2026 02

Sailboat project examples with « Gene-Hull Sailboat 3.5 »

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« Gene-Hull Sailboat » spreadsheet application, in its new proposed version 3.5, is in line and upgraded from the previous version 3.4.

Gene-Hull sailboat 3.5 is here below illustrated by the generation of some reference boats proposed as a starting point for a project + also various hulls inspired by existing or historical boats.

The corresponding hulls input data are stored in the « Hulls storage » sheet of the application, inc. the input data for the keel, the rudder, the sailplan, the mass spreadsheet and the loading. So you can reproduce them by copy/paste the corresponding data from the « Hulls storage » sheet to the « Gene-Hull » one.

Examples shown with Gene-Hull Sailboat 3.5 :

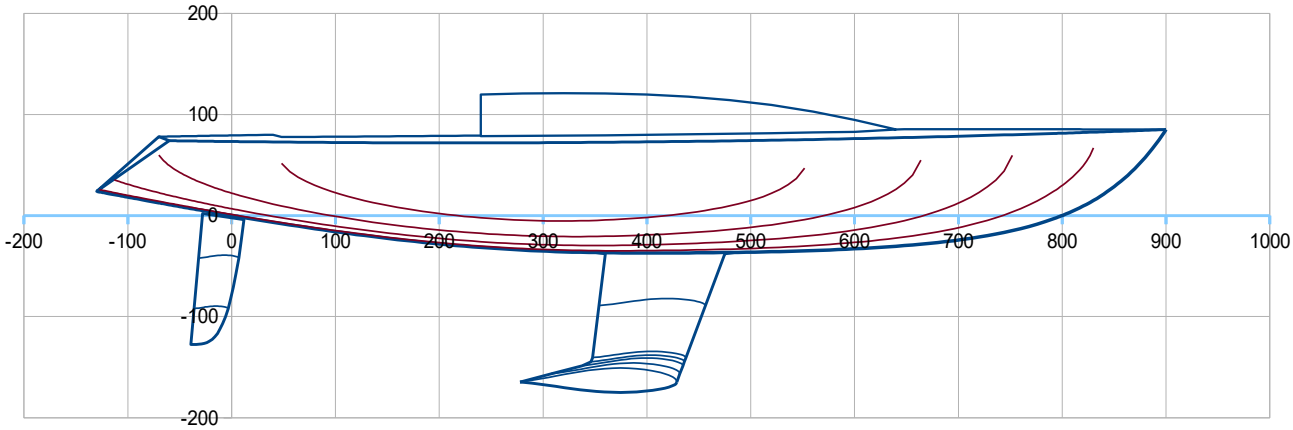
- **V1 reference modern classic sailboat :** all functions are detailed for this example (Hull and Appendages, Hydrostatics data, Sailplan, Mass spreadsheet, Stability and righting moment with a loading)
- **V1,1 variant –** with a modified bow line
- **V1,2 variant –** with V sections only
- **V1,3 variant –** with some tumblehome in the sections
- **U1 reference modern sailboat**
- **U1,1 variant –** with a scow bow
- **B52**, inspired by « Bojar » flush deck cutter 1937 / Johan Anker
- **Classic 6m JI**, inspired by this metric class with a classic approach
- **S30**, inspired by S30 / Knud Reimers
- **T37**, inspired by Tina / Dick Carter
- **M32**, inspired by Melges 32 / Reichel Pugh
- **Blue Water 39,** inspired by Corbin 39 / Robert Dufour - Marius Corbin
- **T10**, inspired by Tofinou 10 / Joubert-Nivelt
- **Dolfi 22,7** , inspired by 15m2 SNS swiss class
- **Dolfi 32S**, inspired by Beneteau Figaro III / VPLP
- **Syd 38**, inspired by Sydney 38 / Murray Burns Dovell
- **Mini 650**, with a classic bow
- **Mini 650 variant,** with a mid-scow bow,
- **MO24**, inspired by the Moore 24,
- **ULDB 50**, inspired by the Swede 55 / Knud Reimers
- **DH17**, inspired by the Drak Harbor 17,5 / B.B. Crowninshield
- **AL29**, inspired by Aloa 29 / Jean-Marie Finot
- **Fa40**, inspired by the Farr 40 One Design / Bruce Farr
- **J120**, inspired by the J/120 / Rod Johnstone

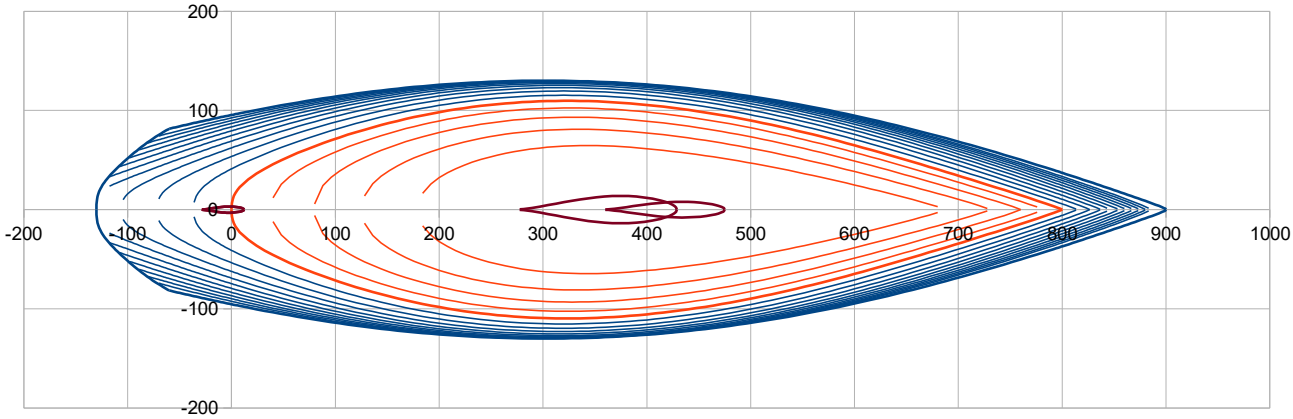
Boat V1 modern classic daysailer

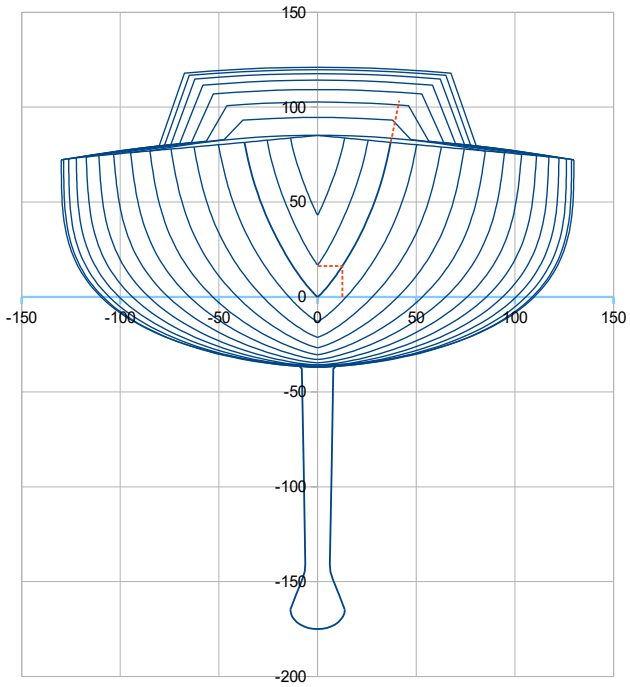
Boat V1 - Step 1 : Hull and appendages

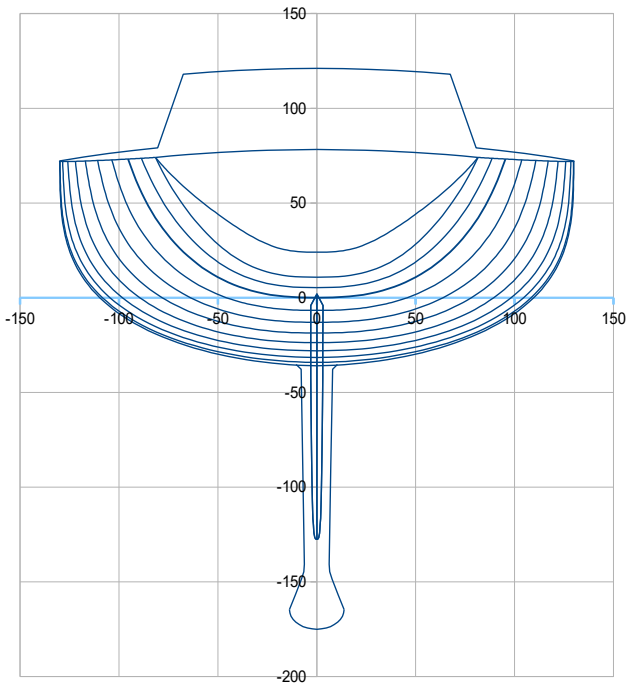
Loa 10,30 m ; Lwl 8,00 m ; B 2,60 m ; Draft 1,75 m ; Displacement : 2673 kg ; Keel-bulb 1090 kg

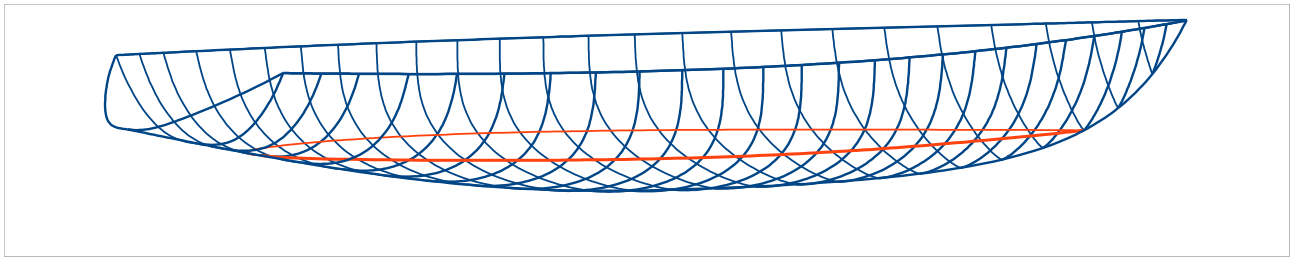
>> LCB hull 47,06 %Lwl ; Cp hull : 0,545 ; Sw : 17,38 m2 ; DLR : 145 ; Ballast ratio : 40,8 %









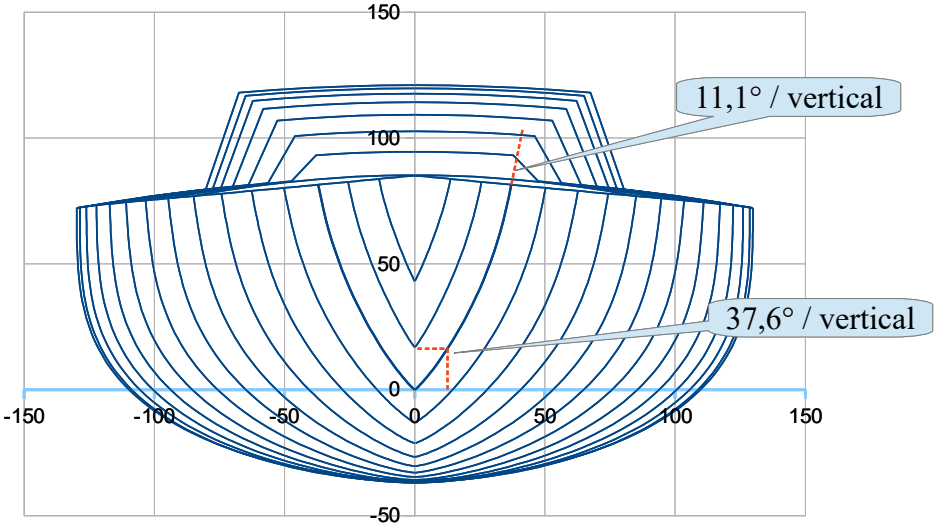


More on the new output data proposed about the section C10 (the fore perpendicular)

>>> on the right side (columns J and K, lines 59 to 64) are given the angle / vertical of the section line at Z = sheer and Z = 20% sheer + a convex check : positive = all sections are fully convex , negative = some sections could show concavity . The sections parameter C PE1 in particular has influence on these output.

Example 1 : The data for the boat V1 , giving for section C10 respectively angle 11,1° at top (Z = sheer) and 37,6° at root (excatly at Z = 20% sheer) and convex check is positive, i.e. no concavity in the sections.

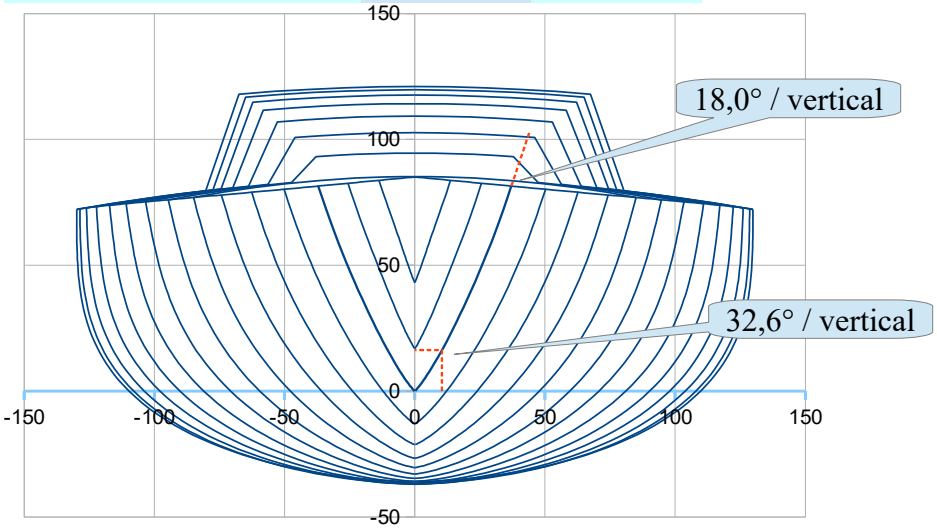
	PE1	C PE1	PE2
Fore	2,000	1,630	1,000
Mid	3,310	1,000	1,700
Aft	2,000	1,490	2,800



Angle C10 at Z sheer (°)
11,1
Angle C10 at Z 20%sheer
37,6
Convex check
0,04

Example 2 : Fore C PE1 is increased to 2,0 and this introduces some concavity in the top ends of some sections. >>> For section C10 : respectively angle 18,0° at top (Z = sheer) and 32,6° at root (at Z = 20% sheer) and convex check is negative, i.e. concavity in the top ends of some sections.

	PE1	C PE1	PE2
Fore	2,000	2,000	1,000
Mid	3,310	1,000	1,700
Aft	2,000	1,490	2,800



Angle C10 at Z sheer (°)
18,0
Angle C10 at Z 20%sheer
32,6
Convex check
-0,03

So, with the help of such output data, you can iterate on the sections parameters in order to have precisely the fore sections you want, in particular for the V sections : with a V more or less sharp at root and more or less flared at top.

Hydrostatics data (at design displacement 2673 kg, i.e. light weight boat without load)

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

2.1 Hull

Loa (m)	**10,30**	**Lwl (m)**	**8,00**	> Hull speed (Knots)	6,89	at Froude 0,4		
>> ft	*33,79*		*26,25*					
Boa (m)	**2,60**	**at X (% Lwl)**	**38,0**	Bsheer (m)	2,60	at X (% Lwl)	38,0	
>> ft	*8,53*							
Bwl (m)	**2,19**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,844			
>> ft	*7,20*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,370**	**at X (%Lwl)**	**50**		**0,74**	**0,72**	**0,85**	
>> ft	*1,21*			*>> ft*	*2,43*	*2,36*	*2,79*	
Displacement at H0 (m3)	**2,44334**	**at LCB (m)**	**3,765**	**LCB (%Lwl)**	**47,06**	**ZCB (m)**	**-0,130**	
>> lbs	*5521*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,43*	
Cp	**0,545**							
Sf (m2)	**11,85**	**at LCF (m)**	**3,586**	**LCF (%Lwl)**	**44,83**	>>> LCB – LCF (%Lwl)	2,23	
>> ft2	*127,51*	*>> ft*	*11,77*					
Angle Freeboard/Half beam	29,1	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**18,6**	**at 95% Lwl**		
Sw (m2)	**12,80**	>Sw/D^(2/3)	7,06					
>> ft2	*137,82*							
Shull (m2)	**29,47**	**at X (m)**	**3,636**	**Z (m)**	**0,093**			
>> ft2	*317,20*	*>> ft*	*11,93*	*>> ft*	*0,30*			
Sdeck (m2)	**20,09**	**at X (m)**	**3,511**	**Z (m)**	**0,79**			
>> ft2	*216,21*	*>> ft*	*11,52*	*>> ft*	*2,59*			

2.2 Keel

Vol. keel(m3)	**0,14938**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**	
		>> ft	*13,18*			*>> ft*	*-3,60*	
Ballast (kg)	**1090,5**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**	
>> lbs	*2404*	*>> ft*	*13,18*			*>> ft*	*-3,60*	
Draft oa (m)	**1,75**		**Sw (m2)**	**3,66**		**Sxz (m2)**	**1,36**	
>> ft	*5,74*		*>> ft2*	*39,45*		*>> ft2*	*14,61*	
CLR (m)	**4,34**	**CLR (%Lwl)**	**54,23**	*CLR = Center of Lateral Resistance*				
>> ft	*14,23*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,01486**	**at X (m)**	**-0,12**	**X (%Lwl)**	**-1,47**	**Z (m)**	**-0,54**	
Sw (m2)	**0,91**	*>> ft*	*-0,39*			**Sxz (m2)**	**0,44**	per rudder
>> ft2	*9,80*					*>> ft2*	*4,71*	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**2,60757**	**at LCB (m)**	**3,757**	**LCB (%Lwl)**	**46,96**	**at ZCB (m)**	**-0,188**	
(kg)	**2673**	*>> ft*	*12,33*			*>> ft*	*-0,62*	
>> lbs	*5892*							
, of wich Ballast (kg)	**1090**	**at Xg (m)**	**4,019**	**Xg (%Lwl)**	**50,23**	**at Zg (m)**	**-1,098**	
>> lbs	*2404*	*>> ft*	*13,18*			*>> ft*	*-3,60*	
>> % Ballast	40,8							
Sw (m2)	**17,38**	>Sw/D^(2/3)	9,17	Lwl/D^(1/3)	5,81			
>> ft2	*187,07*			***DLR***	***145***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**2673**	**at Xg (m)**	**3,782**	**Xg (%Lwl)**	**47,28**	**at Zg (m)**	**-0,078**

Some more information on the hydrostatics data :

In 2.1 Hull :

Hull speed V at Froude 0,4 : is based on the following formula : 0,4 = V / (g Lwl)^0,5
>>> it is the speed that usually can be reached in displacement mode, e.g. usually when beam reaching or downwind sailing providing there is sufficient wind and sail area. For the boat V1, it is 6,9 Knots.

Boa (overall) and Bsheer (at sheer line) : can be different in case of tumblehome sections. Then Boa can be slightly greater than Bsheer

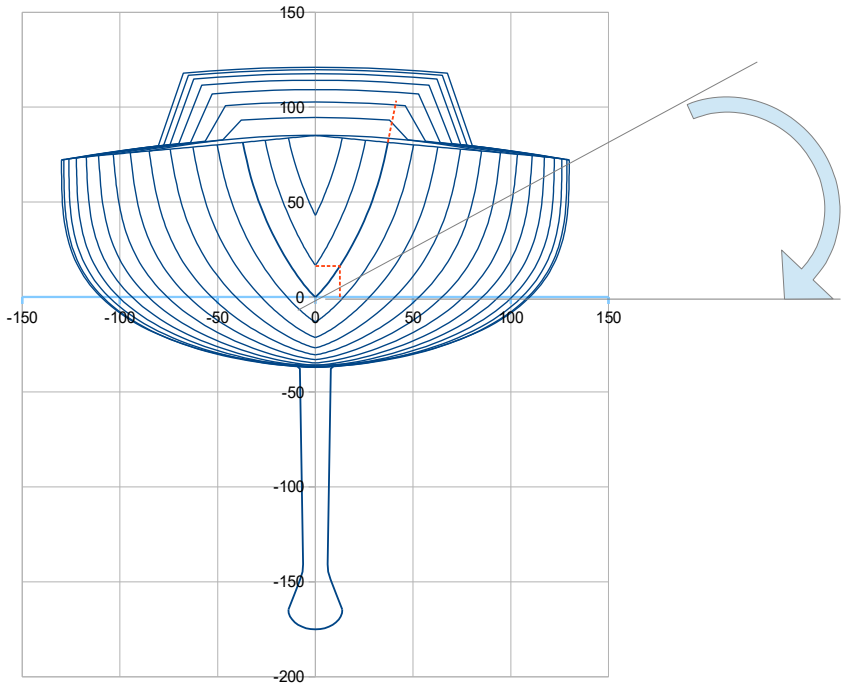
Tc (m) : hull body maximum draft (it is an input data)

Hull body / LCB (Longitudinal Center of Buoyancy) **and Cp** (Prismatic coefficient) : optimal values are proposed by L. Larsson and Rolf E Eliasson in « Principles of yacht Design », based on Delft series of parent models :

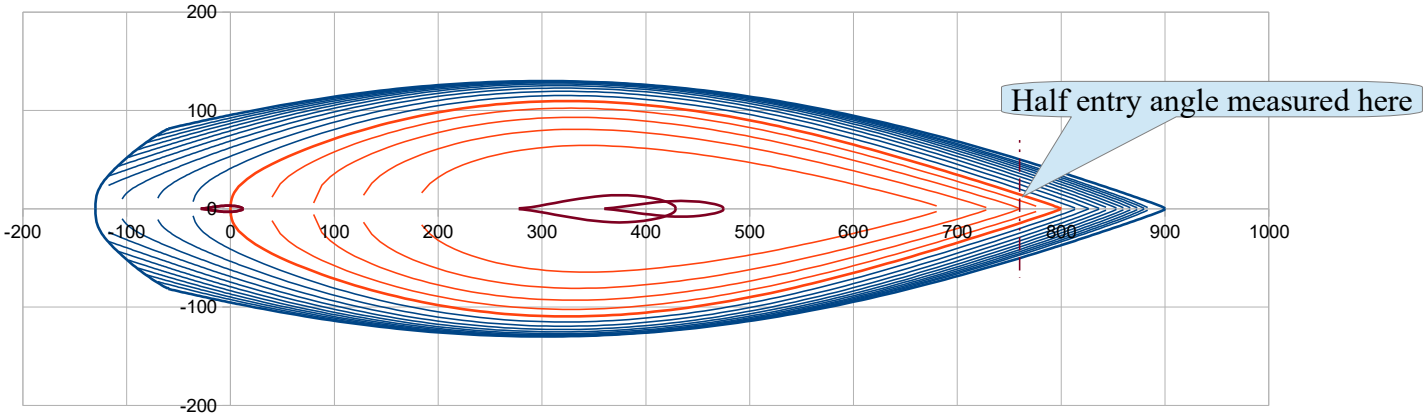
- Optimal LCB can be choosen preferably in the 46% - 47% zone to minimize the residuary drag for the Froude range 0,3 to 0,4
- Optimal Cp choice depends of the Froude main objective for the design : e.g. can be around 0,56 for Froude 0,35 ; from 0,56 to 0,52 for less Froude objective ; from 0,56 to 0,60 for more Froude objective.

Sf and its longitudinal position LCF : Sf is the floatation waterplane area. LCF is usually behind LCB and LCB-LCF (%Lwl) is also given as an indication. In the stability ouput data (here after), LCB-LCF with heel is given, and the two centers LCB and LCF are showed in the floatation area.

Angle Free-board / half beam : this geometrical data is given at that preliminary stage (before the stability with load following study) to help appreciate the heel angle which could put the sheer line in the water. Usually, due to the exact computation of the heeled hull, if an heel angle > 30° is your objective for such occurrence, a geometrical angle of around 26° to 28° leads to this objective.



Half entry angle : this data is proposed computed at 95 % Lwl, i.e. not exactly at the fore end waterplane fore end in order to mitigate any hollow or roundness influence. For the Boat V1 example, it is 18,6° :



Sw is the wetted surface of the hull body

Shull is the total surface of the hull body and X,Z its geometrical center, **Sdeck** is the total surface of the deck assumed flush (the roof is not taken into account) and X,Z its geometrical geometry. These data are used in the mass spreadsheet preliminary estimation.

In 2,2 Keel :

Ballast (kg) = it is the mass of the keel taking into account the two input densities for the wing and for the bulb, in this case of « keel with bulb » type. In the example above, the two densities are 7,3 i.e. cast iron material . If we change the Bulb density to 11,35 / Lead material, this changes not only the ballast weight but also its X, Z position :

Density Wing	**7,30**						
Density Bulb	**7,30**						
		>>>					
Ballast (kg)	**1090,5**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**
Density Wing	**7,30**						
Density Bulb	**11,35**						
		>>>					
Ballast (kg)	**1300,7**	**at X (m)**	**3,979**	**X (%Lwl)**	**49,74**	**Z (m)**	**-1,180**

For the « keel without bulb » type, we consider only one material density.

Sxz : it is the projected area of the keel profile in the vertical plan of symmetry. This data is used in the sailplan sheet for the design ratio « **Skeel / St (%)** » where Skeel is this Sxz and St the area of the two sail triangles main and fore, in order to appreciate if there is enough keel area to provide the lateral resistance. An average of 3,5% ± 0,75 % is proposed for this ratio by L. Larsson and Rolf E Eliasson in « Principles of Yacht Design ».

