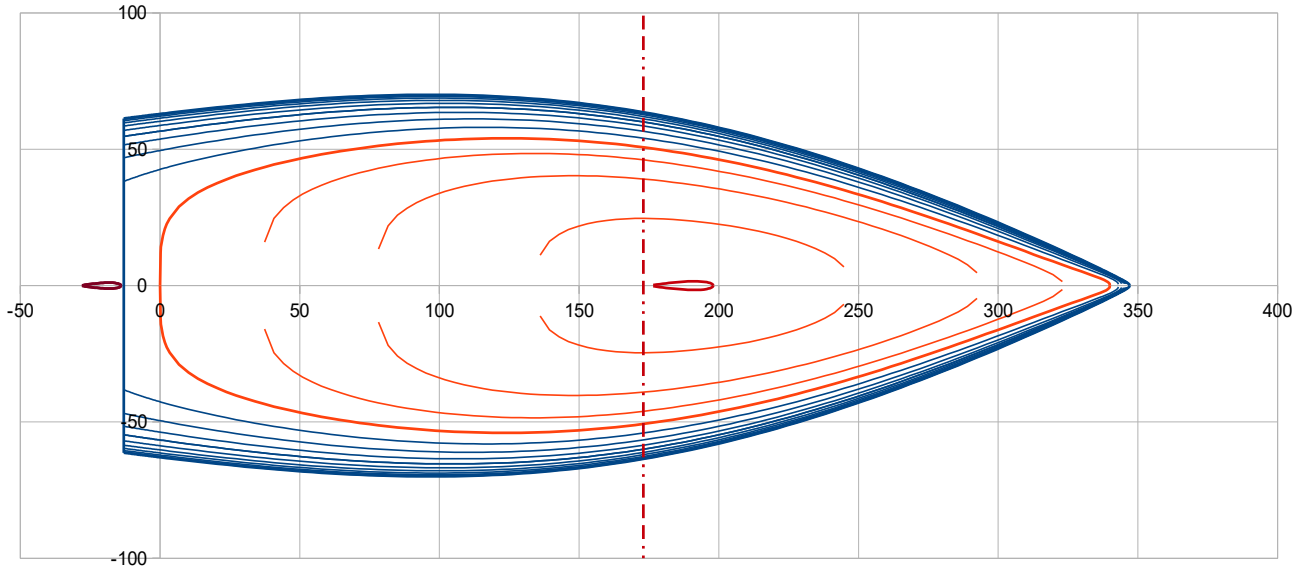
Dolfi 12 V4 : Loa 3,60 m ; Lwl : 3,40 m ; Boa 1,40 m ; Bwl 1,08 m ; Draft 0,85 m

Linesplan with design waterline for displacement 135 kg









Russ comments on versions V3 and V4 :

I like the V3, hard chine, zero differential angle at the bow. It is a visually appealing design. I see how you were able to manipulate this angle. Plus the stability numbers look good. V4 round bilge looks great as well. It seems the hard chine aft is to gain waterline beam aft but these two designs seem to have similar shapes below waterline. Can you please describe the differences in below-waterline shape?

I do like the plumb bow of the Melges 14 and Truc 12. I imagine this is just an appearance change.