CLR : it is the Center of Lateral Ressitance, estimated by the metod of the keel profile extended to the waterline, as proposed by L. Larsson and Rolf E Eliasson in « Principles of Yacht Design ». This data is used in the Sailplan sheet, to estimate the Lead = CE – CLR (%Lwl), more details are given here after for the Sailplan issue. The CLR is estimated à Z 45% and Chord 25% to 35% depending of of the keel wing shape in order to cover the fin keel to long keel cases.

In 2,3 Rudder :

Sxz : it is the projected area of the rudder profile in the vertical plan of symmetry. This data is used in the sailplan sheet for the design ratio « **Srudder / St (%)** » where Srudder is this Sxz and St the area of the two sail triangles main and fore, in order to appreciate if there is enough rudder area to provide the lateral resistance. An average of 1,4% (inc. the skeg area if any) is proposed for this ratio by L. Larsson and Rolf E Eliasson in « Principles of Yacht Design », with 1% the lower limit and 2% the upper limit. In case of twin rudders, the area of one rudder is taken into account for this criteria.

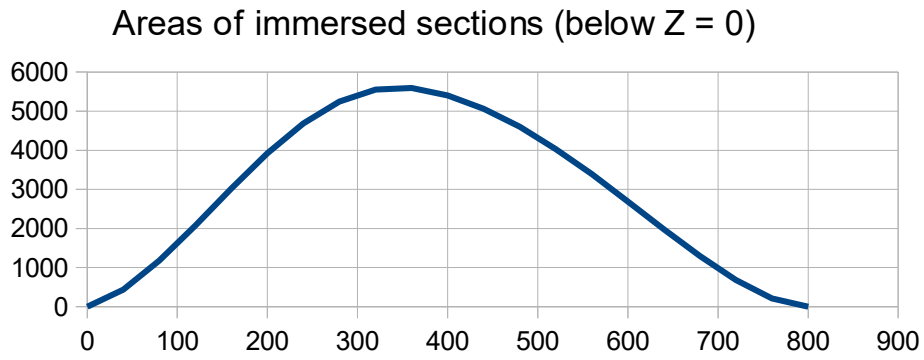
In 2,4 Hull + Keel + Rudder(s) :

DLR : the Displacement/Length ratio is of first importance, its value should be an objective for the naval architect in relation with the type of yachts he wants to design. The classification, as proposed by various authors, can be as follows :

Boat Type	DLR
Ultra-light ocean racer	60 - 100
Very light ocean racer	100 - 150
Light ocean racer	150 - 200
Light ocean cruiser	200 - 250
Average ocean cruiser	250 - 300
Moderately heavy ocean cruiser	300 - 350
Heavy ocean cruiser	350 - 400+

To note that the ability of planing is considered beginning around DLR < 125 . For the Displacement, one can use either the light ship weight or the loaded weight to see the evolution of the DLR with the weight, especially for small boats where the crew weight is important in %.

A DLR objective means a more or less heavy scantlings for the hull structure, a more or less heavy accomodations inside the cabin, etc … Once a DLR objective is given to guide the design process, the mass spreadsheet and the construction technology should be in tune and reflect the reality of this figure. Practically, a preliminary inquiry of existing equivalent boats and their DLR can give clue of the relevance of your choice. The areas of immersed sections is also given :



Boat V1 - Step 2 sailplan : Input data (yellow cases) for a 2D Sailplan early stage definition, and output data including the « Lead » (CE-CLR) and usual ratios : Skeel/St, Srudder/St, St(or SA)/Sw, St (or SA)/D^(2/3).

Sailplan – early stage definition

Data to enter :		>> in feet
Xmast (m)	4,78	15,68
Zboom(m)	1,88	6,17
I (m)	11,00	36,09
J (m)	3,55	11,65
P (m)	11,30	37,07
E (m)	3,40	11,15
Jib LP (m)	4,35	14,27
Main Roach	2,00	Coeff ≥1
Fat head (m)	0,00	753,47
Spi (m2)	70,00	
sym0 asym1	0	
Extra Top(cm	0	0 by default
Luff top (cm)	0	0 by default

Results considering St = fore + main triangles and its geometrical center CE for the Lead estimation

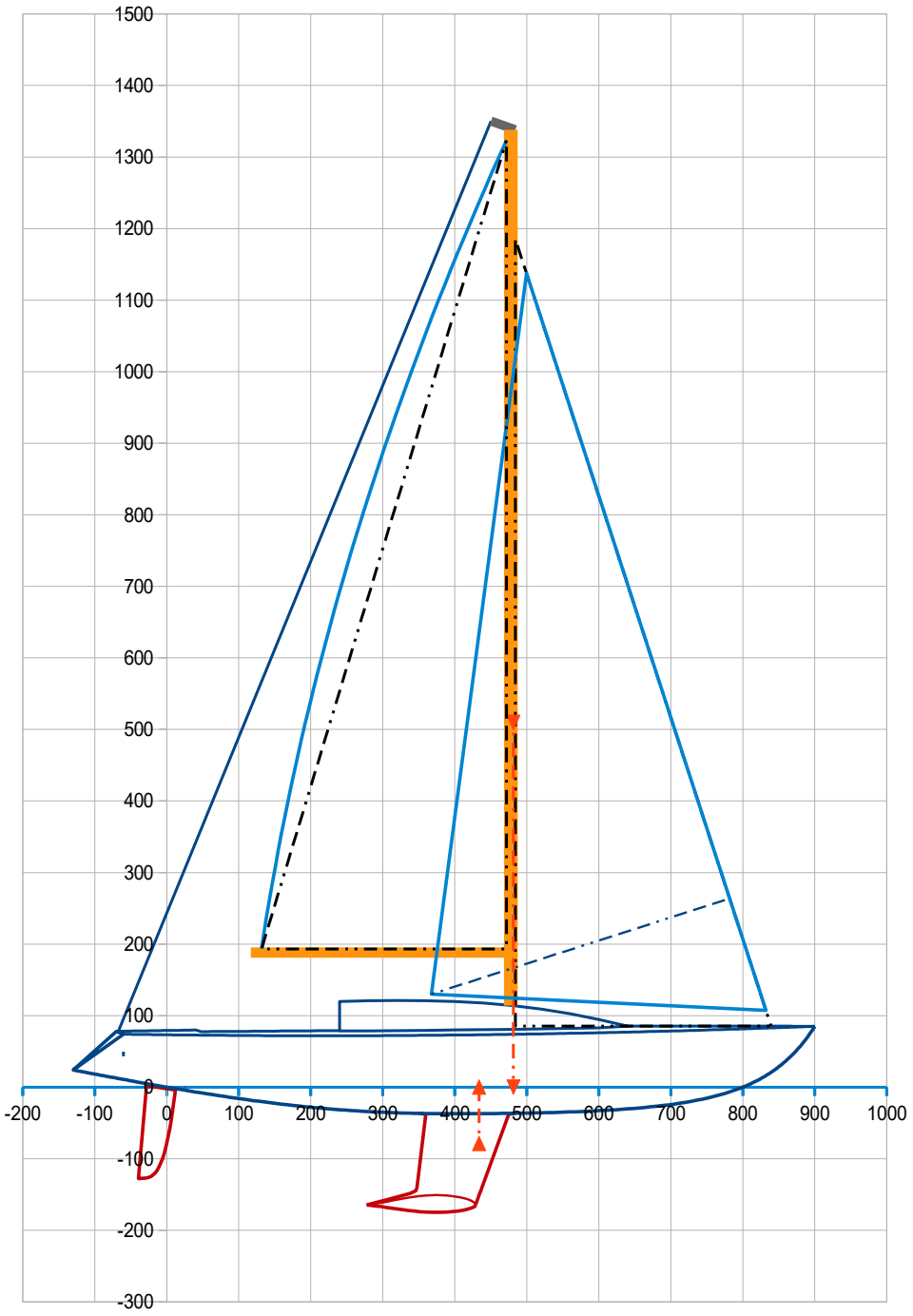
Surface triangles St (m2)	38,7	416,94	sqft	Main (%)	49,6	
XCE (m)	4,81	ZCE (m)	5,10	Fore (%)	50,4	
Lead (CE – CLR) (% Lwl)	6,0	CE geometrical center of the 2 triangles, CLR see Gene-Hull sheet				
Skeel / St (%)	3,50	ratio keel surface / triangles surface		St/Sw	2,23	
Srudder / St (%)	1,13	ratio rudder surface / triangles surface		St/D^(2/3)	20,45	

Results considering SA = jib + mainsail for an upwind sailing

SA (m2)	47,10	507,03	sqft	Mainsail(m2)	23,06	
Xsa (m)	4,59	Zsa (m)	5,26	Foresail(m2)	24,04	
>> SA/Sw	2,71	ratio sails area/wetted area		Overlap (%)	122,5	HLP/J
>> SA/D^(2/3)	24,86	ratio sails area/displacement^(2/3)				

For Gene-VPP :	Main (m2)	Jib (m2)	ZCE (m)	Zdeck (m)	Zmast (m)	Spi (m2)	ZCE spi (m)
	23,06	24,04	5,26	0,85	13,23	70,00	6,31

sym0 asym1
0



Some extra information on the sailplan output data :

Main (%) and Fore (%) : it is the distribution between the two triangles, 50/50 being an average value.

Lead (CE – CLR) (%Lwl) : it is the criteria to consider for a good balance when heeled sailing, to avoid either too much weather helm or lee helm.Pratically, that guides the relative position of the mast and the sailplan with regard the keel wing. According to L. Larsson and Rolf E Eliasson in « Principles of yacht Design », for the extended keel method, the recommeded range of values is :

Sloop with Masthead rig : 5% - 9%

Sloop with Fractional rig : 3% - 7%

To note that, to take into account the low aspect ratio of heavy fin keel shape typical of some cruising yachts, the CLR is estimated from 25% to 35% of the keel wing chord to better suits with experimental experiences done on models. This value is ouput in the hydrostatics data.

The Skeel / St (%) and Srudder / St (%) were already mentiond above.

St/Sw (%) or SA/Sw (%) ratio, is the Sails area (either **St** triangle areas or **SA** real areas main + jib) versus wetted surface ratio. When considering St, according to L. Larsson and Rolf E Eliasson in « Principles of yacht Design », statistics give a value between 2 and 2,5 with an average at 2,25. If you prefer to consider SA >>> ~ 2,5 to 3,0 with an average at 2,75.

St/D^(2/3) or SA/D^(2/3) ratio, is the Sail area (either **St** triangle areas or **SA** real areas main + jib) versus Displacement ratio. When considering St, according to L. Larsson and Rolf E Eliasson in « Principles of yacht Design », statistics give a value between 15 and 22 with an average at 19. If you prefer to consider SA >>> ~ 18,5 to 27,5 with an average at 23,5

Boat V1 - Step 3 mass spreadsheet : Hull, keel, rudder(s), sailplan being preliminary defined within a DLR objective, a Displacement and a LCB are provided in the output data. This next step is to adjust the mass units in the mass spreadsheet so that the light boat weight can fit with this displacement and LCB data, i.e. introducing the following input data :

- an overall weight per m2 for the Hull structure
- an overall weight per m2 for the Deck structure
- an overall % of the displacement dedicated to the Rig and Sails
- an overall % of the displacement for the accomodation and motor
- an overall % of the displacement for the rudder(s) system

That's a preliminary step of course : if your mass units and % on which you can rely due to your proper experience lead to a boat light weight that cannot match the displacement (i.e. your initial DLR objective), then you have to iterate on the hull geometry, and etc … back and forth iterations up to light weight = displacement and Xg equal or close to LCB.

Mass and Xg, Zg position – early stage estimation	**Input data**		**Results**				
	L or S or V	**mass unit**	**Mass**	**Xg**	M Xg	**Zg**	M Zg
Data to enter : in yellow cells	m or m2 or m3	**or % Disp.**	**(kg)**	**(m)**		**(m)**	
Hull (skin, structure, keel interface)	29,47	**19,00**	559,91	3,64	2035,62	0,02	13,02
, with S, Xs and Zs from Gene-Hull sheet		(kg/m2)					
Deck – roof – cockpit (skin and structure)	20,09	**13,50**	271,17	3,51	951,97	0,79	214,22
, with S, Xs and Zs from Gene-Hull sheet		(kg/m2)					
Rig, sails and deck fittings		**8,60**	229,86	4,40	1010,82	3,21	738,22
		(% Disp.)					
Cabin accomodation and motor		**18,00**	481,10	3,60	1731,95	0,09	44,57
		(% Disp.)					
Keel			1090,49	4,02	4382,17	-1,10	-1197,40
Rudder		**1,50**	40,09	-0,12	-4,71	-0,54	-21,73
		(% Disp.)					
	Results : Light weight boat >>>		**2672,6**	**3,782**	10107,83	**-0,078**	-209,11

Here we show the final iteration : with these mass units and % (the input data in the yellow cells), that leads to a weight of 2674 kg which match with the displacement, and a Xg 3,78 m very close to the LCB 3,76 m. The Zg value is also a useful output data, will be of first importance in the next step to assess the stability and the available righting moments with heel. These light weight results are automatically reported at the end of the hydrostatics data :

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**2673**	**at Xg (m)**	**3,782**	**Xg (%Lwl)**	**47,28**	**at Zg (m)**	**-0,078**

… and in the sub-section 5,1 for the next step here after with a loading :

	Mass	**Xg**	**Zg**	**Yg**	(in the coordinates of the 2D
Data to enter : yellow cells	**(kg)**	**(m)**	**(m)**	**(m)**	
Displacement of ref. (kg)	*2672,61*	*3,782*	*-0,078*	*0*	*from the mass spreadsheet*

Boat V1 - Step 4 stability and righting moment with a loading :

In the section 5.1 a design loading can be introduced and in the section 5.2 the resulting sinkage, trim, stability (GZ) and righting moment (RM) can be computed for every heel angle.

At first, to input the loading data in the sub-section 5,1 « Mass spreadsheet with input of a load ».

Example here below : 300 kg at Xg 2,00 m, Yg = 0 m & Zg 0,85 m (Crew at center) or Yg = 1,0 m & Zg 0,85 m (Crew sit windward).

5.1 Mass spreadsheet with input of a load

Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*2672,61*	*3,782*	*-0,078*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**2,00**	**0,85**	**0,00**	Crew at center
			0,85	**1,00**	Crew sit windward
Total >>> Mass (kg)	**2972,61**	**3,602**	**0,015**	**0,000**	**Crew at center**
Disp. (m3)	**2,90011**		**0,015**	**0,101**	**Crew sit windward**

The resulting data (in dark red) are used in the computation of the hydrostatic equilibrium in the sub-section 5,2 : for a given heel angle (inc. when heel = 0) , the user iterates on height and trim up to reach both weight = displacement and Xc (LCB) = Xg.

This sub-routine can be used for various investigations (to remind that negative value of height is a sinkage and that negative value of trim is a bow down attitude).

The case Heel = 0° inform on the draft and trim for the given loading :

5.2 Computation, by input of an Heel angle, and iteration on Height and Trim up to Displacement equality and Xc (LCB) = Xg

Data to enter : yellow cells		Results				Specific results			
Heel (°)	**0**	**Disp. (m3)**	**2,90012**	**/ Disp. (m3)**	**2,90011**	**Relevant only when heel = 0°**		DLR	147
Height (cm)	**-2,1799**	**Xc heel (m)**	**3,602**	**/ Xg (m)**	**3,602**	Lwl (m)	8,26	Z fore (cm)	1,7
Trim (°)	**0,520**	Yc heel (m)	0,000	Yg heel (m)	0,101	Bwl (m)	2,24	Z aft (cm)	-5,6
		Zc heel (m)	-0,190	**> GZ (m)**	**0,101**	Tc (m)	0,39	Trim (°)	0,52
		Sw heel(m2)	**18,25**	**RM (kN.m)**	**2,943**	Cp Hull	0,537	LCB Hull (%)	47,34
		Bwl heel (m)	**2,24**	**FB mini (cm)**	**67,5**	**Relevant only when heel = 1°**			
		LCB – LCF (%Lwl)	**2,07**	**Obliquity (°)**	**0,0**	Yg heel (m)	0,000	with crew at center	

The relevant results are the ones in black + in blue (when heel = 0°) >>> under this loading :

** Lwl = 8,26 m ; Bwl 2,24 m ; Trim = 0,52° (> 0 = nose up) leading to an elevation at fore perpendicular Z fore = 1,7 cm and a sinkage at aft perpendicular Z aft = -5,6 cm (Z<0 = sinkage).

** Sw = 18,25 m2 ; Free-Board minimum = 67,5 cm ; Cp = 0,537 and DLR = 147 in charge.

The case Heel = 1° give the metacentric center GM1° representative of the initial stability when the loading is Y-centered (the pink results are with Yg = 0) :

5.2 Computation, by input of an Heel angle, and iteration on Height and Trim up to Displacement equality and Xc (LCB) = Xg

Data to enter : yellow cells		Results				Specific results			
Heel (°)	**1**	**Disp. (m3)**	**2,90011**	**/ Disp. (m3)**	**2,90011**	**Relevant only when heel = 0°**		DLR	147
Height (cm)	**-2,1650**	**Xc heel (m)**	**3,602**	**/ Xg (m)**	**3,602**	Lwl (m)	8,26	Z fore (cm)	1,7
Trim (°)	**0,520**	Yc heel (m)	-0,018	Yg heel (m)	0,101	Bwl (m)	2,24	Z aft (cm)	-5,6
		Zc heel (m)	-0,190	**> GZ (m)**	**0,119**	Tc (m)	0,39	Trim (°)	0,52
		Sw heel(m2)	**18,26**	**RM (kN.m)**	**3,472**	Cp Hull	0,537	LCB Hull (%)	47,33
		Bwl heel (m)	**2,24**	**FB mini (cm)**	**65,6**	**Relevant only when heel = 1°**			
		LCB – LCF (%Lwl)	**2,07**	**Obliquity (°)**	**0,1**	Yg heel (m)	0,000	with crew at center	
						Gz (m)	0,018		
						> GM1° (m)	**1,04**		

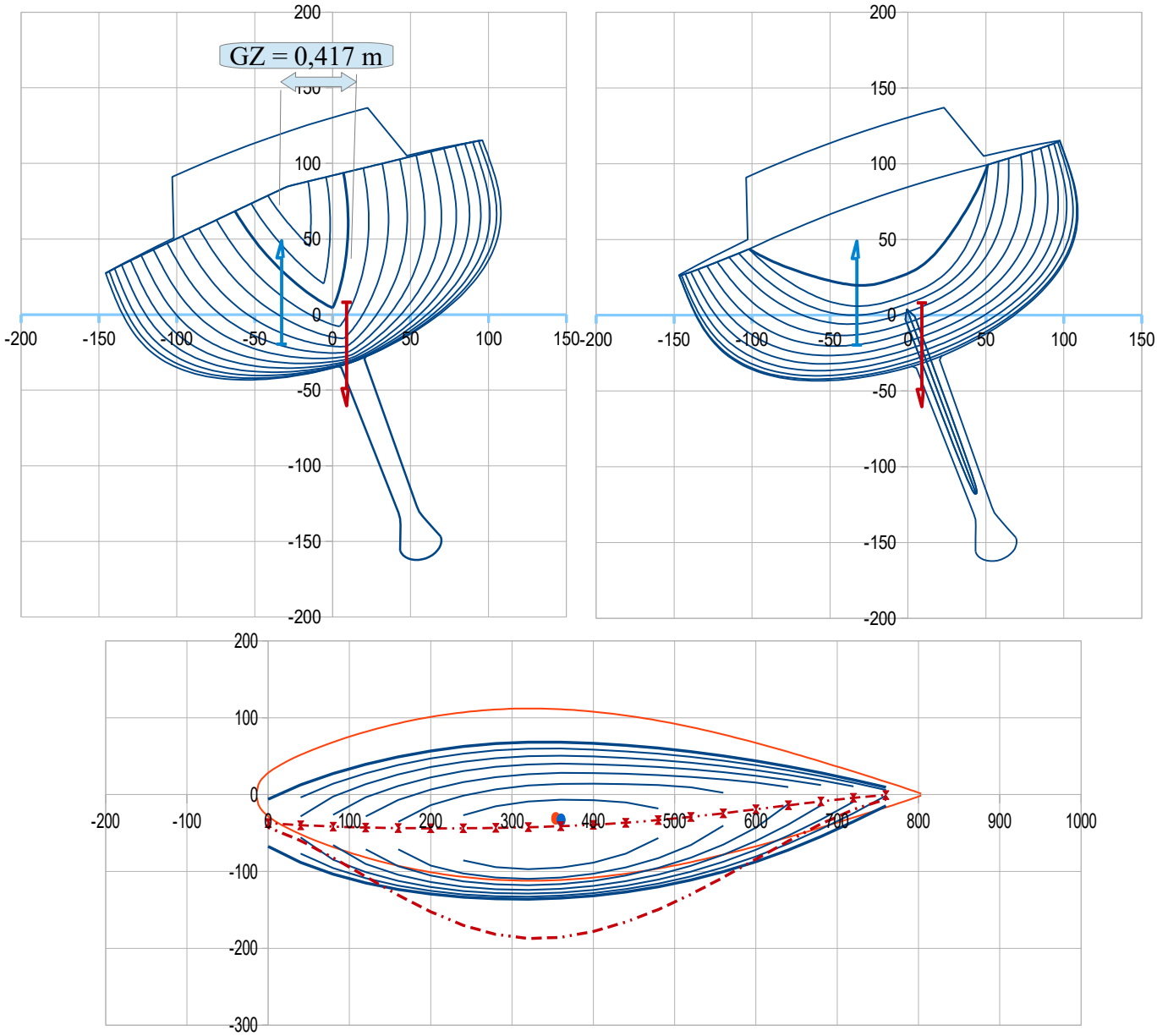
>>> Here, the relevant result is in pink : **GM1° = 1,04 m**

The case Heel = 20° can give the boat attitude and the RM for an usual sailing *(for a sailboat, the hydrostatics of the hull at around 20° heel are the most important)*

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**2,90011**	**/ Disp. (m3)**	**2,90011**
Height (cm)	**3,2629**	**Xc heel (m)**	**3,602**	**/ Xg (m)**	**3,602**
Trim (°)	**0,170**	Yc heel (m)	-0,327	Yg heel (m)	0,090
		Zc heel (m)	-0,196	**> GZ (m)**	**0,417**
		Sw heel(m2)	**17,51**	**RM (kN.m)**	**12,158**
		Bwl heel (m)	**2,04**	**FB mini (cm)**	**26,2**
		LCB – LCF (%Lwl)	**0,81**	**Obliquity (°)**	**2,7**

>>> GZ = 0,417 m ; RM = 12,158 kN.m ; Sw = 17,51 m2 ; Free-board minimum : 26,2 cm

>>> Trim = + 0,17° (Red arrow = Weight ; Blue arrow = Buoyancy)

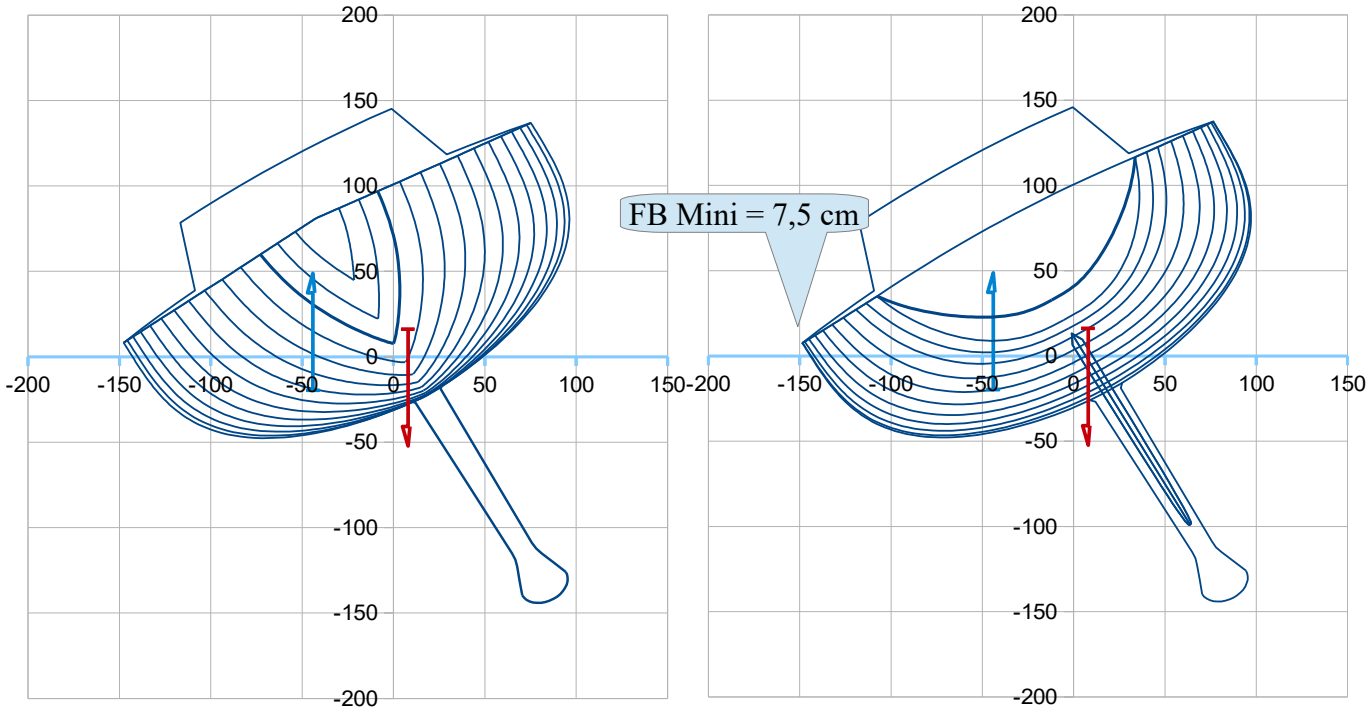


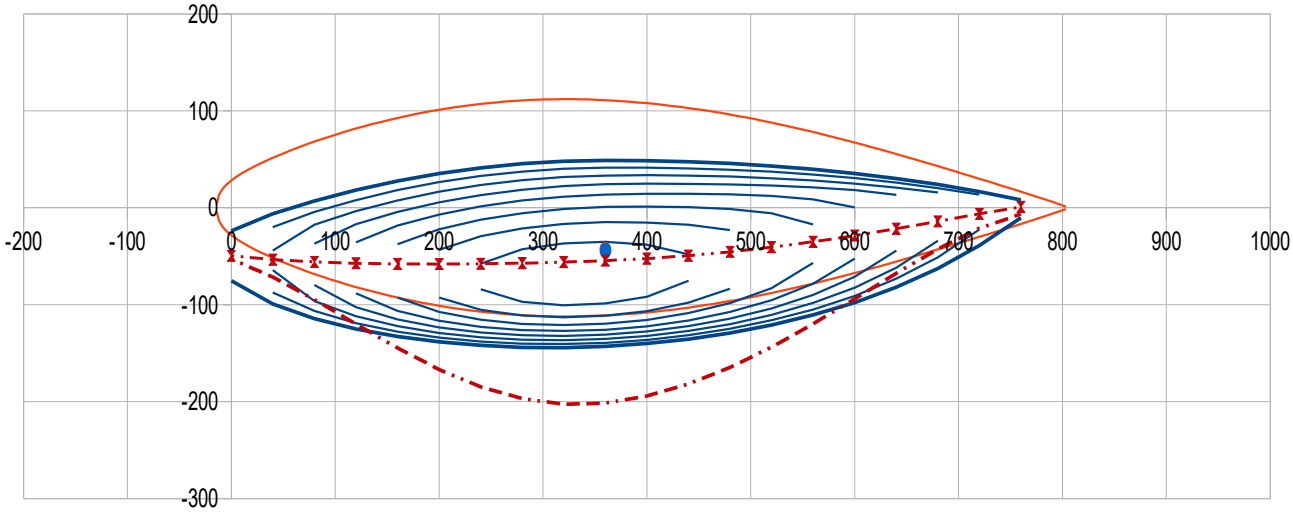
The red line is the floatation waterline when upright with the loading. The blue lines are the waterlines of the heeled hull, the blue point being the center of buoyancy, the red point being the center of floatation. The dashed line with points are the centers of the immersed areas of the heeled hull, this line should be as much as possible regular with a low curvature. Information completed with a dashed line representative of these areas.

The case Heel = 30° give the design RM30° useful to dimension the rig, and the minimum free-board versus the sheer line :

Data to enter : yellow cells		Results			
Heel (°)	30	Disp. (m3)	2,90011	/ Disp. (m3)	2,90011
Height (cm)	9,6824	Xc heel (m)	3,602	/ Xg (m)	3,602
Trim (°)	-0,253	Yc heel (m)	-0,440	Yg heel (m)	0,080
		Zc heel (m)	-0,198	> GZ (m)	0,519
		Sw heel(m2)	17,08	RM (kN.m)	15,144
		Bwl heel (m)	1,92	FB mini (cm)	7,5
		LCB – LCF (%Lwl)	0,06	Obliquity (°)	3,8

>>> **RM30° = 15,144 kN.m** ; Sw = 17,08 m2 ; **Free-board minimum : 7,5 cm**





The Sw and RM results for heel = 0°, 20° and 30° are used to complete the table of input data for the « Gene-VPP » application, by recopy / special paste the Sw and RM results from sub-section 5,2 for each heel angle (0°, 20°, 30°) into the table located in sub-section 5,3 :

Righting Moment RM (kN.m)		
RM0°	RM20°	RM30°
2,943	12,158	15,144

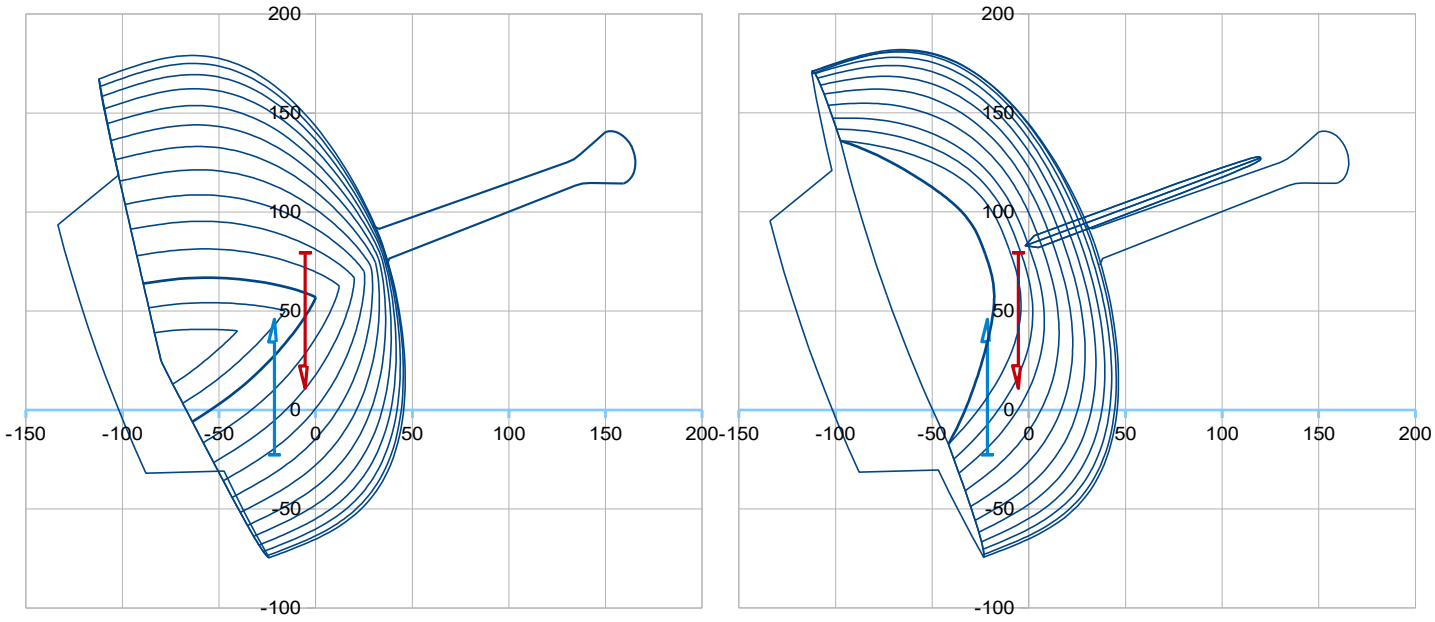
Wetted surface Sw (m2)		
Sw0°	Sw20°	Sw30°
18,25	17,51	17,08

(More information on **Gene-VPP** in its specific User guide and Examples)

The computation can also be done for heel > 30°, up to 180°, although due to the need of manual iterations for each equilibrium, it is time consuming for the building of the Gz Curve. For this task, we recommend to use **Gene-Stab** post-application allowing an automation of the iterations based on a direct use of the data provided by Gene-Hull. (More information on **Gene-Stab** in its specific User guide and Examples).

Nevertheless, the current subroutine within the sub-section 5,2 of Gene-Hull can be used to explore some « beyond 30° » case, still with manual iterations on height and trim to reach the equilibrium. Here is an example with heel 110° :

Data to enter : yellow cells		Results			
Heel (°)	110	Disp. (m3)	2,90010	/ Disp. (m3)	2,90011
Height (cm)	70,5398	Xc heel (m)	3,602	/ Xg (m)	3,602
Trim (°)	-1,850	Yc heel (m)	-0,214	Yg heel (m)	-0,049
		Zc heel (m)	-0,226	> GZ (m)	0,165
		Sw heel(m2)	17,77	RM (kN.m)	4,807
		Bwl heel (m)	1,48	FB mini (cm)	-74,6
		LCB – LCF (%Lwl)	-1,58	Obliquity (°)	-2,0

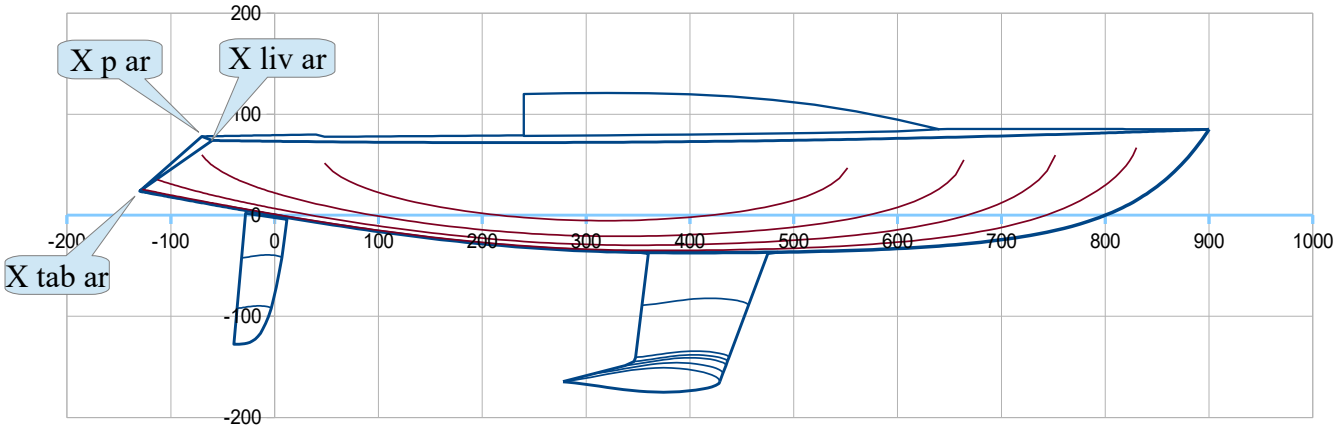


Boat V1 – with a classic shape for the rear transom :

At any moment in the design process, it is possible to draw a classic shape for the rear transom instead of an inverted one. Just 2 data changes are required, example with V1 :

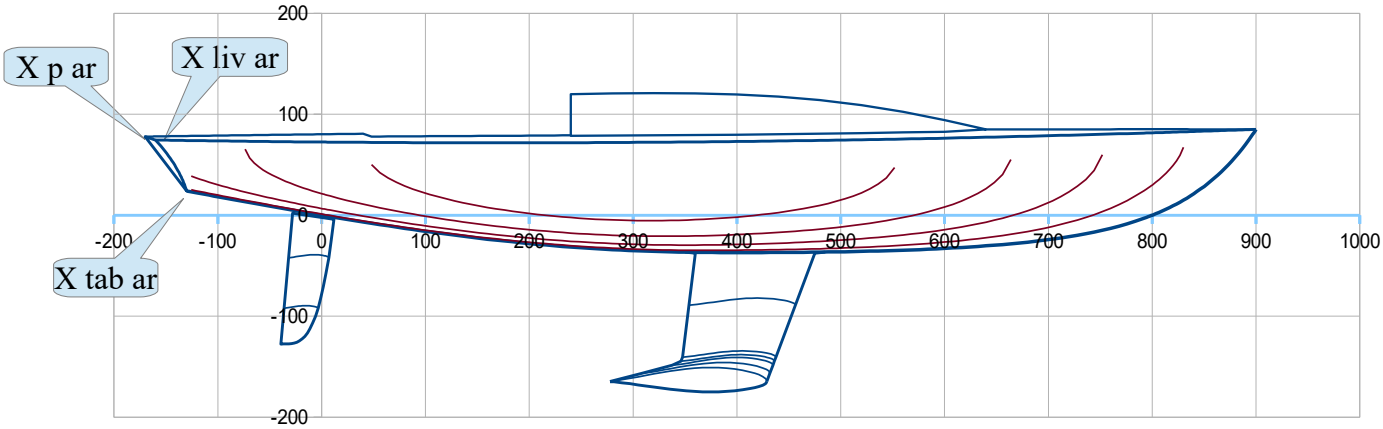
Inverted transom	>>>	**Classic transom**
Sheer line, in horizontal proje		**Sheer line, in horizontal proje**
X liv ar (m) -0,60		**X liv ar (m) -1,60**
Deck / central line rear end		**Deck / central line rear end**
X p ar (m) -0,70		**X p ar (m) -1,70**

With inverted transom :



>>>>>

With classic transom :



In this example, **X tab ar** is kept unchanged, but it is not necessary.

Conditions for these 3 X values :

All should be negative and ,

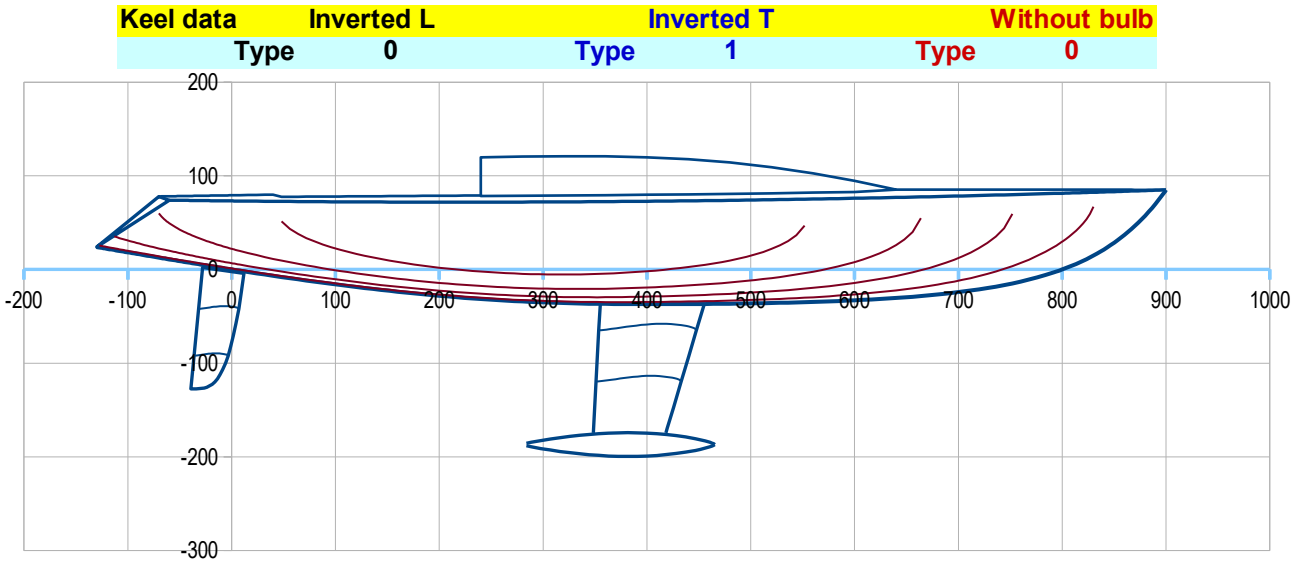
Inverted transom : X tab ar < X p ar < X liv ar < 0

Classic transom : X p ar < X liv ar < X tab ar < 0

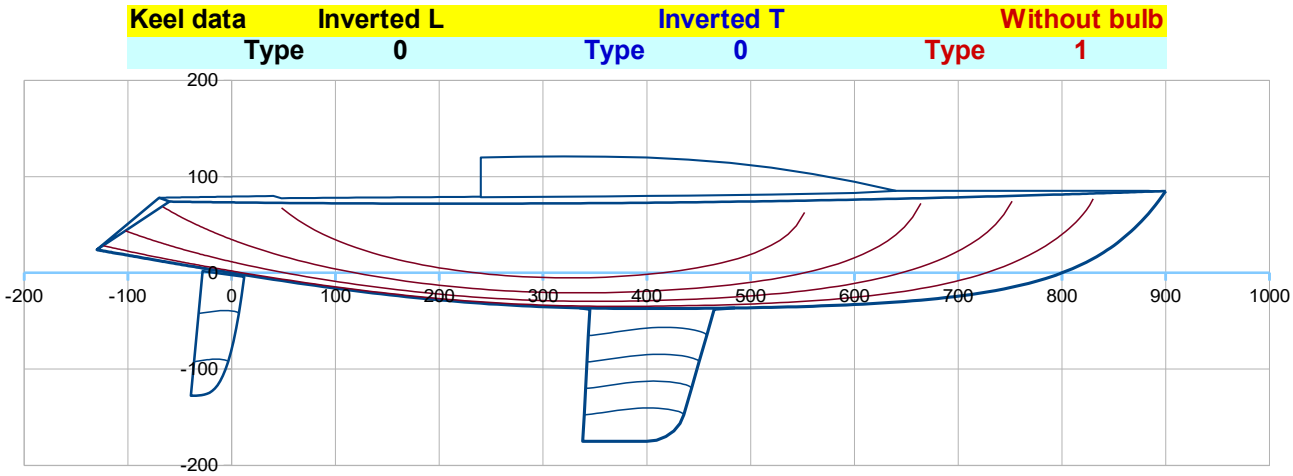
Boat V1 – Other options : « Inverted T keel », « Keel without bulb » , « rudder with skeg »

These two options can be introduced by putting Type = 1 for them (and 0 for the previous ones) and input the requested data. Some examples :

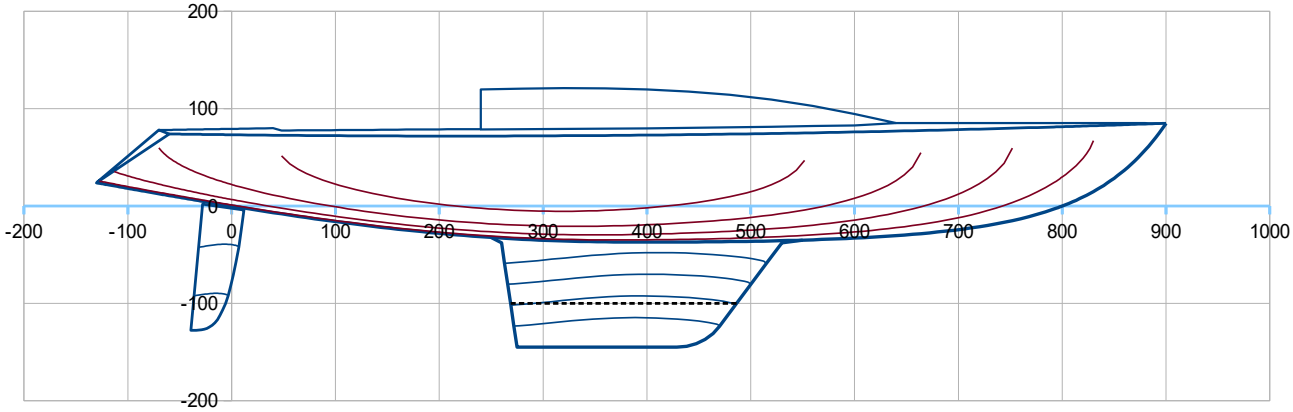
With an **inverted T keel** :



With a **Fin keel without bulb** :

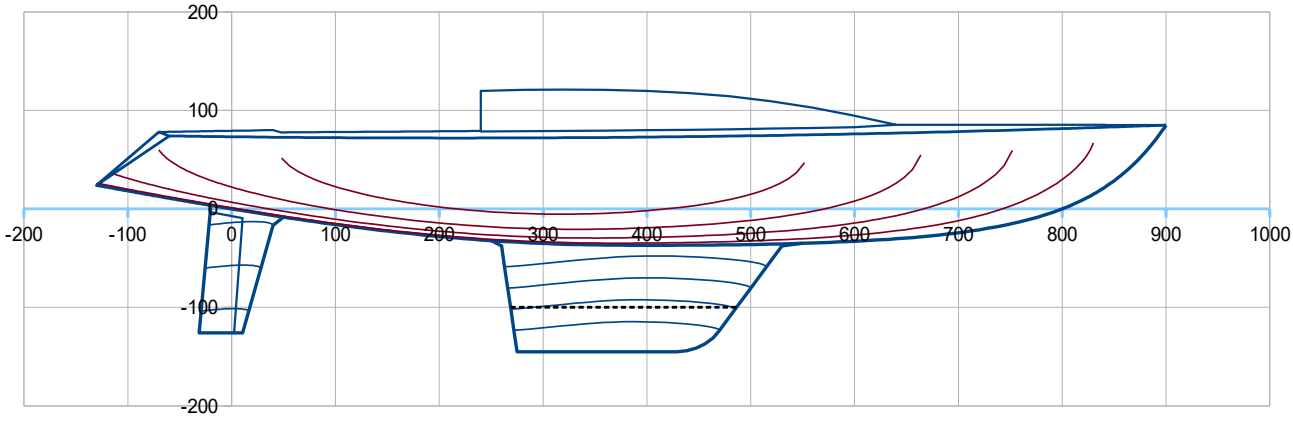


>> within this « Fin keel without bulb » option, you can also draw a low aspect ratio keel wing with a ballast in the lower part, a dashed line showing its upper surface (here with H ballast = 1,0 m) :



>> and then , you can also opt for a **Rudder with skeg** :

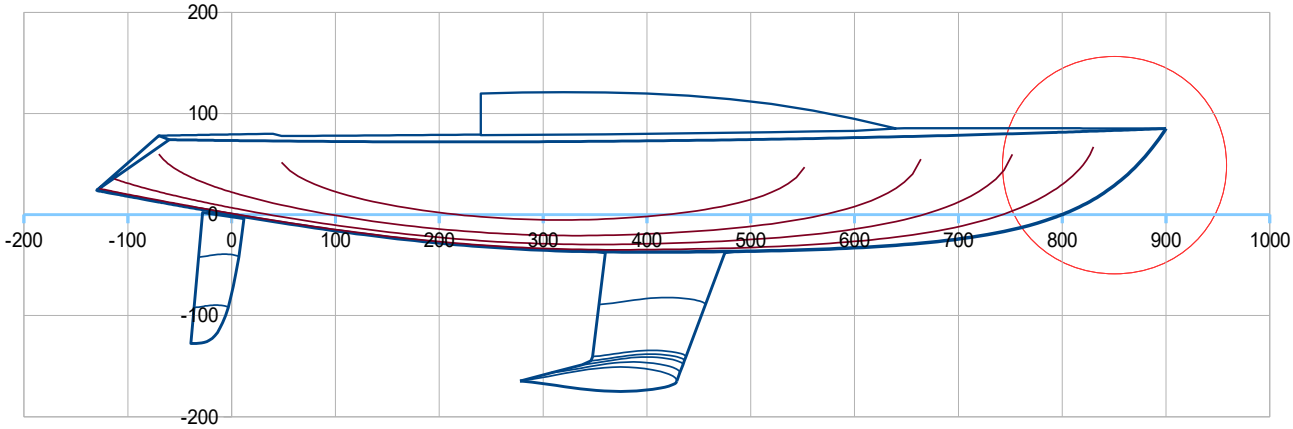
Rudder data	Suspended		With skeg
	Type 0	Type	1



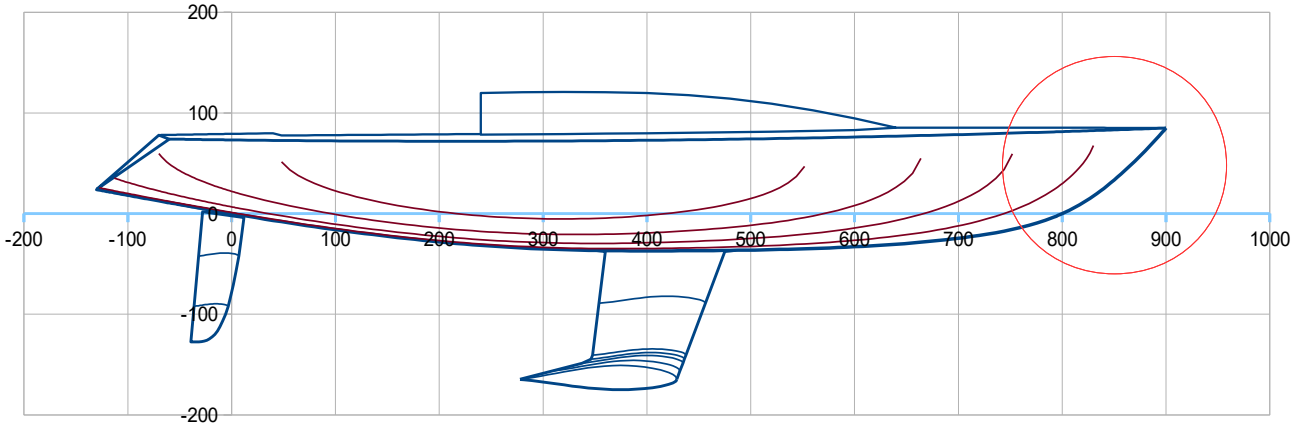
Boat V1 variant >>> V1,1 with a modified bow line

A bow fine shaping can be done by using the parameter **Kbrion.** At first, demonstration by images of its influence :