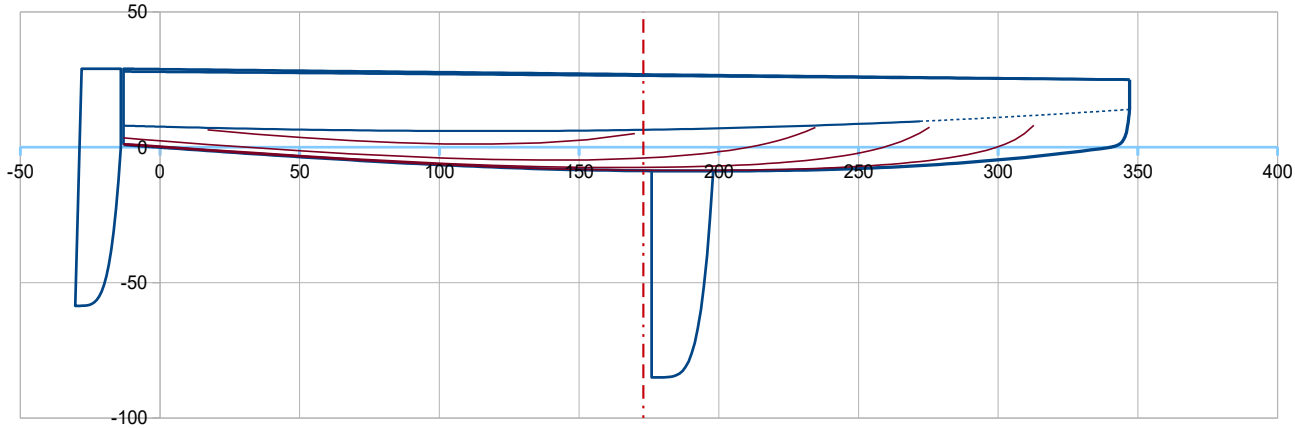
Jean-François answer, leading to the V3b version :

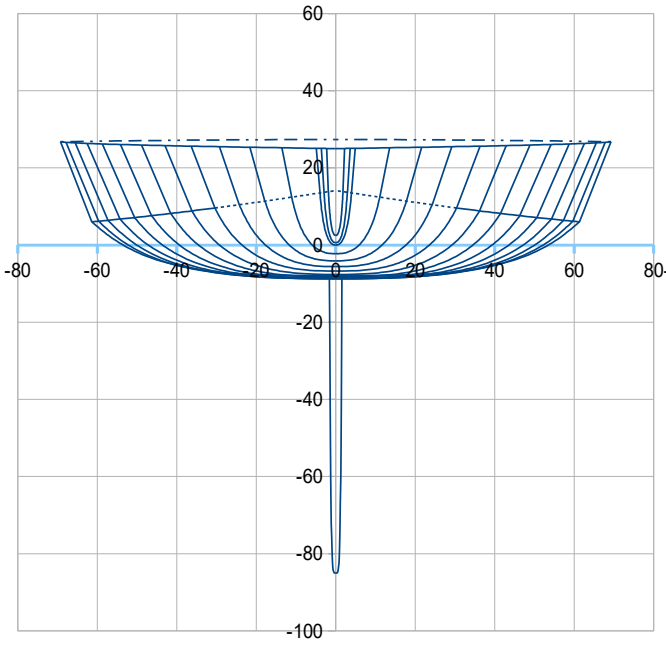
Actually the waterlines are very similar (it was the objective), the main difference is the presence of the chine which is supposed to improve the way the water escape (below the chine) in the half part, in the same way the upper part (above the chine) can better channeled the spray with minimum drag.

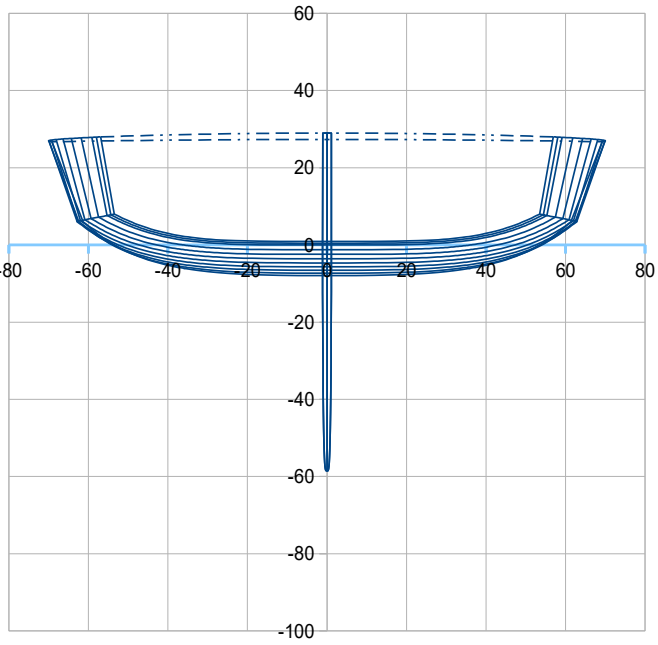
I could not resist to refine the V3 version, so here attached the V3b one with some improvements (in my opinion), like more plumb bow and pointy fore waterlines (for a better passage in choppy sea state), and more strechted tranversal lines below the chine in the aft sections, in relation with the comment above in order to favor the water escape at speed.