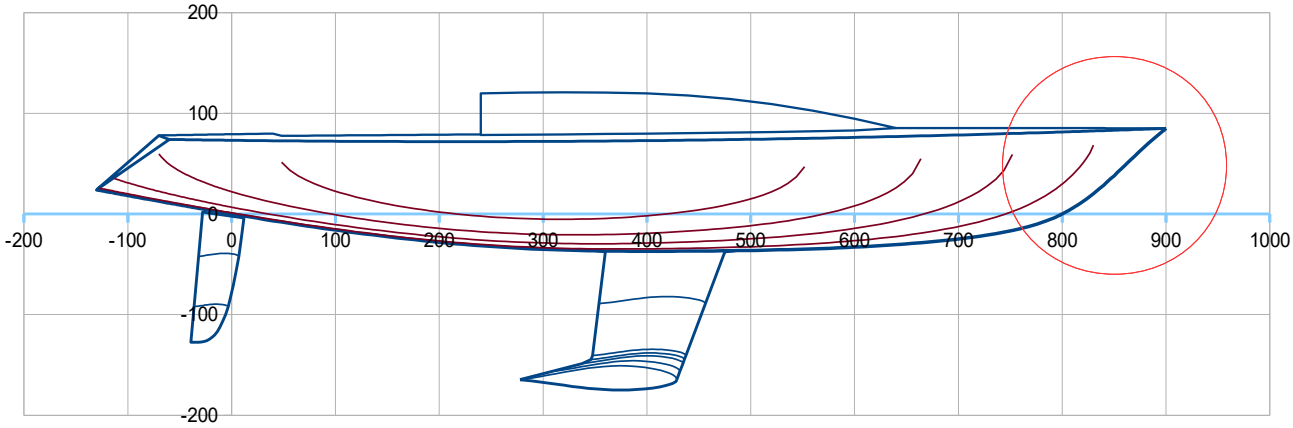
Kbrion = 0 - the initial V1 version



Kbrion = 0,10



Kbrion = 0,20

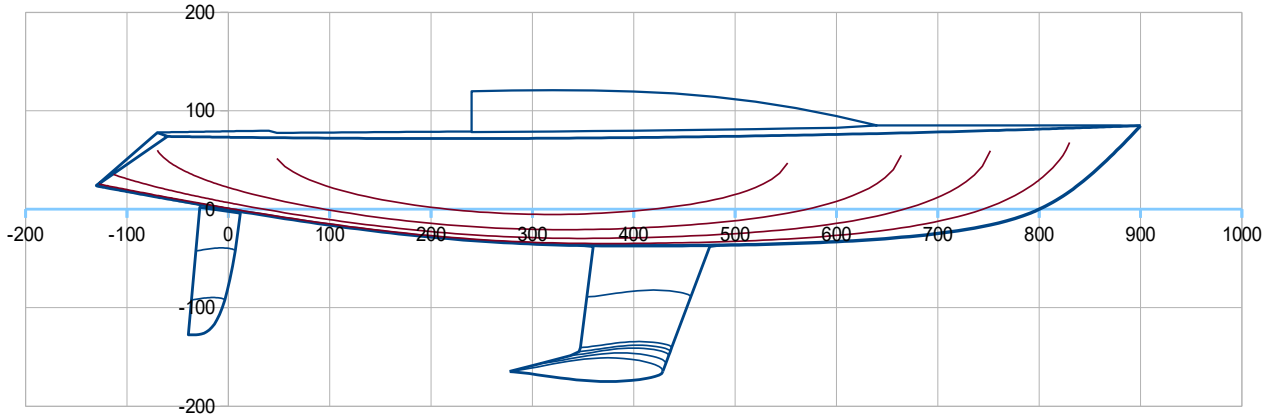


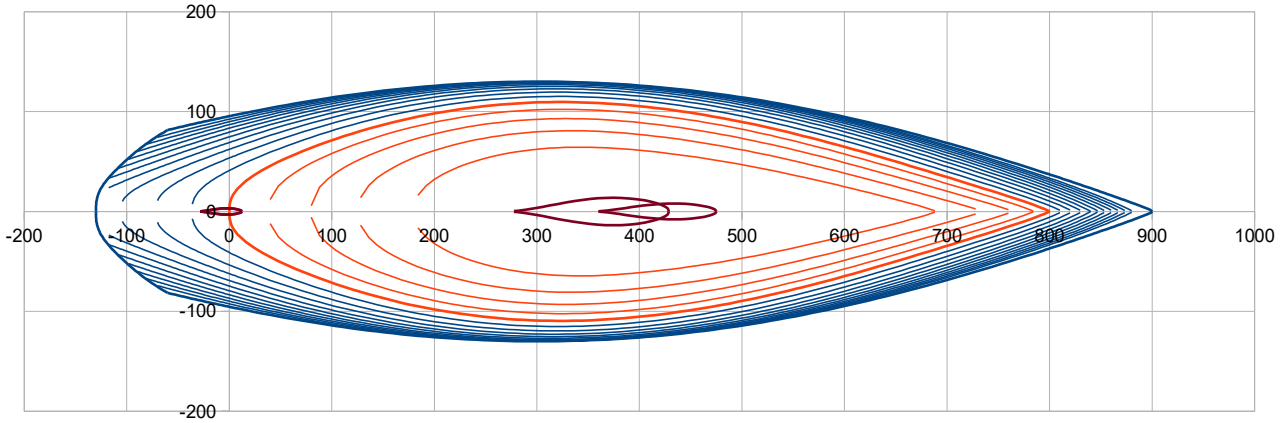
Kbrion > 0 straigthens the bow shape above the water and accentuates the knuckle below, giving a bit more fore volume.

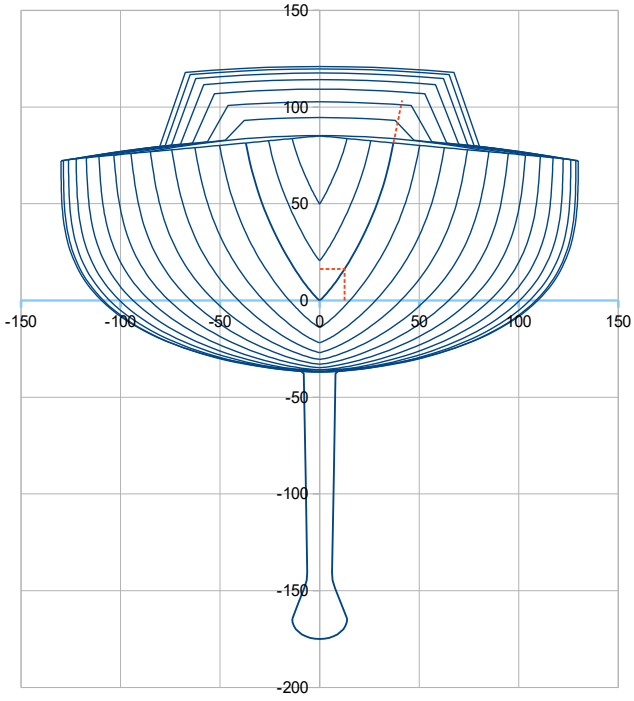
From this screening, one can choose Kbrion = 0,12 for the boat V1,1 version, and some sections parameters are slightly adapted to this new shape and to maintain displacement = weight.

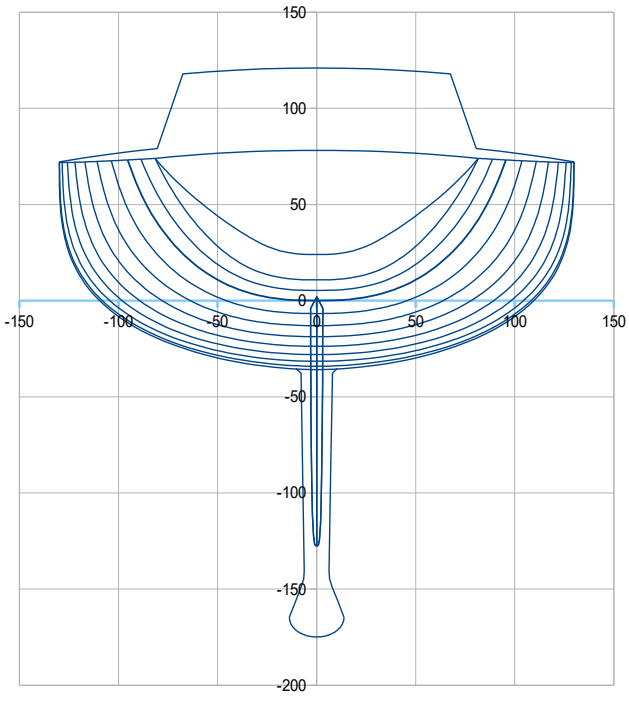
Boat V1 variant >>> V1,1 version with Kbrion = 0,12

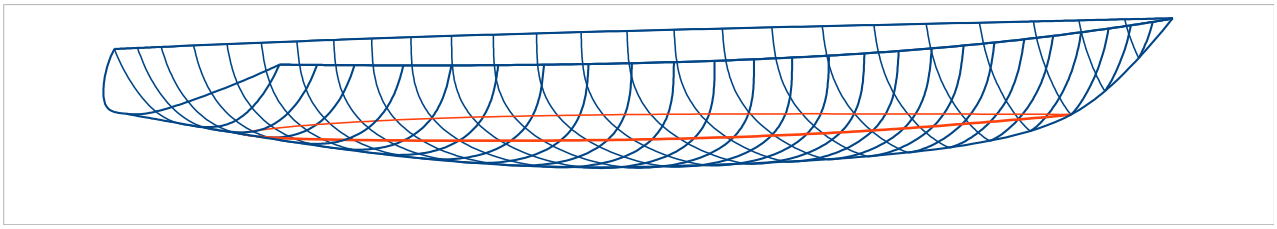
Loa 10,30 m ; Lwl 8,00 m ; B 2,60 m ; Draft 1,75 m ; Displacement : 2671 kg ; Keel-bulb 1090 kg
>> LCB hull 47,11 %Lwl ; Cp hull : 0,545 ; Sw : 17,38 m2 ; DLR : 145 ; Ballast ratio : 40,8 %











Boat V1,1 hydrostatics data :

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

2.1 Hull

Loa (m)	**10,30**	**Lwl (m)**	**8,00**	> Hull speed (Knots)	6,89	at Froude 0,4		
>> ft	*33,79*		*26,25*					
Boa (m)	**2,60**	**at X (% Lwl)**	**38,0**	Bsheer (m)	2,60	at X (% Lwl)	38,0	
>> ft	*8,53*							
Bwl (m)	**2,19**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,843			
>> ft	*7,19*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,370**	**at X (%Lwl)**	**50**		**0,74**	**0,72**	**0,85**	
>> ft	*1,21*			*>> ft*	*2,43*	*2,36*	*2,79*	
Displacement at H0 (m3)	**2,44156**	**at LCB (m)**	**3,769**	**LCB (%Lwl)**	**47,11**	**ZCB (m)**	**-0,130**	
>> lbs	*5517*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,43*	
Cp	**0,545**							
Sf (m2)	**11,84**	**at LCF (m)**	**3,590**	**LCF (%Lwl)**	**44,87**	>>> LCB – LCF (%Lwl)	2,23	
>> ft2	*127,45*	*>> ft*	*11,78*					
Angle Freeboard/Half beam	29,1	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**18,4**	**at 95% Lwl**		
Sw (m2)	**12,80**	>Sw/D^(2/3)	7,06					
>> ft2	*137,83*							
Shull (m2)	**29,43**	**at X (m)**	**3,630**	**Z (m)**	**0,092**			
>> ft2	*316,75*	*>> ft*	*11,91*	*>> ft*	*0,30*			
Sdeck (m2)	**20,09**	**at X (m)**	**3,511**	**Z (m)**	**0,79**			
>> ft2	*216,21*	*>> ft*	*11,52*	*>> ft*	*2,59*			

2.2 Keel

Vol. keel(m3)	**0,14938**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**	
		>> ft	*13,18*			*>> ft*	*-3,60*	
Ballast (kg)	**1090,5**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**	
>> lbs	*2404*	*>> ft*	*13,18*			*>> ft*	*-3,60*	
Draft oa (m)	**1,75**		**Sw (m2)**	**3,66**		**Sxz (m2)**	**1,36**	
>> ft	*5,74*		*>> ft2*	*39,45*		*>> ft2*	*14,60*	
CLR (m)	**4,34**	**CLR (%Lwl)**	**54,23**	*CLR = Center of Lateral Resistance*				
>> ft	*14,23*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,01486**	**at X (m)**	**-0,12**	**X (%Lwl)**	**-1,47**	**Z (m)**	**-0,54**	
Sw (m2)	**0,91**	*>> ft*	*-0,39*			**Sxz (m2)**	**0,44**	per rudder
>> ft2	*9,80*					*>> ft2*	*4,71*	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**2,60580**	**at LCB (m)**	**3,761**	**LCB (%Lwl)**	**47,01**	**at ZCB (m)**	**-0,188**
(kg)	**2671**	*>> ft*	*12,34*			*>> ft*	*-0,62*
>> lbs	*5888*						
, of wich Ballast (kg)	**1090**	**at Xg (m)**	**4,019**	**Xg (%Lwl)**	**50,23**	**at Zg (m)**	**-1,098**
>> lbs	*2404*	*>> ft*	*13,18*			*>> ft*	*-3,60*
>> % Ballast	40,8						
Sw (m2)	**17,38**	>Sw/D^(2/3)	9,18	Lwl/D^(1/3)	5,81		
>> ft2	*187,08*			***DLR***	***145***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**2671**	**at Xg (m)**	**3,781**	**Xg (%Lwl)**	**47,26**	**at Zg (m)**	**-0,079**

Boat V1 variant >>> V1,2 with V sections

Hull with typical V sections can be obtained with **PE2 Mid = 1 and/or close to 1 as for PE2 fore and PE2 aft**. Then, you have to adjust the other sections parameters (PE1 and C PE1) + some other parameters in order to maintain displacement = weight. Here, the V1,2 example :

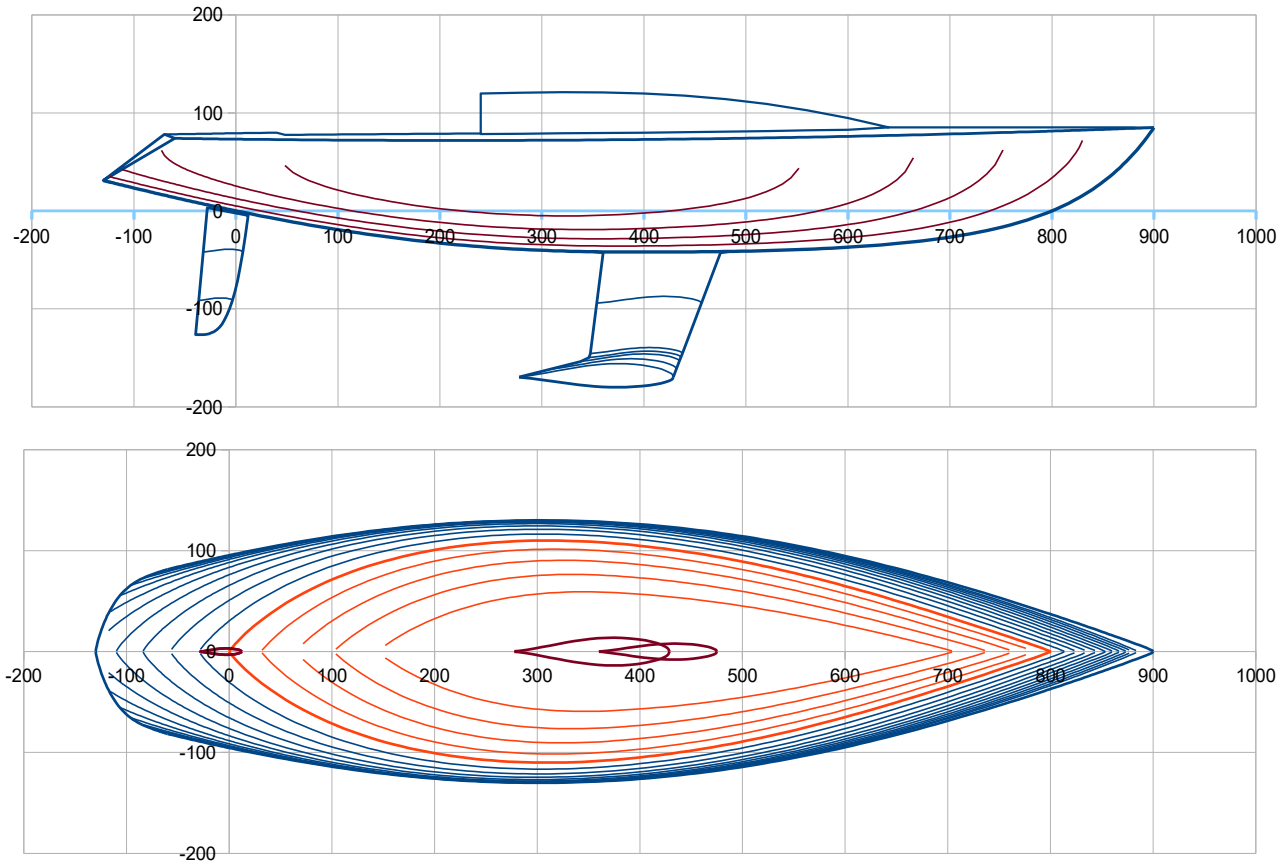
	PE1	C PE1	PE2
Fore	1,200	1,400	1,200
Mid	4,100	1,000	1,000
Aft	3,150	1,100	1,200

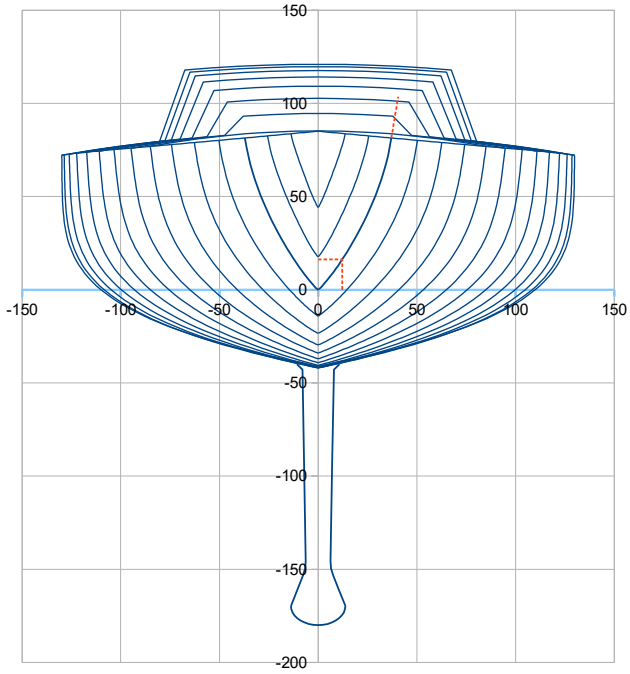
which, associated with some other modifications,

Tc (m)	0,42
Pui q ar	2,45
Z tab ar (m)	0,31
Draft oa (m)	1,80

lead to an equilibrium at 2681 kg for this variant **V1,2** of V1 :

Loa 10,60 m ; Lwl 8,00 m ; B 2,60 m ; Draft 1,80 m ; Displacement : 2681 kg ; Keel-bulb 1090 kg >> LCB hull 47,38 %Lwl ; Cp hull (%): 0,552 ; Sw : 17,43 m2 ; DLR : 146 ; Ballast ratio : 40,7 %




150
100
50
0
-50
-100
-150
-200
-150
-100
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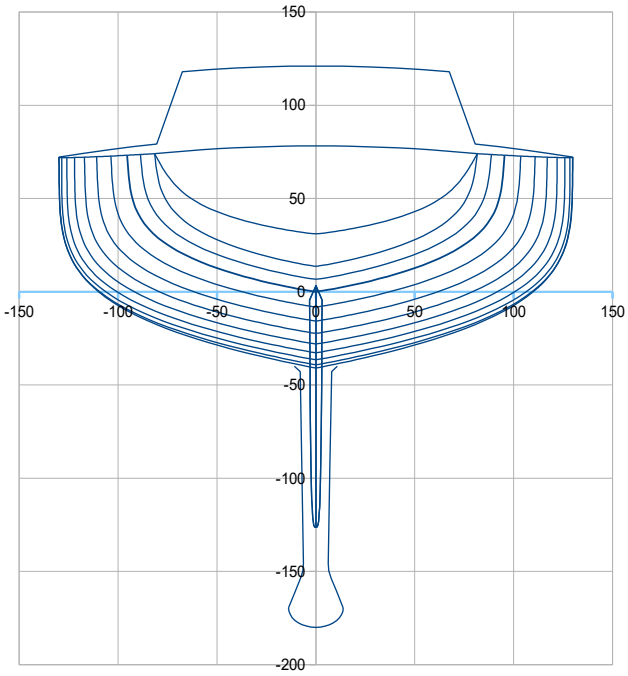
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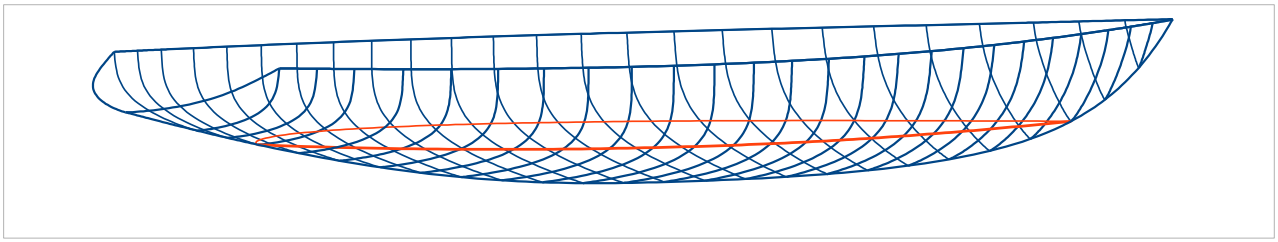


Boat V1,2 hydrostatics data :

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

2.1 Hull

Loa (m)	**10,30**	**Lwl (m)**	**8,00**	> Hull speed (Knots)	6,89	at Froude 0,4		
>> ft	*33,79*		*26,25*					
Boa (m)	**2,60**	**at X (% Lwl)**	**38,0**	Bsheer (m)	2,60	at X (% Lwl)	38,0	
>> ft	*8,53*							
Bwl (m)	**2,20**	**at X (% Lwl)**	**39,0**	> Bwl / Boa	0,846			
>> ft	*7,22*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,420**	**at X (%Lwl)**	**50**		**0,74**	**0,72**	**0,85**	
>> ft	*1,38*			*>> ft*	*2,43*	*2,36*	*2,79*	
Displacement at H0 (m3)	**2,45116**	**at LCB (m)**	**3,790**	**LCB (%Lwl)**	**47,38**	**ZCB (m)**	**-0,136**	
>> lbs	*5539*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,44*	
Cp	**0,552**							
Sf (m2)	**11,77**	**at LCF (m)**	**3,612**	**LCF (%Lwl)**	**45,15**	>>> LCB – LCF (%Lwl)	2,23	
>> ft2	*126,64*	*>> ft*	*11,85*					
Angle Freeboard/Half beam	29,1	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**18,7**	**at 95% Lwl**		
Sw (m2)	**12,86**	>Sw/D^(2/3)	7,07					
>> ft2	*138,39*							
Shull (m2)	**29,81**	**at X (m)**	**3,619**	**Z (m)**	**0,090**			
>> ft2	*320,88*	*>> ft*	*11,87*	*>> ft*	*0,30*			
Sdeck (m2)	**20,09**	**at X (m)**	**3,511**	**Z (m)**	**0,79**			
>> ft2	*216,21*	*>> ft*	*11,52*	*>> ft*	*2,59*			

2.2 Keel

Vol. keel(m3)	**0,14929**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,149**	
		>> ft	*13,18*			*>> ft*	*-3,77*	
Ballast (kg)	**1089,8**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,149**	
>> lbs	*2403*	*>> ft*	*13,18*			*>> ft*	*-3,77*	
Draft oa (m)	**1,80**		**Sw (m2)**	**3,66**		**Sxz (m2)**	**1,36**	
>> ft	*5,91*		*>> ft2*	*39,43*		*>> ft2*	*14,62*	
CLR (m)	**4,35**	**CLR (%Lwl)**	**54,34**	*CLR = Center of Lateral Resistance*				
>> ft	*14,26*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,01472**	**at X (m)**	**-0,12**	**X (%Lwl)**	**-1,47**	**Z (m)**	**-0,54**	
Sw (m2)	**0,91**	*>> ft*	*-0,39*			**Sxz (m2)**	**0,44**	per rudder
>> ft2	*9,77*					*>> ft2*	*4,70*	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**2,61517**	**at LCB (m)**	**3,781**	**LCB (%Lwl)**	**47,27**	**at ZCB (m)**	**-0,196**	
(kg)	**2681**	*>> ft*	*12,41*			*>> ft*	*-0,64*	
>> lbs	*5910*							
, of wich Ballast (kg)	**1090**	**at Xg (m)**	**4,019**	**Xg (%Lwl)**	**50,23**	**at Zg (m)**	**-1,149**	
>> lbs	*2403*	*>> ft*	*13,18*			*>> ft*	*-3,77*	
>> % Ballast	40,7							
Sw (m2)	**17,43**	>Sw/D^(2/3)	9,18	Lwl/D^(1/3)	5,81			
>> ft2	*187,58*			***DLR***	***146***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

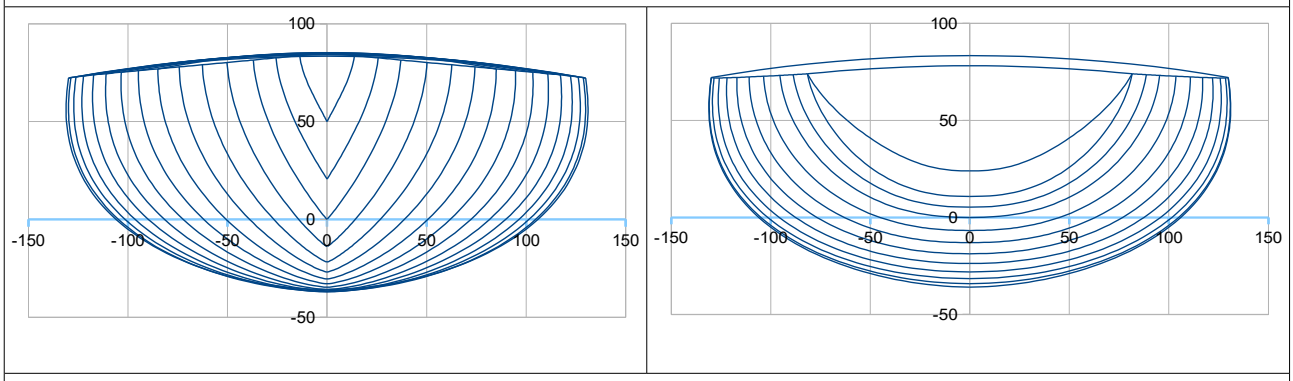
2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**2681**	**at Xg (m)**	**3,778**	**Xg (%Lwl)**	**47,23**	**at Zg (m)**	**-0,100**

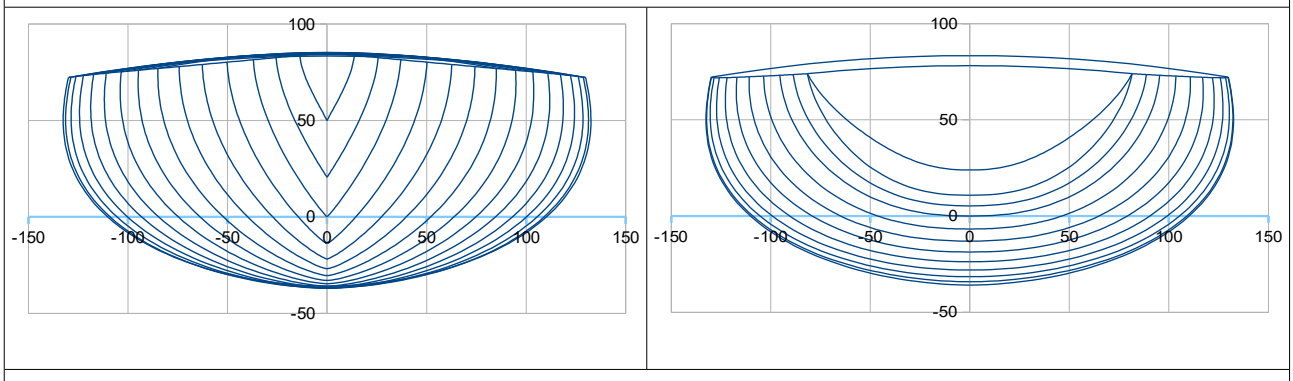
Boat V1 variant >>> V1,3 with some tumblehome in the sections

It is an extension of the sections shape formulation, where adimensional parameters « C PE1», and especially the C PE1 value set at midship, can be < 1 and that gives a tumblehome effect. At first, demonstration of its influence by the images :

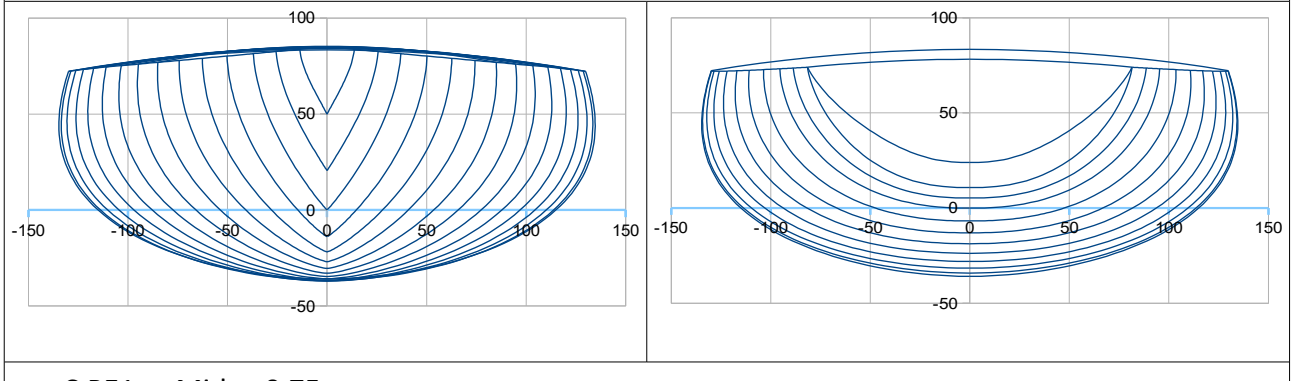
C PE1 at Mid = 0,90



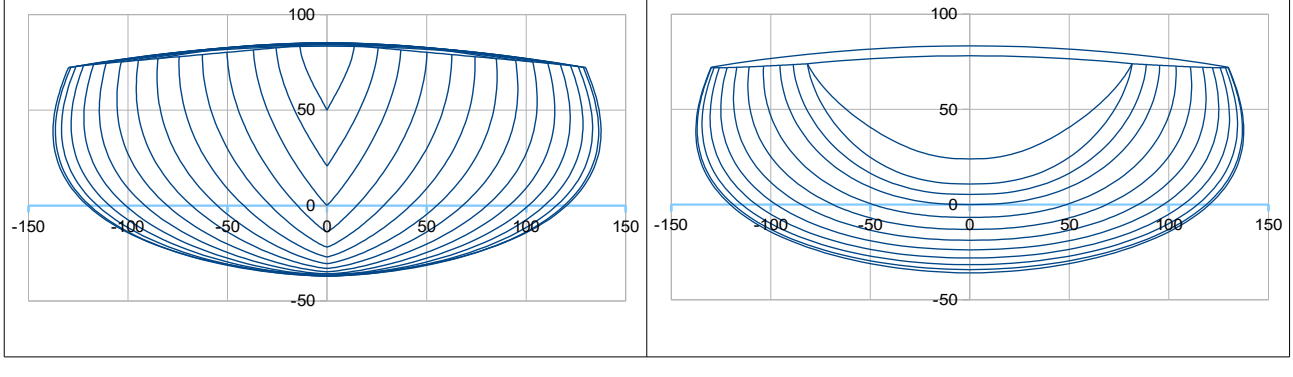
C PE1 at Mid = 0,85



C PE1 at Mid = 0,80



C PE1 at Mid = 0,75

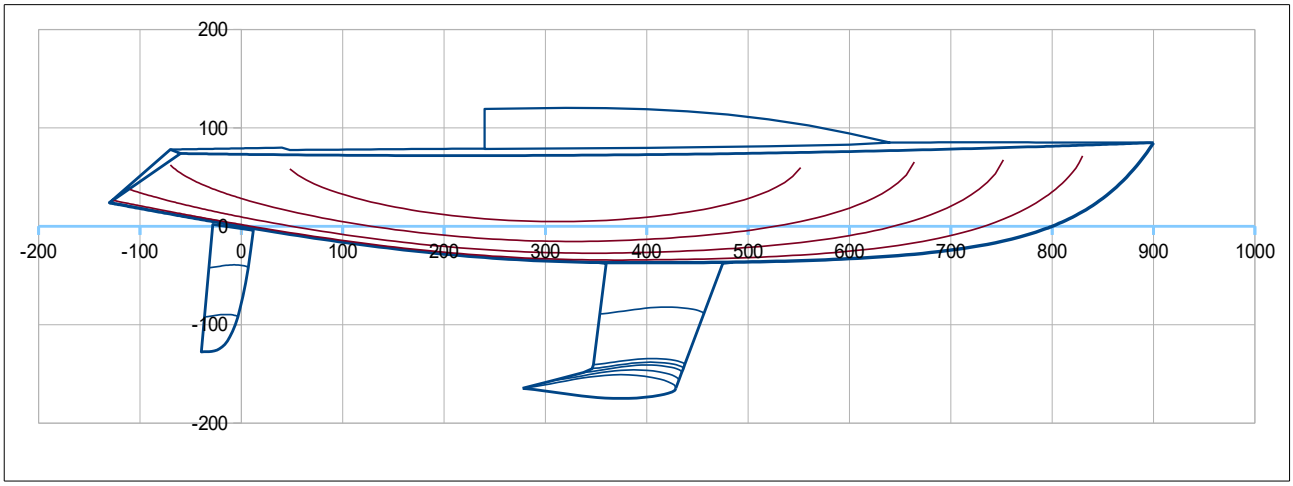


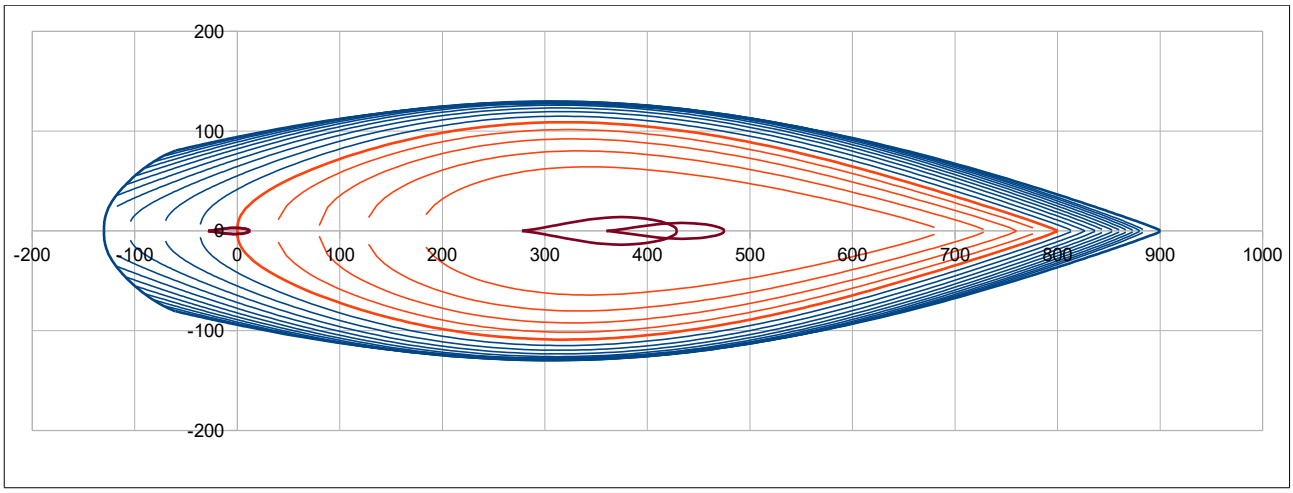
>>> V1,3 version , obtained from the V1 version with choosing **C PE1 Mid = 0,835.**
The sheer line parameter **Bg** is slightly adjusted to keep Boa at 2,60 m (then Bsheer becomes 2,55 m) and others sections parameters (in red) are adjusted in order to maintain displacement = weight :

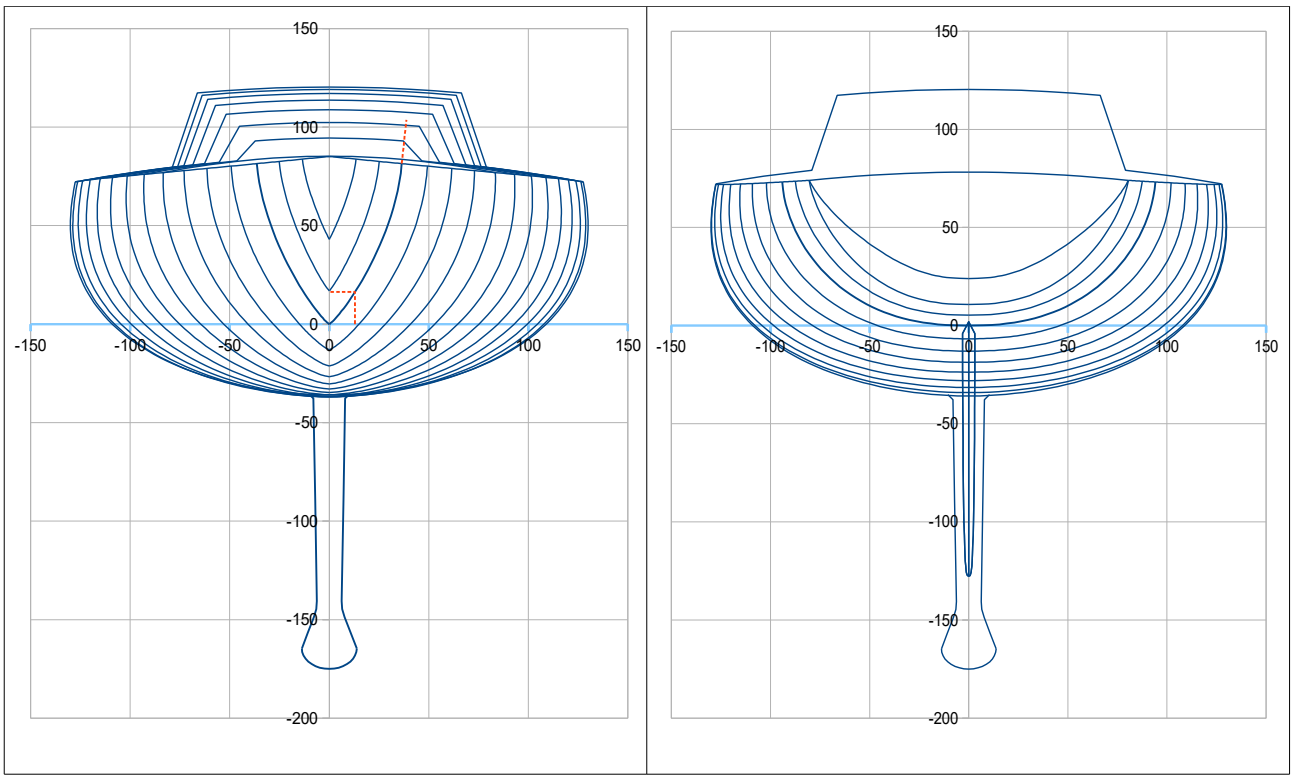
Bg (m)	2,153

	PE1	C PE1	PE2
Fore	1,750	1,350	1,000
Mid	2,250	0,835	1,800
Aft	1,750	1,250	2,500

Loa 10,30 m ; Lwl 8,00 m ; Boa 2,60 m (Bsheer 2,55 m) ; Draft 1,75 m ; Displacement : 2668 kg ; Keel-bulb 1090 kg (Ballast ratio : 40,9 %)
>> LCB hull 47,14 %Lwl ; Cp hull (%): 0,548 ; Sw : 17,35 m2 ; DLR : 145



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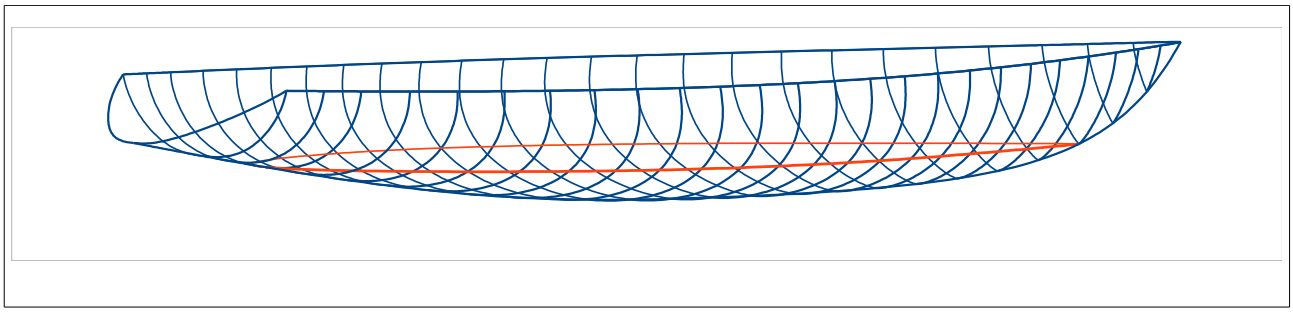


Boat V1,3 hydrostatics data :

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

2.1 Hull

Loa (m)	**10,30**	**Lwl (m)**	**8,00**	> Hull speed (Knots)	6,89	at Froude 0,4		
>> ft	*33,79*		*26,25*					
Boa (m)	**2,60**	**at X (% Lwl)**	**38,0**	Bsheer (m)	2,55	at X (% Lwl)	38,0	
>> ft	*8,53*							
Bwl (m)	**2,18**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,838			
>> ft	*7,15*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,370**	**at X (%Lwl)**	**50**		**0,74**	**0,72**	**0,85**	
>> ft	*1,21*			*>> ft*	*2,43*	*2,36*	*2,79*	
Displacement at H0 (m3)	**2,43864**	**at LCB (m)**	**3,771**	**LCB (%Lwl)**	**47,14**	**ZCB (m)**	**-0,131**	
>> lbs	*5511*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,43*	
Cp	**0,548**							
Sf (m2)	**11,81**	**at LCF (m)**	**3,583**	**LCF (%Lwl)**	**44,78**	>>> LCB – LCF (%Lwl)	2,35	
>> ft2	*127,14*	*>> ft*	*11,75*					
Angle Freeboard/Half beam	29,5	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**18,7**	**at 95% Lwl**		
Sw (m2)	**12,78**	>Sw/D^(2/3)	7,05					
>> ft2	*137,55*							
Shull (m2)	**29,54**	**at X (m)**	**3,630**	**Z (m)**	**0,092**			
>> ft2	*318,00*	*>> ft*	*11,91*	*>> ft*	*0,30*			
Sdeck (m2)	**19,74**	**at X (m)**	**3,508**	**Z (m)**	**0,79**			
>> ft2	*212,52*	*>> ft*	*11,51*	*>> ft*	*2,59*			

2.2 Keel

Vol. keel(m3)	**0,14938**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**	
		>> ft	*13,18*			*>> ft*	*-3,60*	
Ballast (kg)	**1090,5**	**at X (m)**	**4,019**	**X (%Lwl)**	**50,23**	**Z (m)**	**-1,098**	
>> lbs	*2404*	*>> ft*	*13,18*			*>> ft*	*-3,60*	
Draft oa (m)	**1,75**		**Sw (m2)**	**3,66**		**Sxz (m2)**	**1,36**	
>> ft	*5,74*		*>> ft2*	*39,45*		*>> ft2*	*14,61*	
CLR (m)	**4,34**	**CLR (%Lwl)**	**54,23**	*CLR = Center of Lateral Resistance*				
>> ft	*14,23*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,01486**	**at X (m)**	**-0,12**	**X (%Lwl)**	**-1,47**	**Z (m)**	**-0,54**	
Sw (m2)	**0,91**	*>> ft*	*-0,39*			**Sxz (m2)**	**0,44**	per rudder
>> ft2	*9,80*					*>> ft2*	*4,71*	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**2,60288**	**at LCB (m)**	**3,763**	**LCB (%Lwl)**	**47,04**	**at ZCB (m)**	**-0,189**
(kg)	**2668**	*>> ft*	*12,35*			*>> ft*	*-0,62*
>> lbs	*5882*						
, of wich Ballast (kg)	**1090**	**at Xg (m)**	**4,019**	**Xg (%Lwl)**	**50,23**	**at Zg (m)**	**-1,098**
>> lbs	*2404*	*>> ft*	*13,18*			*>> ft*	*-3,60*
>> % Ballast	40,9						
Sw (m2)	**17,35**	>Sw/D^(2/3)	9,17	Lwl/D^(1/3)	5,82		
>> ft2	*186,80*			***DLR***	***145***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

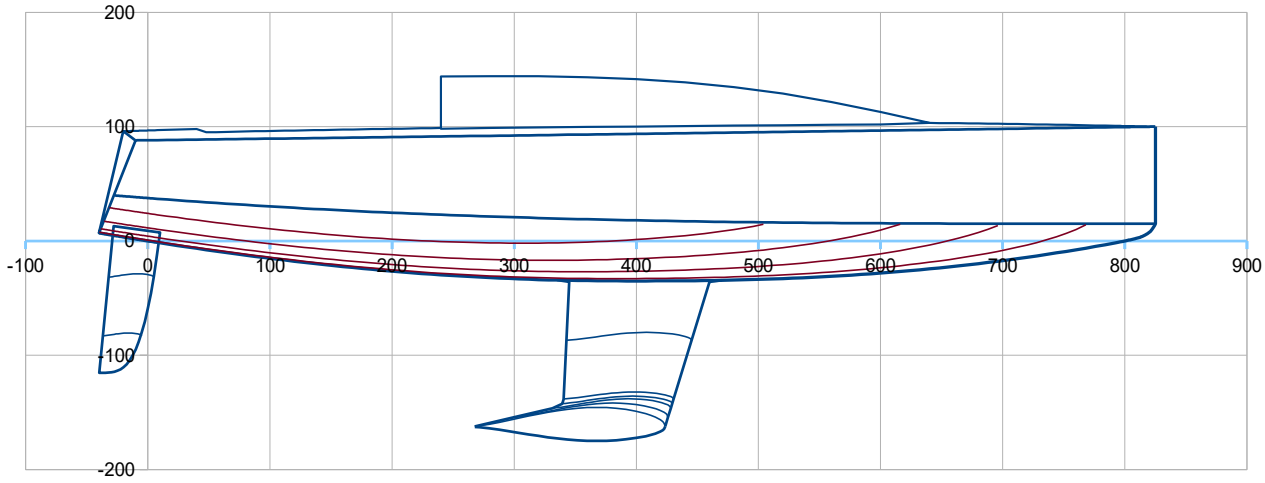
2.5 Data from the mass spreadsheet

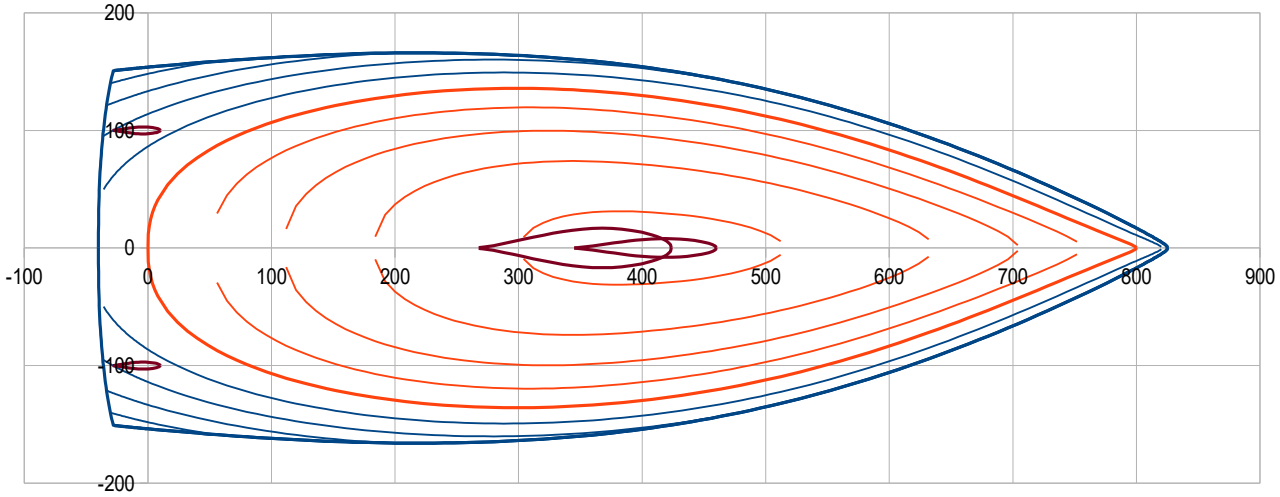
Light boat:	**M (kg)**	**2668**	**at Xg (m)**	**3,781**	**Xg (%Lwl)**	**47,26**	**at Zg (m)**	**-0,080**

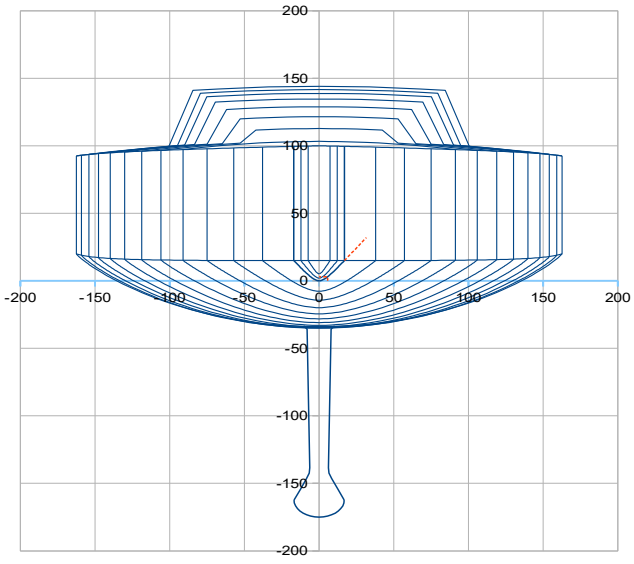
Boat U1 : modern style sailboat

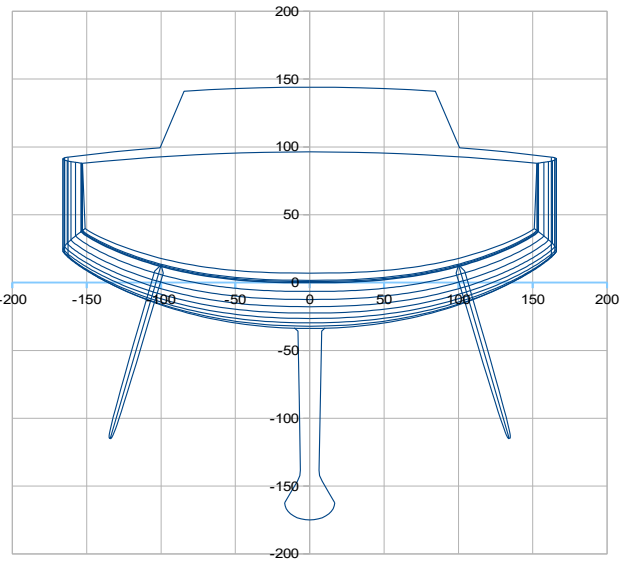
Loa 8,65 m ; Lwl 8,00 m ; Boa 3,32 m ; Draft 1,75 m ; Displacement : 3103 kg ; Keel-bulb 1198 kg (Ballast ratio : 38,6 %)