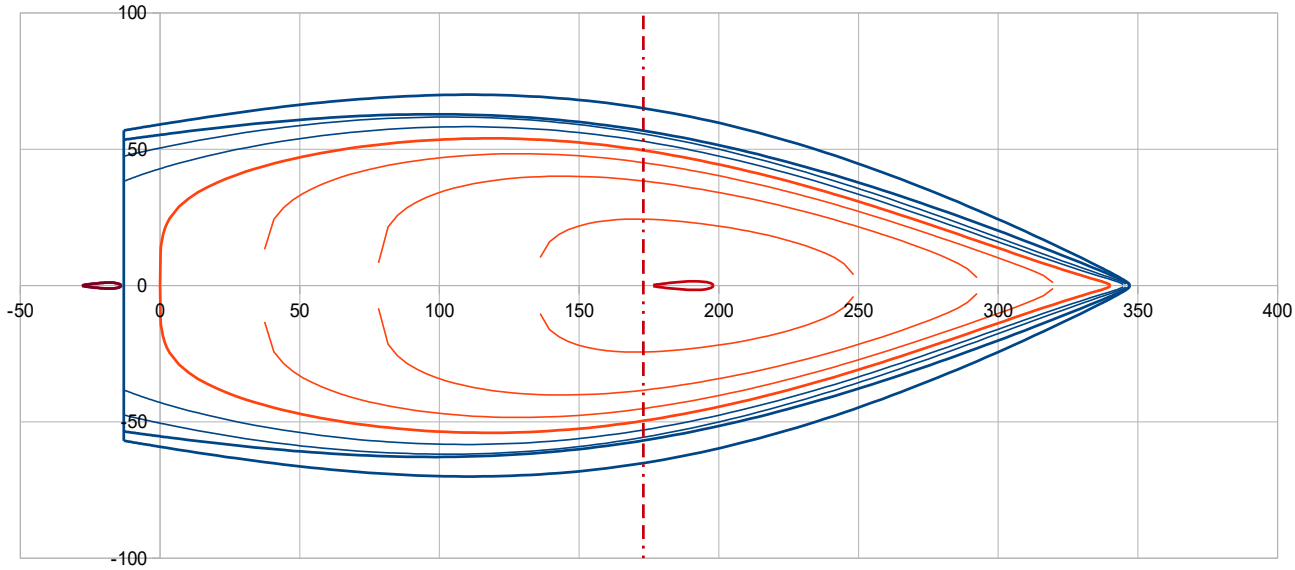
Dolfi 12 V3b : Loa 3,60 m ; Lwl : 3,40 m ; Boa 1,40 m ; Bwl 1,08 m ; Draft 0,85 m