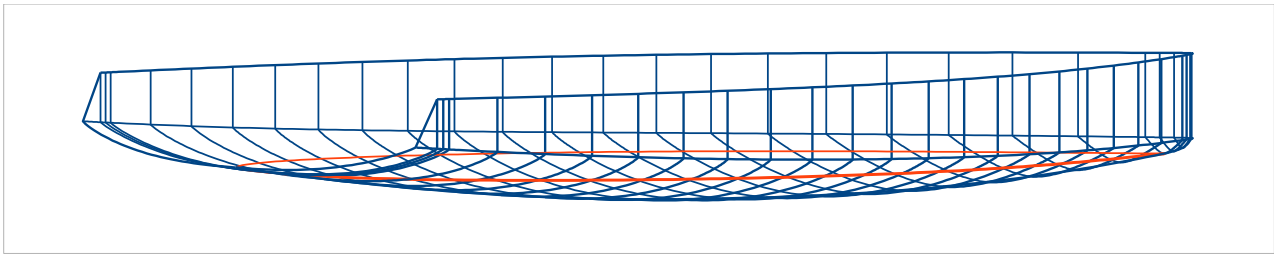
>> LCB hull 46,03 %Lwl ; Cp hull (%): 0,562 ; Sw : 21,62 m2 ; DLR : 169











Boat U1 hydrostatics data :

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

2.1 Hull

Loa (m)	**8,65**	**Lwl (m)**	**8,00**	> Hull speed (Knots)	6,89	at Froude 0,4		
>> ft	*28,38*		*26,25*					
Boa (m)	**3,32**	**at X (% Lwl)**	**27,0**	Bsheer (m)	3,32	at X (% Lwl)	27,0	
>> ft	*10,89*							
Bwl (m)	**2,72**	**at X (% Lwl)**	**37,0**	> Bwl / Boa	0,818			
>> ft	*8,91*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,350**	**at X (%Lwl)**	**50**		**0,88**	**0,92**	**1**	
>> ft	*1,15*			*>> ft*	*2,89*	*3,02*	*3,28*	
Displacement at H0 (m3)	**2,83518**	**at LCB (m)**	**3,682**	**LCB (%Lwl)**	**46,03**	**ZCB (m)**	**-0,120**	
>> lbs	*6407*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,39*	
Cp	**0,562**							
Sf (m2)	**15,48**	**at LCF (m)**	**3,492**	**LCF (%Lwl)**	**43,65**	>>> LCB – LCF (%Lwl)	2,37	
>> ft2	*166,58*	*>> ft*	*11,46*					
Angle Freeboard/Half beam	29,7	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**23,5**	**at 95% Lwl**		
Sw (m2)	**15,97**	>Sw/D^(2/3)	7,97					
>> ft2	*171,90*							
Shull (m2)	**35,61**	**at X (m)**	**3,625**	**Z (m)**	**0,130**			
>> ft2	*383,26*	*>> ft*	*11,89*	*>> ft*	*0,43*			
Sdeck (m2)	**22,98**	**at X (m)**	**3,342**	**Z (m)**	**0,97**			
>> ft2	*247,37*	*>> ft*	*10,96*	*>> ft*	*3,17*			

2.2 Keel

Vol. keel(m3)	**0,16408**	**at X (m)**	**3,896**	**X (%Lwl)**	**48,70**	**Z (m)**	**-1,128**	
		>> ft	*12,78*			*>> ft*	*-3,70*	
Ballast (kg)	**1197,8**	**at X (m)**	**3,896**	**X (%Lwl)**	**48,70**	**Z (m)**	**-1,128**	
>> lbs	*2641*	*>> ft*	*12,78*			*>> ft*	*-3,70*	
Draft oa (m)	**1,75**		**Sw (m2)**	**3,86**		**Sxz (m2)**	**1,36**	
>> ft	*5,74*		*>> ft2*	*41,57*		*>> ft2*	*14,66*	
CLR (m)	**4,22**	**CLR (%Lwl)**	**52,69**	*CLR = Center of Lateral Resistance*				
>> ft	*13,83*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**2**							
Volume (m3)	**0,02790**	**at X (m)**	**-0,13**	**X (%Lwl)**	**-1,60**	**Z (m)**	**-0,44**	
Sw (m2)	**1,79**	*>> ft*	*-0,42*			**Sxz (m2)**	**0,43**	per rudder
>> ft2	*19,22*					*>> ft2*	*4,62*	

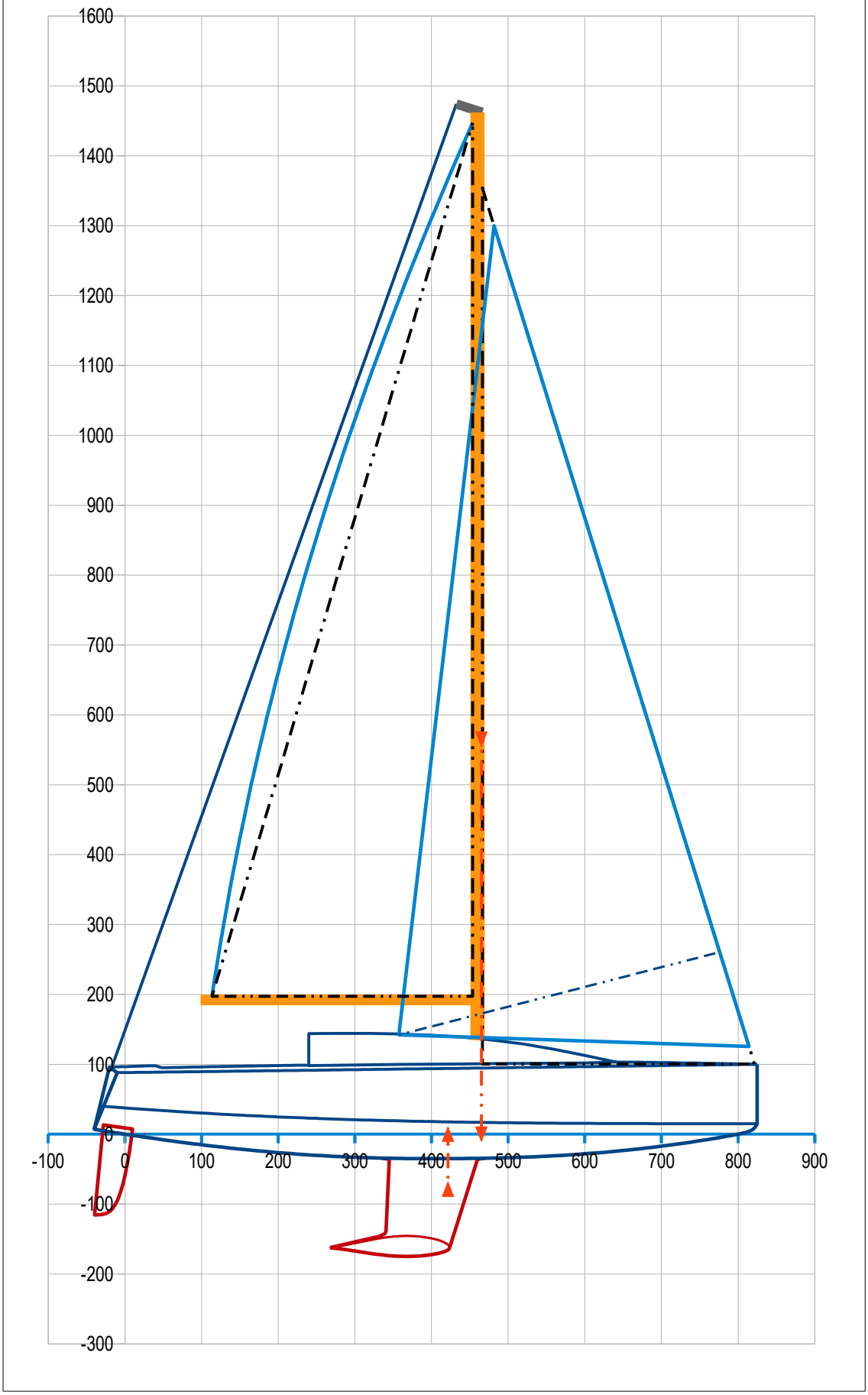
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**3,02717**	**at LCB (m)**	**3,659**	**LCB (%Lwl)**	**45,73**	**at ZCB (m)**	**-0,178**
(kg)	**3103**	*>> ft*	*12,00*			*>> ft*	*-0,58*
>> lbs	*6841*						
, of wich Ballast (kg)	**1198**	**at Xg (m)**	**3,896**	**Xg (%Lwl)**	**48,70**	**at Zg (m)**	**-1,128**
>> lbs	*2641*	*>> ft*	*12,78*			*>> ft*	*-3,70*
>> % Ballast	38,6						
Sw (m2)	**21,62**	>Sw/D^(2/3)	10,33	Lwl/D^(1/3)	5,53		
>> ft2	*232,69*			***DLR***	***169***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**3103**	**at Xg (m)**	**3,636**	**Xg (%Lwl)**	**45,45**	**at Zg (m)**	**-0,010**

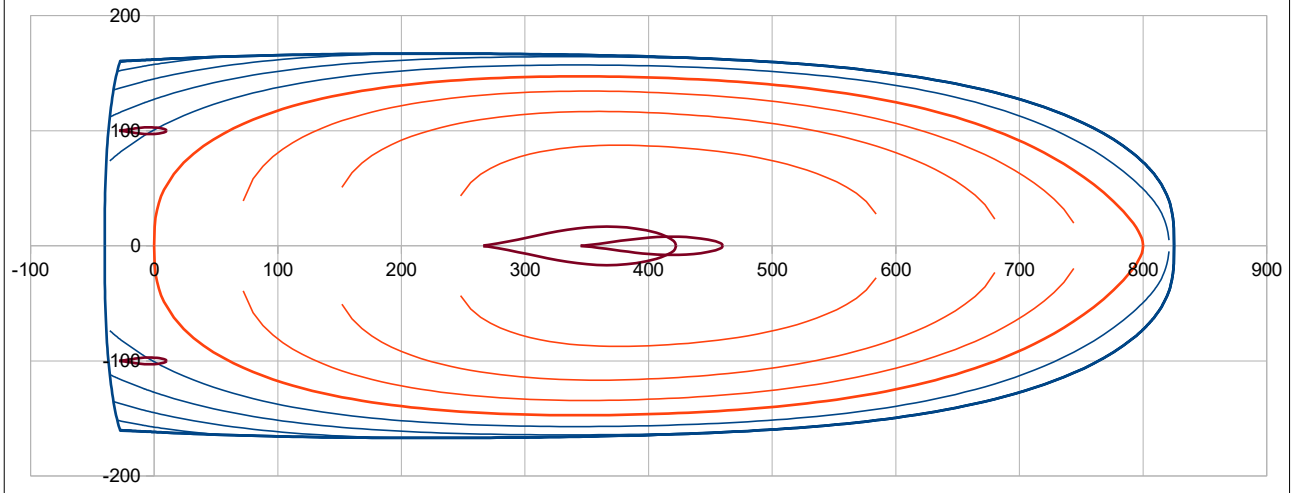
SA 52,6 m2 (Main 25,5 m2 + Jib 27,1 m2) >> SA/Sw = 2,43 SA/D^(2/3) = 25,15



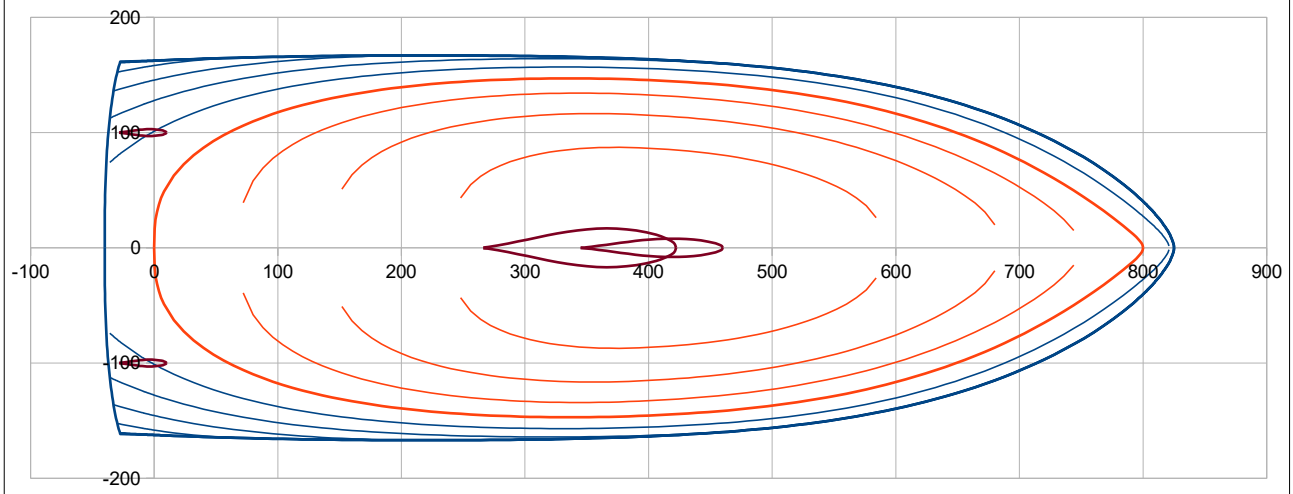
Boat U1 variant >>> **U1,1 is an U1 evolution with a scow bow by using 2 parameters : Scow and Pui Scow.** Scow gives the global proportion of the effect (Scow = 1 means the maximum rectangular proportion) and Pui Scow influences the water entry at bow.

>>> **At first, a show of Pui Scow influence** with using Scow = 1 the maximum effect :

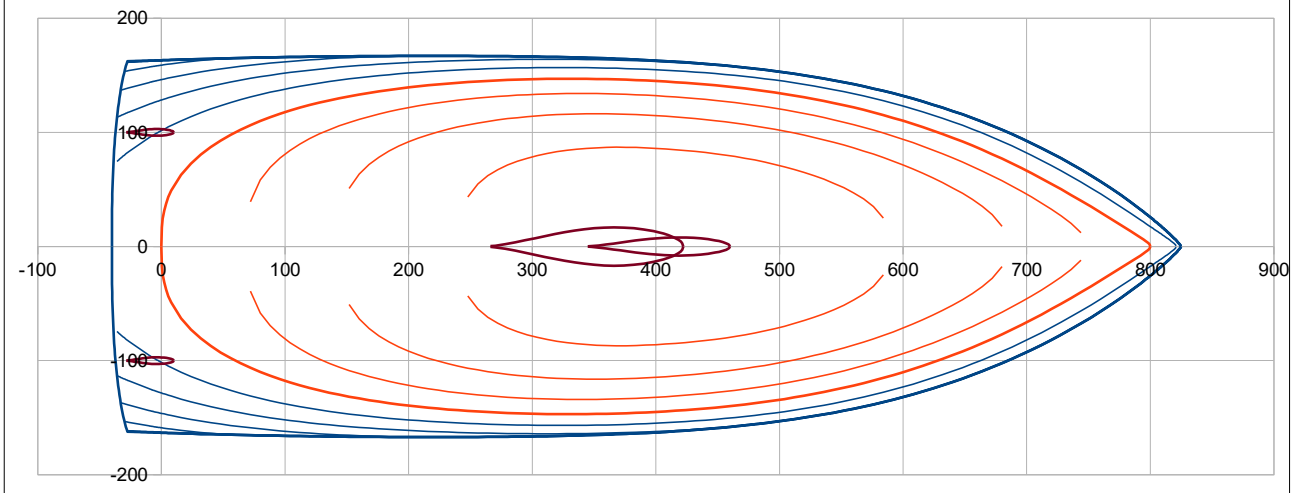
Scow = 1,0 and Pui Scow = 0,30



Scow = 1,0 and Pui Scow = 0,55

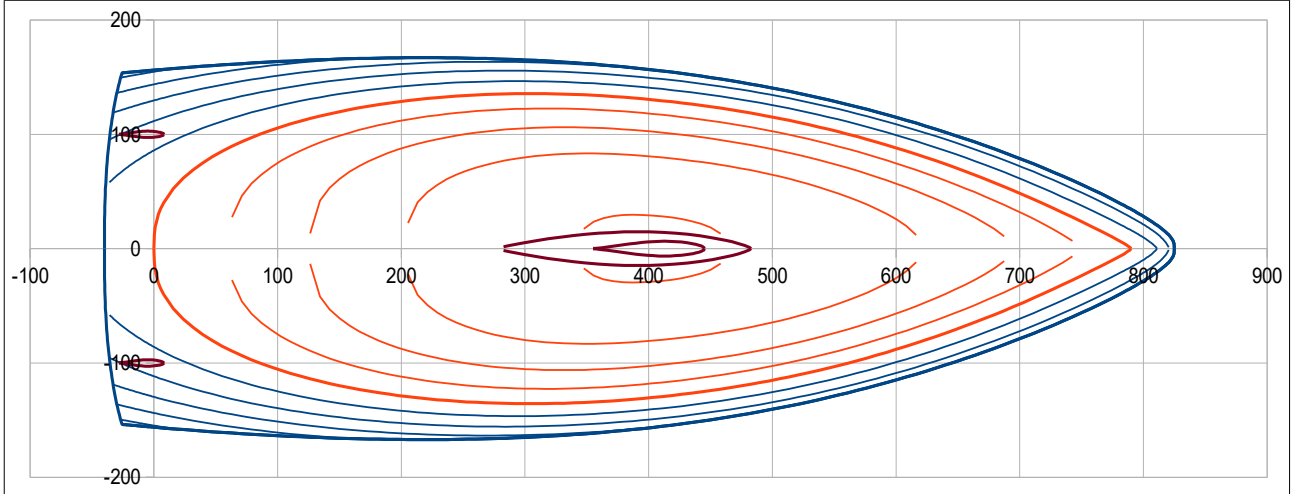


Scow = 1,00 and Pui Scow = 0,80

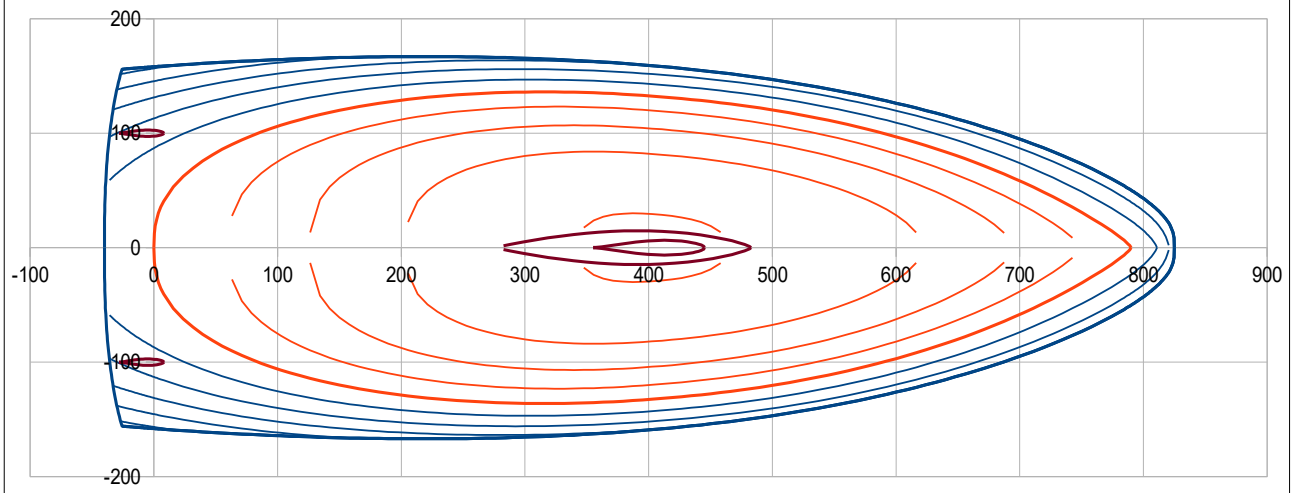


>>> Secondly**, a show of Scow influence** with using Pui Scow = 0,30 :

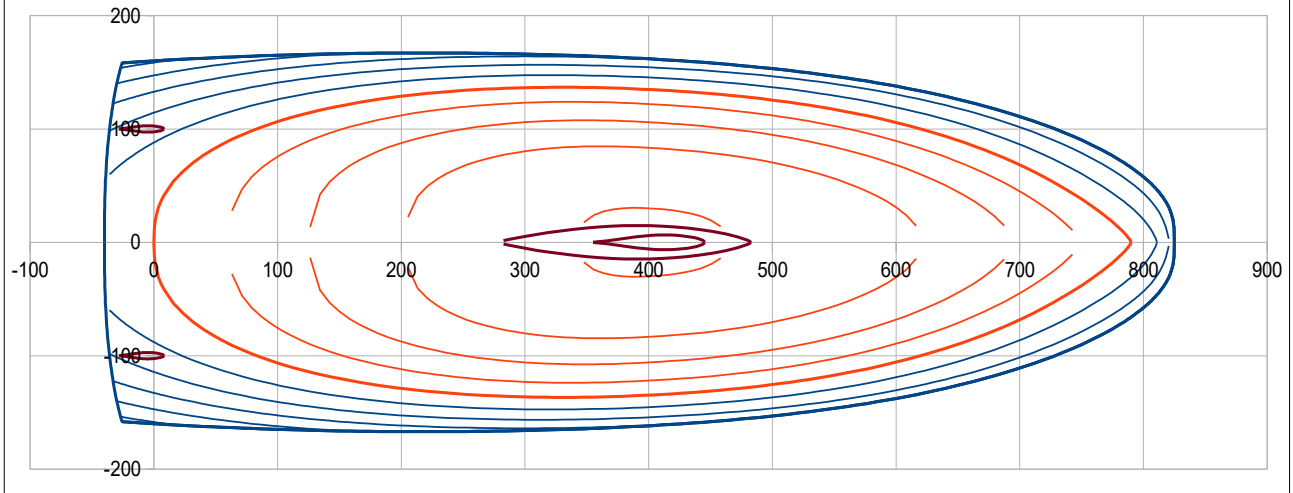
Scow = 0,25 and Pui Scow = 0,30



Scow = 0,50 and Pui Scow = 0,30



Scow = 0,75 and Pui Scow = 0,30

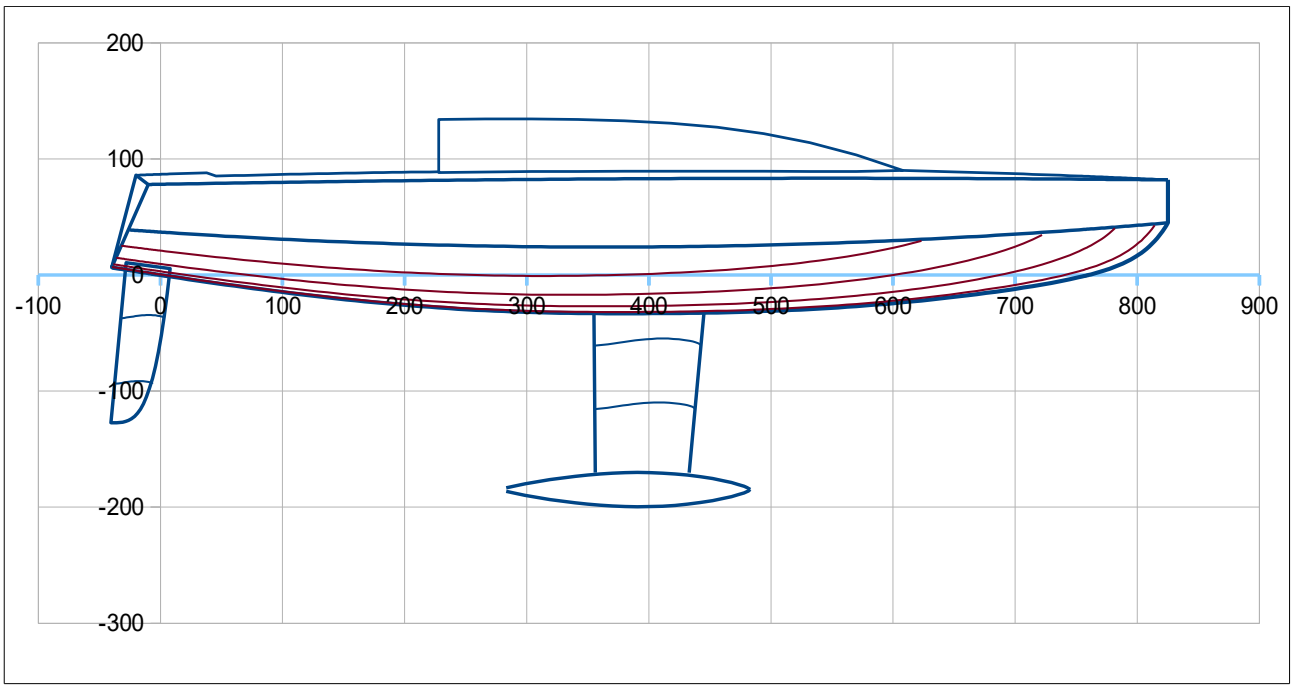


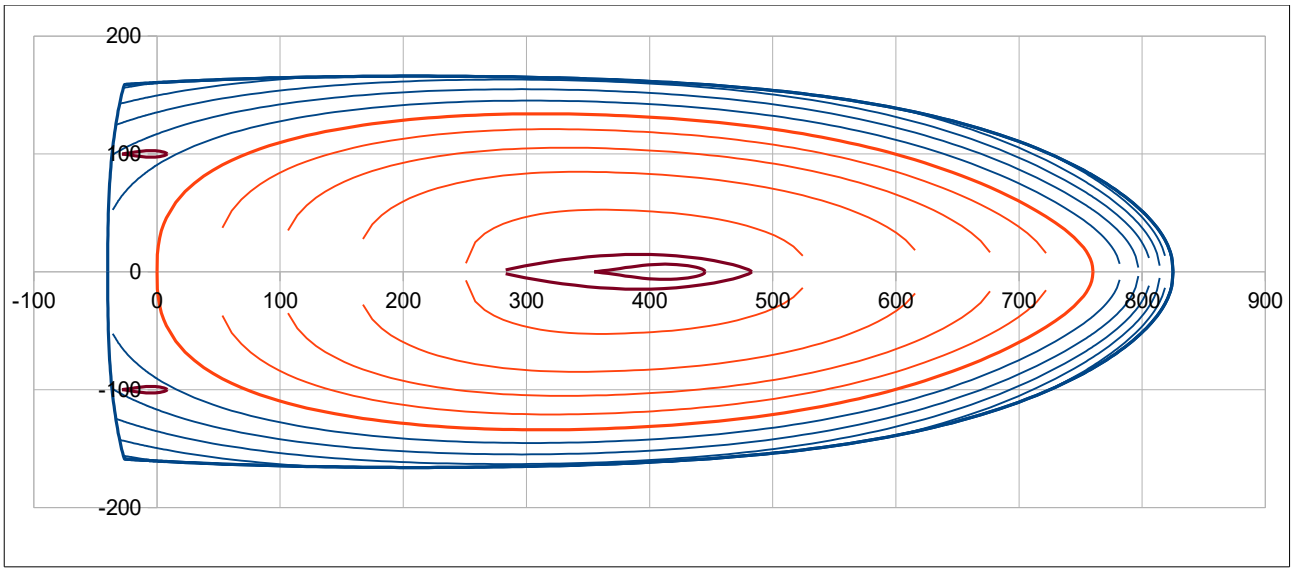
>>> Boat U1,1 for an example with a scow hull we choose :

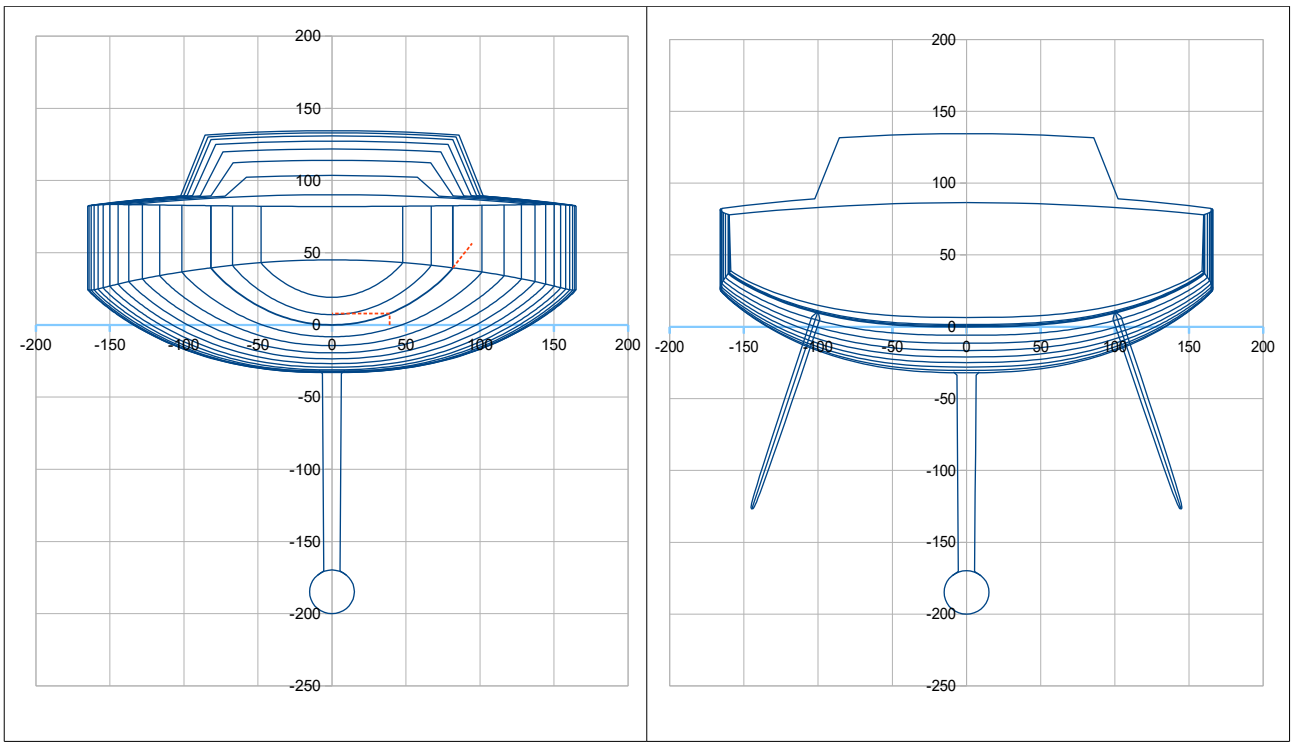
Scow	**0,90**
Pui Scow	**0,40**

, + an inverted T keel and twin suspended rudders :

Loa 8,65 m ; Lwl 7,60 m ; B 3,32 m ; Draft 2,0 m ; Displacement : 3163 kg ; Keel-bulb 1215 kg
>> Cp hull : 0,609 ; Sw : 22,05 m2 ; DLR : 201 (Ballast ratio : 38,4 %)

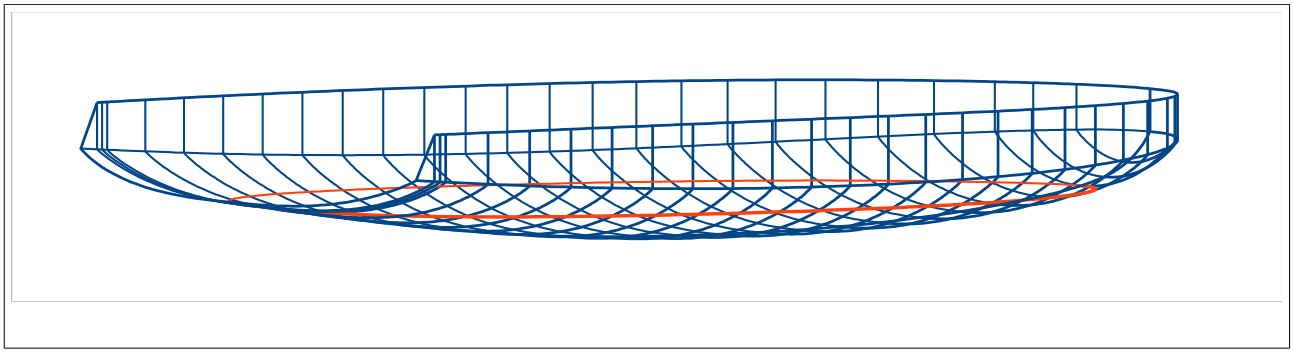




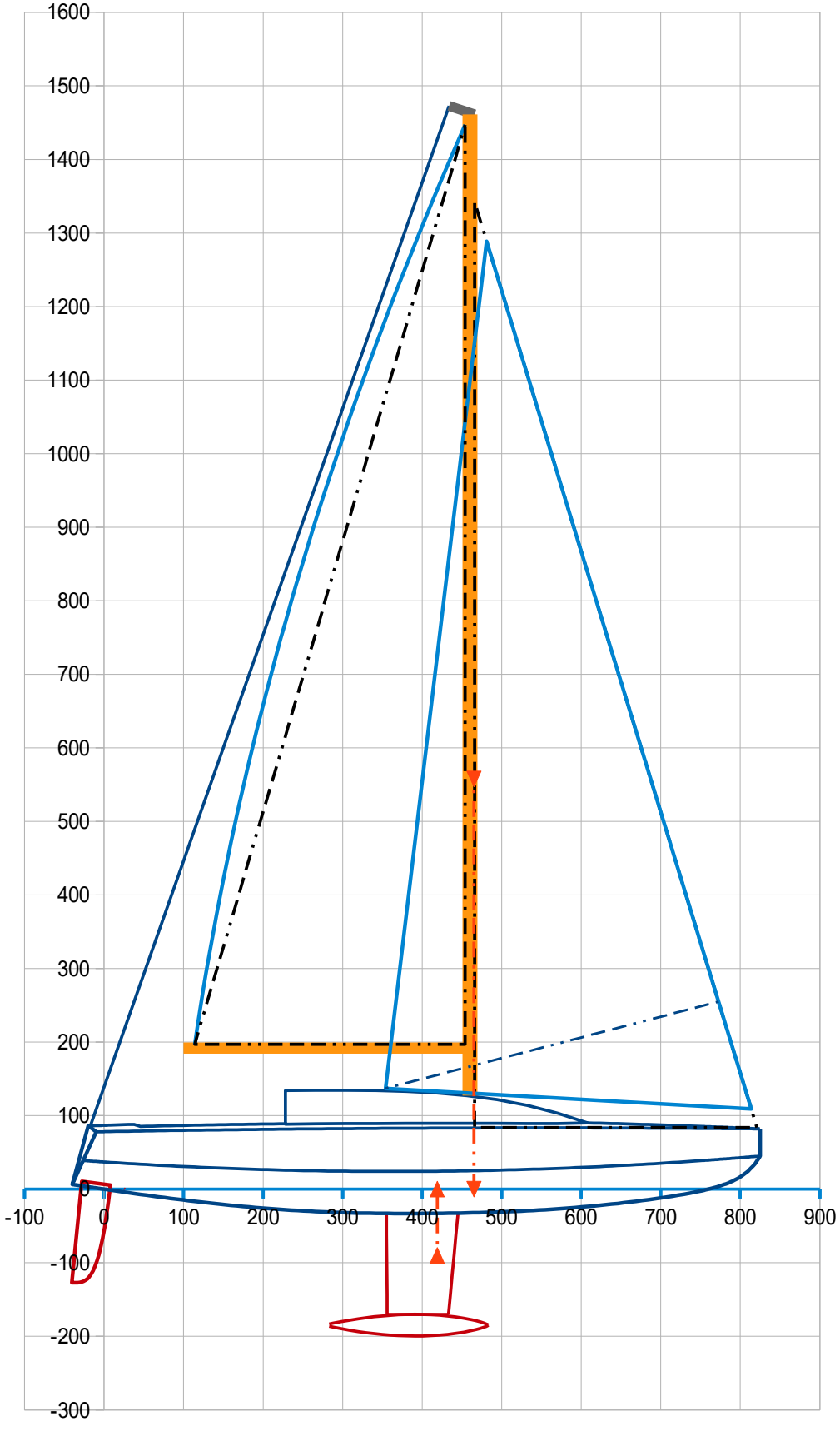


Angle C10 at Z sheer (°)
37,4
Angle C10 at Z 20%sheer
78,5
Convex check
3,92

Here, of course, the C10 angles are very different than for a classic V section.



Boat U1,1 : SA 52,6 m2 (Main 25,5 m2 + Genoa 27,1 m2) >> SA/Sw 2,39 SA/D^(2/3) 24,88



Boat U1,1 hydrostatics data :

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

2.1 Hull

Loa (m)	**8,65**	**Lwl (m)**	**7,60**	> Hull speed (Knots)	6,71	at Froude 0,4		
>> ft	*28,38*		*24,93*					
Boa (m)	**3,32**	**at X (% Lwl)**	**28,0**	Bsheer (m)	3,32	at X (% Lwl)	28,0	
>> ft	*10,89*							
Bwl (m)	**2,68**	**at X (% Lwl)**	**41,0**	> Bwl / Boa	0,808			
>> ft	*8,80*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,330**	**at X (%Lwl)**	**50**		**0,78**	**0,82**	**0,82**	
>> ft	*1,08*			*>> ft*	*2,56*	*2,69*	*2,69*	
Displacement at H0 (m3)	**2,89123**	**at LCB (m)**	**3,709**	**LCB (%Lwl)**	**48,80**	**ZCB (m)**	**-0,116**	
>> lbs	*6533*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,38*	
Cp	**0,609**							
Sf (m2)	**16,26**	**at LCF (m)**	**3,577**	**LCF (%Lwl)**	**47,06**	>>> LCB – LCF (%Lwl)	1,74	
>> ft2	*174,99*	*>> ft*	*11,73*					
Angle Freeboard/Half beam	26,5	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**33,3**	**at 95% Lwl**		
Sw (m2)	**16,59**	>Sw/D^(2/3)	8,18					
>> ft2	*178,60*							
Shull (m2)	**35,05**	**at X (m)**	**3,657**	**Z (m)**	**0,085**			
>> ft2	*377,22*	*>> ft*	*12,00*	*>> ft*	*0,28*			
Sdeck (m2)	**25,61**	**at X (m)**	**3,609**	**Z (m)**	**0,85**			
>> ft2	*275,70*	*>> ft*	*11,84*	*>> ft*	*2,78*			

2.2 Keel

Vol. keel(m3)	**0,16643**	**at X (m)**	**3,965**	**X (%Lwl)**	**52,17**	**Z (m)**	**-1,382**	
		>> ft	*13,01*			*>> ft*	*-4,54*	
Ballast (kg)	**1215,0**	**at X (m)**	**3,965**	**X (%Lwl)**	**52,17**	**Z (m)**	**-1,382**	
>> lbs	*2679*	*>> ft*	*13,01*			*>> ft*	*-4,54*	
Draft oa (m)	**2,00**		**Sw (m2)**	**3,58**		**Sxz (m2)**	**1,57**	
>> ft	*6,56*		*>> ft2*	*38,49*		*>> ft2*	*16,85*	
CLR (m)	**4,19**	**CLR (%Lwl)**	**55,12**	*CLR = Center of Lateral Resistance*				
>> ft	*13,74*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**2**							
Volume (m3)	**0,02824**	**at X (m)**	**-0,14**	**X (%Lwl)**	**-1,86**	**Z (m)**	**-0,52**	
Sw (m2)	**1,88**	*>> ft*	*-0,46*			**Sxz (m2)**	**0,45**	per rudder
>> ft2	*20,20*					*>> ft2*	*4,86*	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**3,08590**	**at LCB (m)**	**3,688**	**LCB (%Lwl)**	**48,52**	**at ZCB (m)**	**-0,188**
(kg)	**3163**	*>> ft*	*12,10*			*>> ft*	*-0,62*
>> lbs	*6973*						
, of wich Ballast (kg)	**1215**	**at Xg (m)**	**3,965**	**Xg (%Lwl)**	**52,17**	**at Zg (m)**	**-1,382**
>> lbs	*2679*	*>> ft*	*13,01*			*>> ft*	*-4,54*
>> % Ballast	38,4						
Sw (m2)	**22,05**	>Sw/D^(2/3)	10,40	Lwl/D^(1/3)	5,22		
>> ft2	*237,29*			***DLR***	***201***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**3163**	**at Xg (m)**	**3,663**	**Xg (%Lwl)**	**48,19**	**at Zg (m)**	**-0,132**

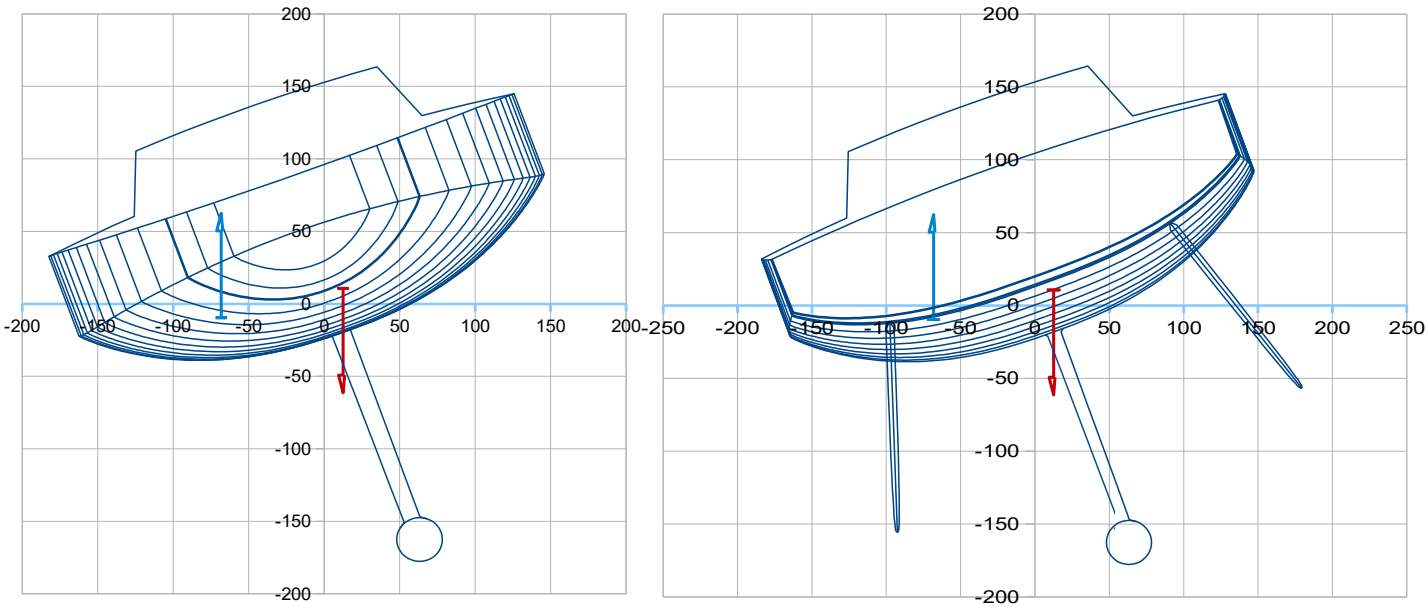
Boat U1,1 at 20° heel , in charge with crew 300 kg sit windward (at Y 1,35 m) :

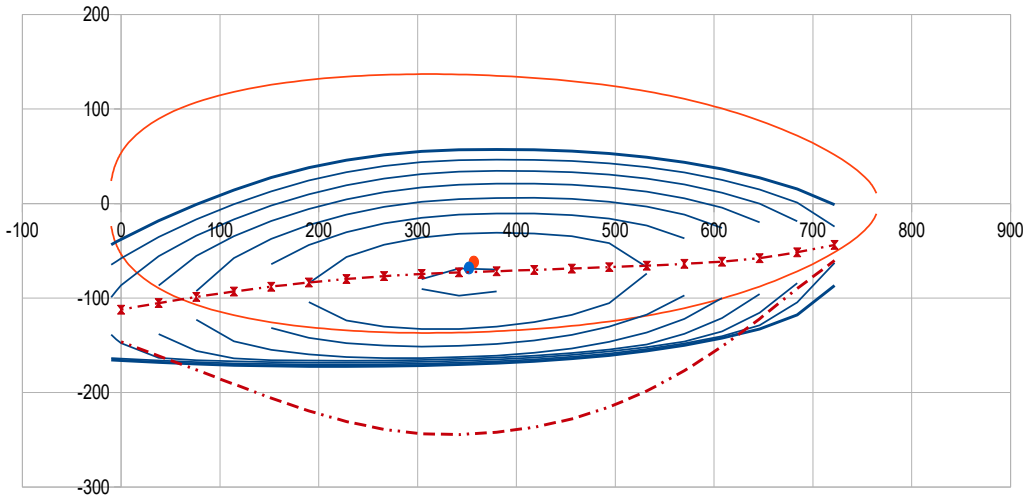
5.1 Mass spreadsheet with input of a load

Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*3162,88*	*3,663*	*-0,132*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**2,00**	**0,85**	**0,00**	Crew at center
			0,85	**1,35**	Crew sit windward
Total >>> Mass (kg)	**3462,88**	**3,519**	**-0,047**	**0,000**	**Crew at center**
Disp. (m3)	**3,37842**		**-0,047**	**0,117**	**Crew sit windward**

>>> at 20° heel : RM20° = 27,438 kN.m ; Bwl 2,27 m ; Sw20° 19,80 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**3,37842**	**/ Disp. (m3)**	**3,37842**
Height (cm)	**10,9884**	**Xc heel (m)**	**3,519**	**/ Xg (m)**	**3,519**
Trim (°)	**-0,295**	Yc heel (m)	-0,682	Yg heel (m)	0,126
		Zc heel (m)	-0,096	**> GZ (m)**	**0,808**
		Sw heel(m2)	**19,80**	**RM (kN.m)**	**27,438**
		Bwl heel (m)	**2,27**	**FB mini (cm)**	**31,2**
		LCB – LCF (%Lwl)	**-0,64**	**Obliquity (°)**	**3,2**



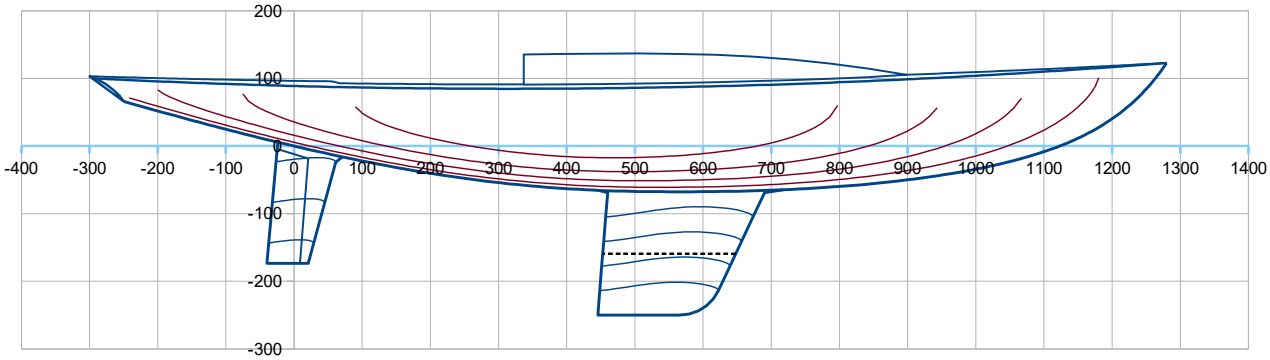


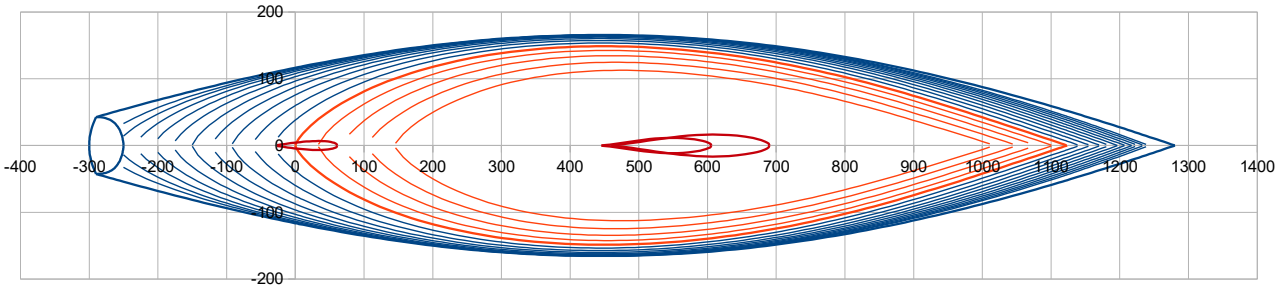
Other examples inspired by historical or recent designs

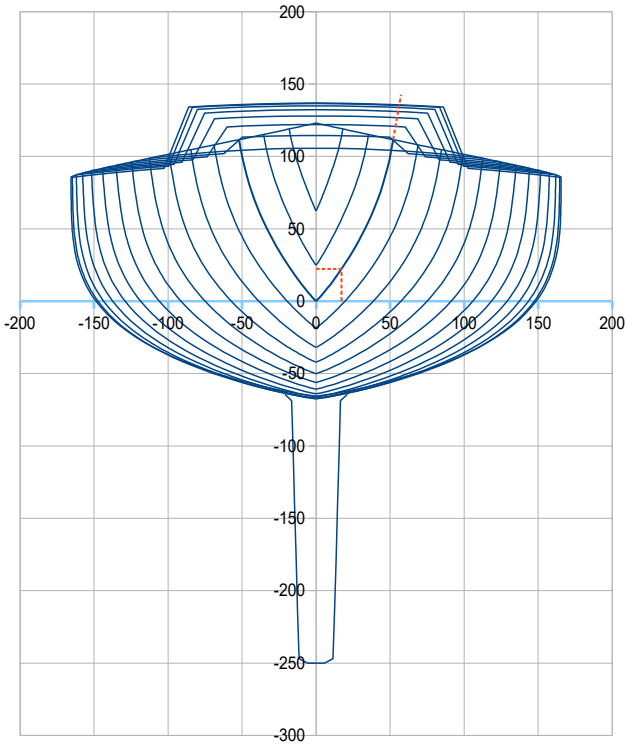
B52, inspired by « Bojar » flush deck cutter 1937 / Johan Anker