Linesplan with design waterline for displacement 135 kg









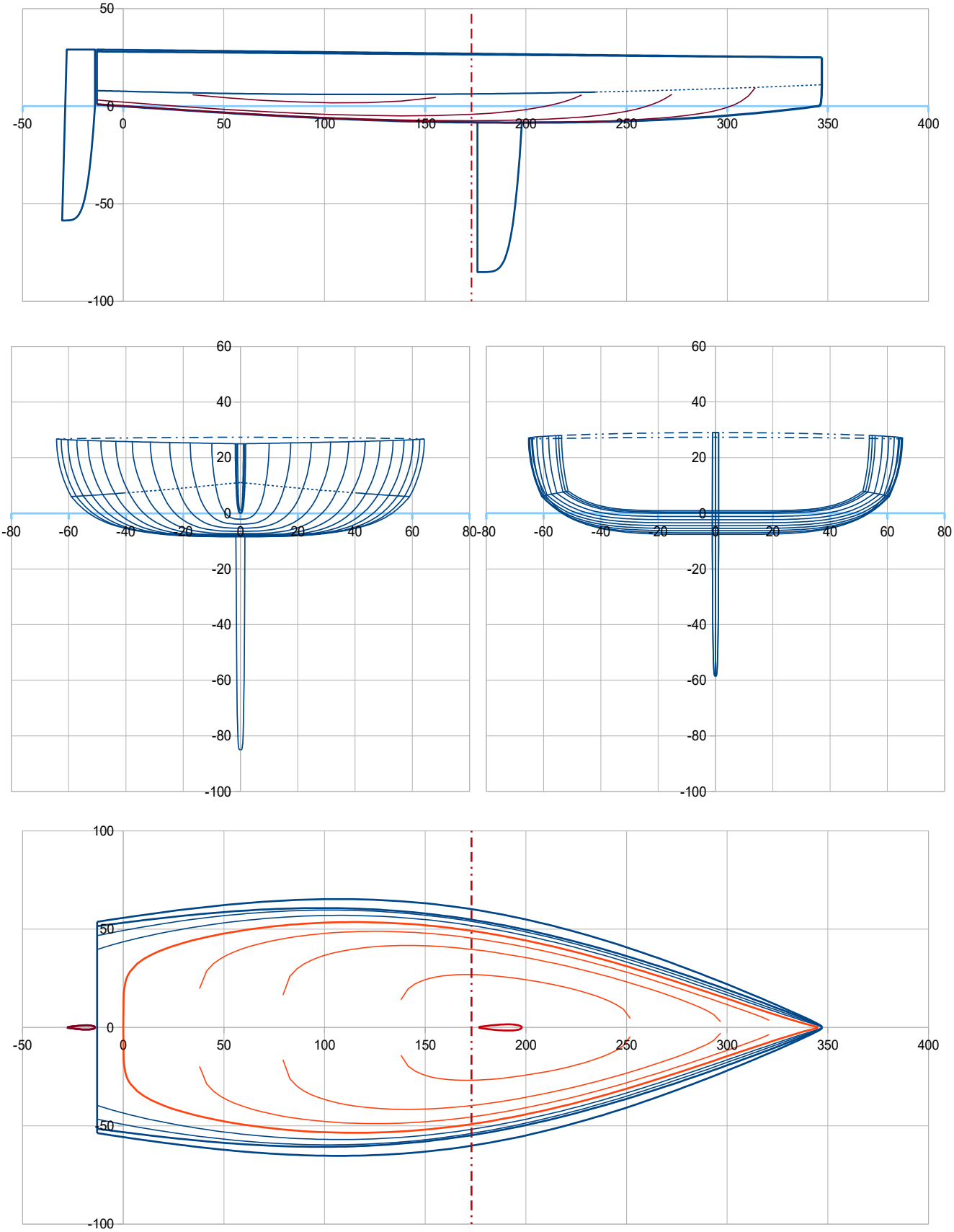
Russ comments on V3b :

This design is beautiful. I do have two ideas for slight changes. Could the bow be a little more “plumb?” It seems straighter, vertical on the Melges 14 and Truc 12. I would also like the topsides, above the chine to have a slight curve. They appear just straight. This might narrow the beam at sheer a little and reduce the flare, but I am adding an external gunwale which will give more hiking moment. Of course, curve to the topsides will reduce righting moment when heeled a bit. I do like curves. I like the lesser amount of flare on V4 round bottom. Can we go in this direction?

The bow section, with narrower entry is great, I like this.

Dolfi 12 V3c : Loa 3,60 m ; Lwl : 3,45 m ; Boa 1,31 m ; Bwl 1,07 m ; Draft 0,85 m

Linesplan with design waterline for displacement 135 kg



>>> Russ approval for this V3c version : “I like this design. No changes, it looks just great.”