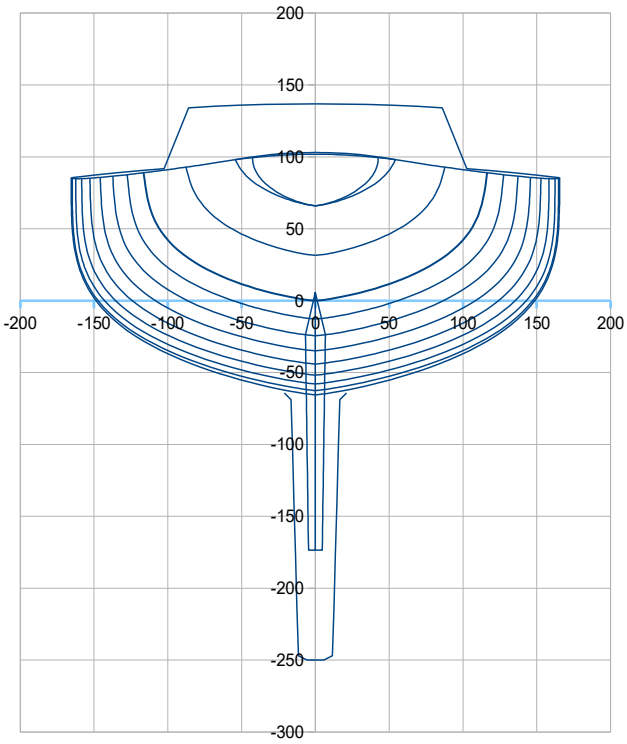
Loa 15,80 m ; Lwl 11,23 m ; B 3,31 m ; Draft 2,50 m ; Displacement : 8897 kg ; Ballast : 3045 kg

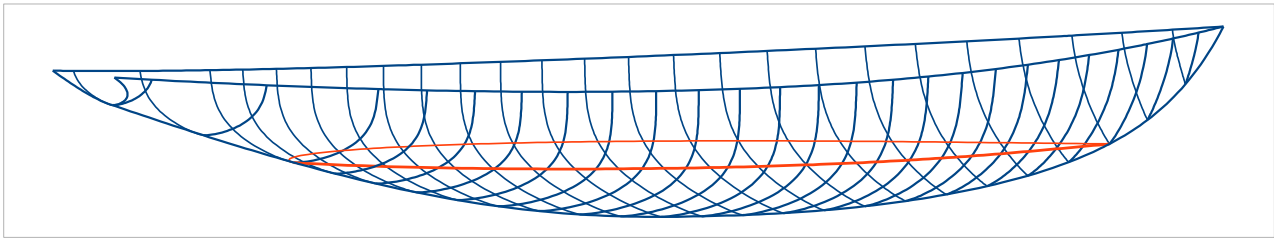
>> LCB hull 47,03 %Lwl ; Cp hull : 0,541 ; Sw : 35,53 m2 ; DLR : 175 ; Ballast ratio : 34,2 %











Boat B52 hydrostatics data :

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

2.1 Hull

Loa (m)	**15,80**	**Lwl (m)**	**11,23**	> Hull speed (Knots)	8,16	at Froude 0,4		
>> ft	*51,84*		*36,84*					
Boa (m)	**3,31**	**at X (% Lwl)**	**40,0**	Bsheer (m)	3,31	at X (% Lwl)	40,0	
>> ft	*10,86*							
Bwl (m)	**2,97**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,898			
>> ft	*9,76*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,675**	**at X (%Lwl)**	**50**		**0,98**	**0,85**	**1,23**	
>> ft	*2,21*			*>> ft*	*3,22*	*2,79*	*4,04*	
Displacement at H0 (m3)	**7,92696**	**at LCB (m)**	**5,281**	**LCB (%Lwl)**	**47,03**	**ZCB (m)**	**-0,224**	
>> lbs	*17913*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,74*	
Cp	**0,541**							
Sf (m2)	**22,71**	**at LCF (m)**	**5,079**	**LCF (%Lwl)**	**45,22**	>>> LCB – LCF (%Lwl)	1,81	
>> ft2	*244,41*	*>> ft*	*16,66*					
Angle Freeboard/Half beam	27,3	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**18,9**	**at 95% Lwl**		
Sw (m2)	**25,50**	>Sw/D^(2/3)	6,41					
>> ft2	*274,45*							
Shull (m2)	**56,62**	**at X (m)**	**4,932**	**Z (m)**	**0,072**			
>> ft2	*609,45*	*>> ft*	*16,18*	*>> ft*	*0,23*			
Sdeck (m2)	**37,88**	**at X (m)**	**4,606**	**Z (m)**	**1,01**			
>> ft2	*407,69*	*>> ft*	*15,11*	*>> ft*	*3,31*			

2.2 Keel

Vol. keel(m3)	**0,65336**	**at X (m)**	**5,696**	**X (%Lwl)**	**50,72**	**Z (m)**	**-1,470**	
		>> ft	*18,69*			*>> ft*	*-4,82*	
Ballast (kg)	**3044,7**	**at X (m)**	**5,547**	**X (%Lwl)**	**49,40**	**Z (m)**	**-1,956**	
>> lbs	*6712*	*>> ft*	*18,20*			*>> ft*	*-6,42*	
Draft oa (m)	**2,50**		**Sw (m2)**	**7,45**		**Sxz (m2)**	**3,64**	
>> ft	*8,20*		*>> ft2*	*80,22*		*>> ft2*	*39,17*	
CLR (m)	**6,16**	**CLR (%Lwl)**	**54,89**	*CLR = Center of Lateral Resistance*				
>> ft	*20,22*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,09933**	**at X (m)**	**0,11**	**X (%Lwl)**	**0,94**	**Z (m)**	**-0,82**	
Sw (m2)	**2,58**	*>> ft*	*0,35*			**Sxz (m2)**	**1,24**	per rudder
>> ft2	*27,73*					*>> ft2*	*13,33*	

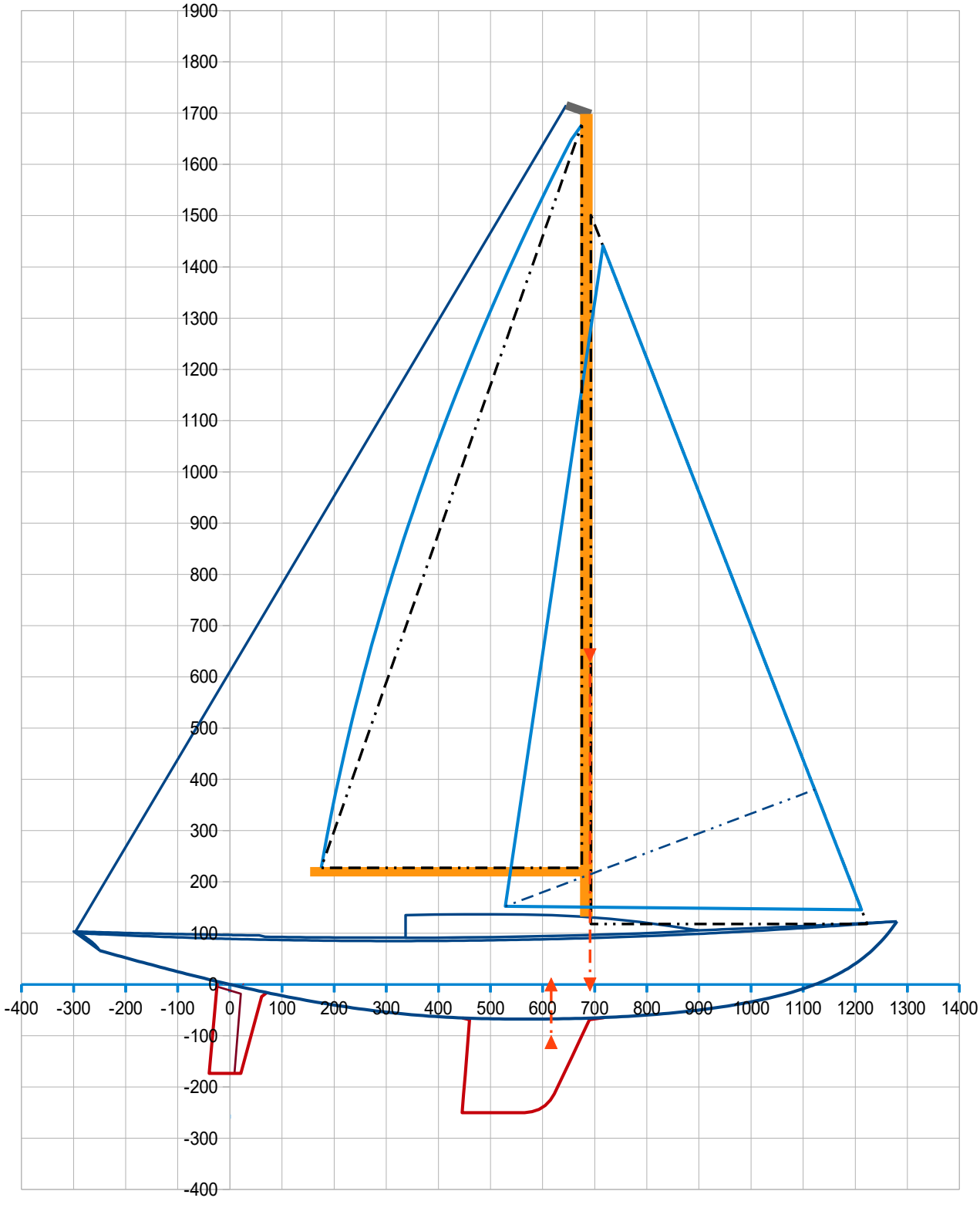
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**8,67965**	**at LCB (m)**	**5,253**	**LCB (%Lwl)**	**46,78**	**at ZCB (m)**	**-0,325**
(kg)	**8897**	*>> ft*	*17,24*			*>> ft*	*-1,07*
>> lbs	*19614*						
, of wich Ballast (kg)	**3045**	**at Xg (m)**	**5,547**	**Xg (%Lwl)**	**49,40**	**at Zg (m)**	**-1,956**
>> lbs	*6712*	*>> ft*	*18,20*			*>> ft*	*-6,42*
>> % Ballast	34,2						
Sw (m2)	**35,53**	>Sw/D^(2/3)	8,41	Lwl/D^(1/3)	5,46		
>> ft2	*382,40*			***DLR***	***175***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**8897**	**at Xg (m)**	**5,195**	**Xg (%Lwl)**	**46,26**	**at Zg (m)**	**-0,120**

Boat B52 SA 88,8 m2 (Main 43,8 m2 + Jib 45,0 m2) >>> SA/Sw 2,50 SA/D^(2/3) 21,02



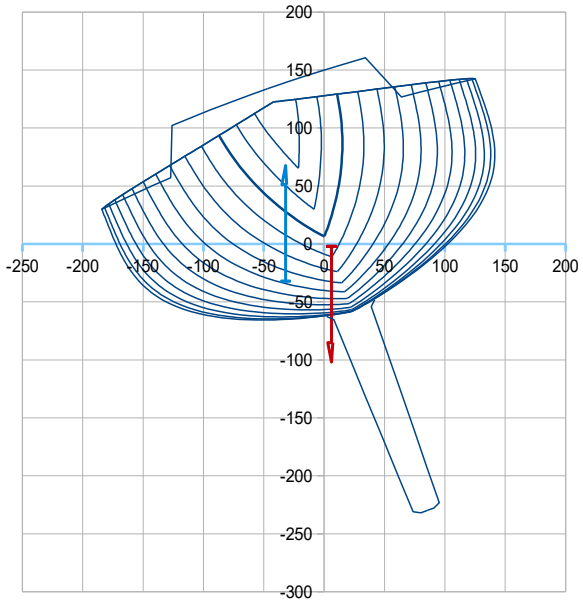
Boat B52 at 20° heel , in charge with crew 300 kg sit windward (at Y 1,00 m) :

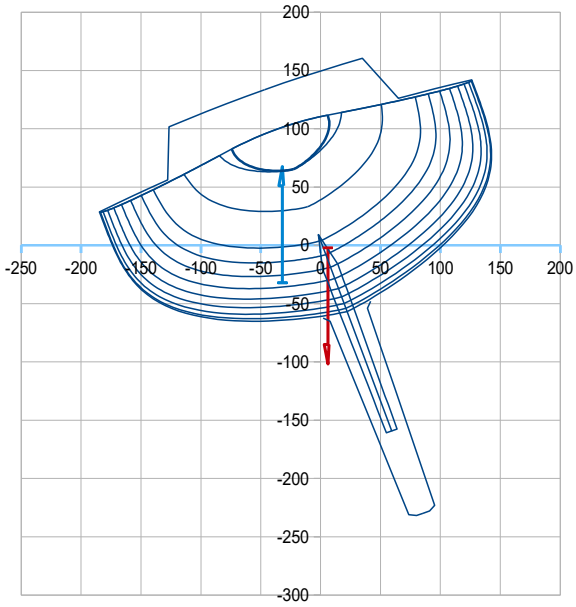
5.1 Mass spreadsheet with input of a load

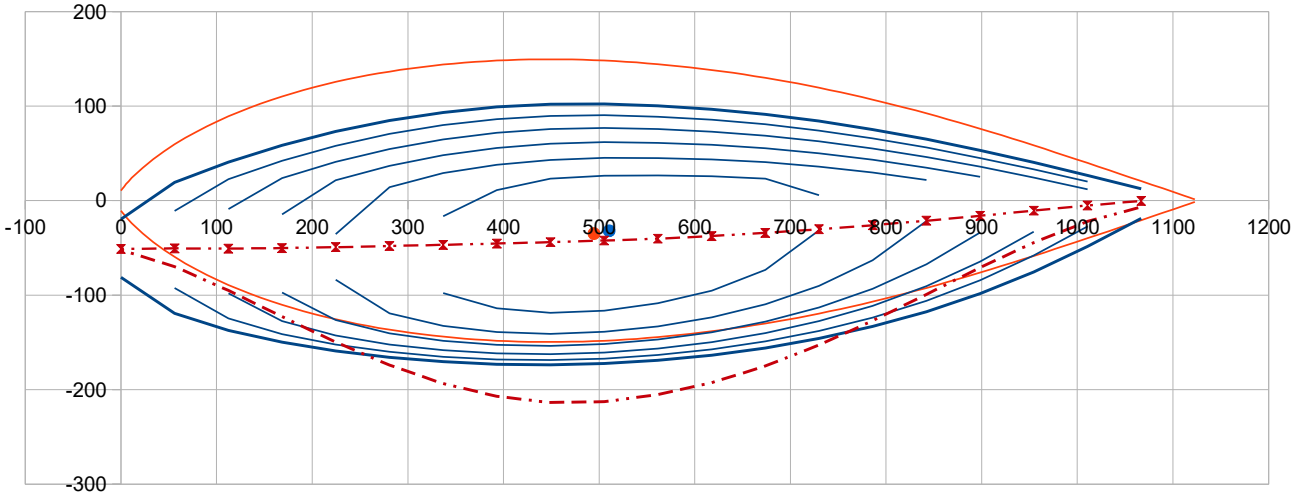
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*8897,18*	*5,195*	*-0,120*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**2,40**	**0,85**	**0,00**	Crew at center
			0,85	**1,00**	Crew sit windward
Total >>> Mass (kg)	**9197,18**	**5,104**	**-0,088**	**0,000**	**Crew at center**
Disp. (m3)	**8,97285**		**-0,088**	**0,033**	**Crew sit windward**

>>> at 20° heel : RM20° = 34,291 kN.m ; Bwl 2,76 m ; Sw20° 35,65 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**8,97284**	**/ Disp. (m3)**	**8,97285**
Height (cm)	**5,1566**	**Xc heel (m)**	**5,104**	**/ Xg (m)**	**5,104**
Trim (°)	**0,134**	Yc heel (m)	-0,319	Yg heel (m)	0,061
		Zc heel (m)	-0,321	**> GZ (m)**	**0,380**
		Sw heel(m2)	**35,65**	**RM (kN.m)**	**34,291**
		Bwl heel (m)	**2,76**	**FB mini (cm)**	**28,4**
		LCB – LCF (%Lwl)	**1,41**	**Obliquity (°)**	**2,4**

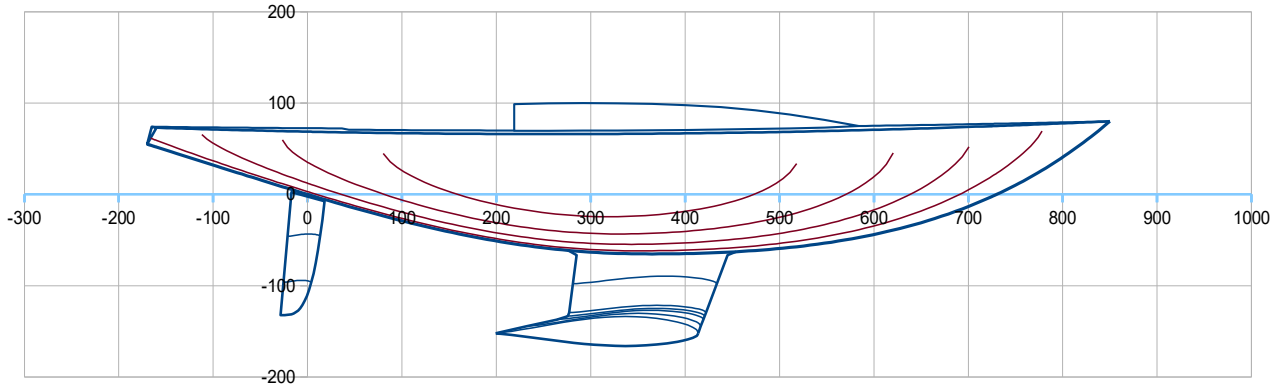


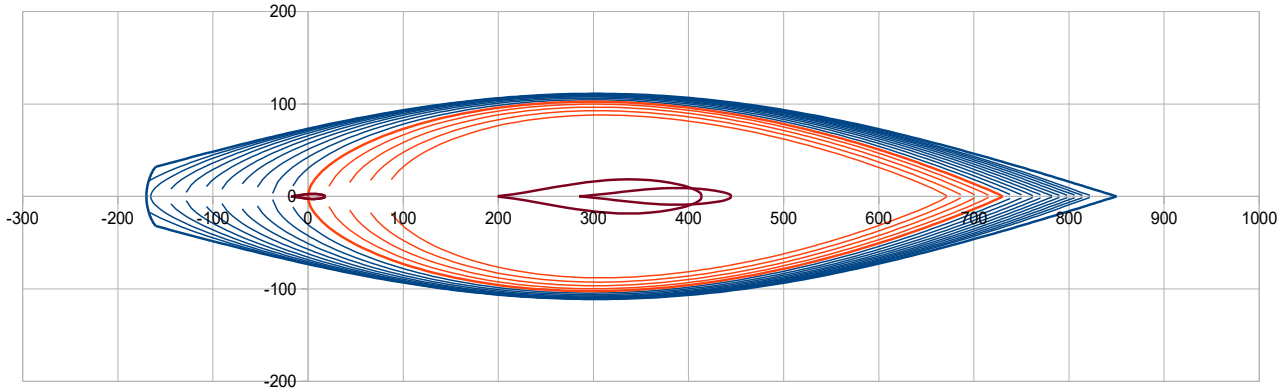


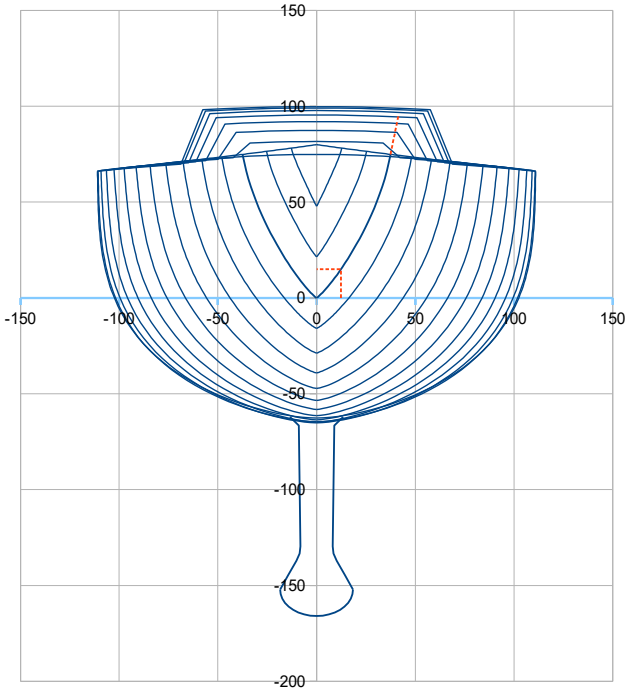


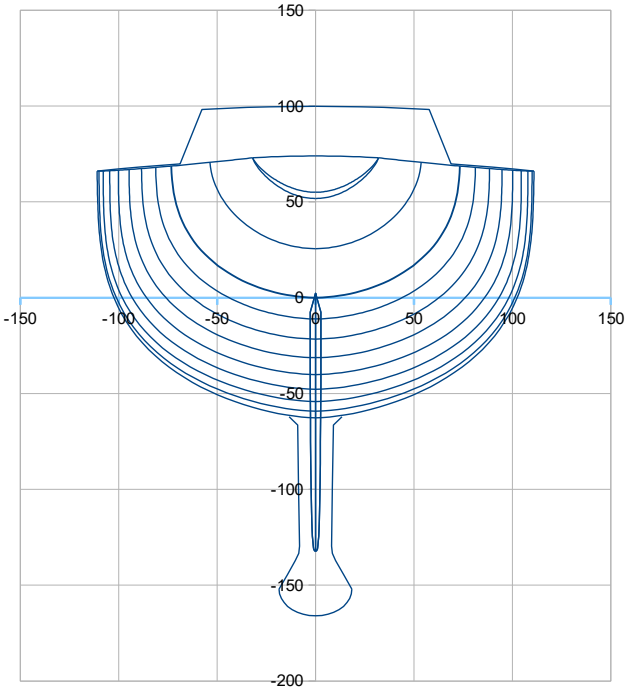
Classic 6m JI, inspired by this metric class with a classic approach

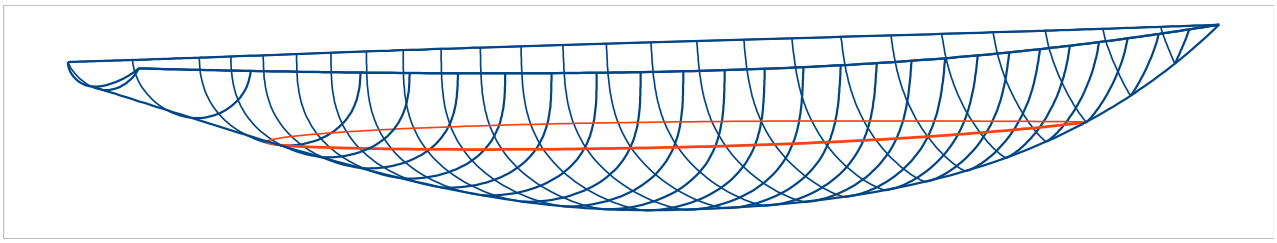
Loa 10,20 m ; Lwl 7,30 m ; B 2,22 m ; Draft 1,66 m ; Displacement : 4022 kg ; Ballast : 2018 kg
>> LCB hull 47,43 %Lwl ; Cp hull : 0,541 ; Sw : 18,14 m2 ; DLR : 288 ; Ballast ratio : 50,2 %











Boat Classic 6m JI hydrostatics data :

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

2.1 Hull

Loa (m)	**10,20**	**Lwl (m)**	**7,30**	> Hull speed (Knots)	6,58	at Froude 0,4		
>> ft	*33,46*		*23,95*					
Boa (m)	**2,22**	**at X (% Lwl)**	**41,0**	Bsheer (m)	2,22	at X (% Lwl)	41,0	
>> ft	*7,28*							
Bwl (m)	**2,05**	**at X (% Lwl)**	**41,0**	> Bwl / Boa	0,923			
>> ft	*6,72*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,652**	**at X (%Lwl)**	**50**		**0,73**	**0,66**	**0,8**	
>> ft	*2,14*			*>> ft*	*2,40*	*2,17*	*2,62*	
Displacement at H0 (m3)	**3,69555**	**at LCB (m)**	**3,463**	**LCB (%Lwl)**	**47,43**	**ZCB (m)**	**-0,224**	
>> lbs	*8351*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,74*	
Cp	**0,541**							
Sf (m2)	**10,47**	**at LCF (m)**	**3,322**	**LCF (%Lwl)**	**45,51**	>>> LCB – LCF (%Lwl)	1,92	
>> ft2	*112,67*	*>> ft*	*10,90*					
Angle Freeboard/Half beam	30,8	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**22,2**	**at 95% Lwl**		
Sw (m2)	**12,81**	>Sw/D^(2/3)	5,36					
>> ft2	*137,92*							
Shull (m2)	**26,93**	**at X (m)**	**3,288**	**Z (m)**	**0,008**			
>> ft2	*289,83*	*>> ft*	*10,79*	*>> ft*	*0,02*			
Sdeck (m2)	**16,41**	**at X (m)**	**3,079**	**Z (m)**	**0,73**			
>> ft2	*176,63*	*>> ft*	*10,10*	*>> ft*	*2,39*			

2.2 Keel

Vol. keel(m3)	**0,21599**	**at X (m)**	**3,535**	**X (%Lwl)**	**48,43**	**Z (m)**	**-1,231**	
		>> ft	*11,60*			*>> ft*	*-4,04*	
Ballast (kg)	**2017,5**	**at X (m)**	**3,500**	**X (%Lwl)**	**47,94**	**Z (m)**	**-1,288**	
>> lbs	*4448*	*>> ft*	*11,48*			*>> ft*	*-4,23*	
Draft oa (m)	**1,66**		**Sw (m2)**	**4,49**		**Sxz (m2)**	**1,43**	
>> ft	*5,45*		*>> ft2*	*48,33*		*>> ft2*	*15,42*	
CLR (m)	**4,03**	**CLR (%Lwl)**	**55,14**	*CLR = Center of Lateral Resistance*				
>> ft	*13,21*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,01200**	**at X (m)**	**-0,03**	**X (%Lwl)**	**-0,47**	**Z (m)**	**-0,59**	
Sw (m2)	**0,84**	*>> ft*	*-0,11*			**Sxz (m2)**	**0,40**	per rudder
>> ft2	*9,00*					*>> ft2*	*4,33*	

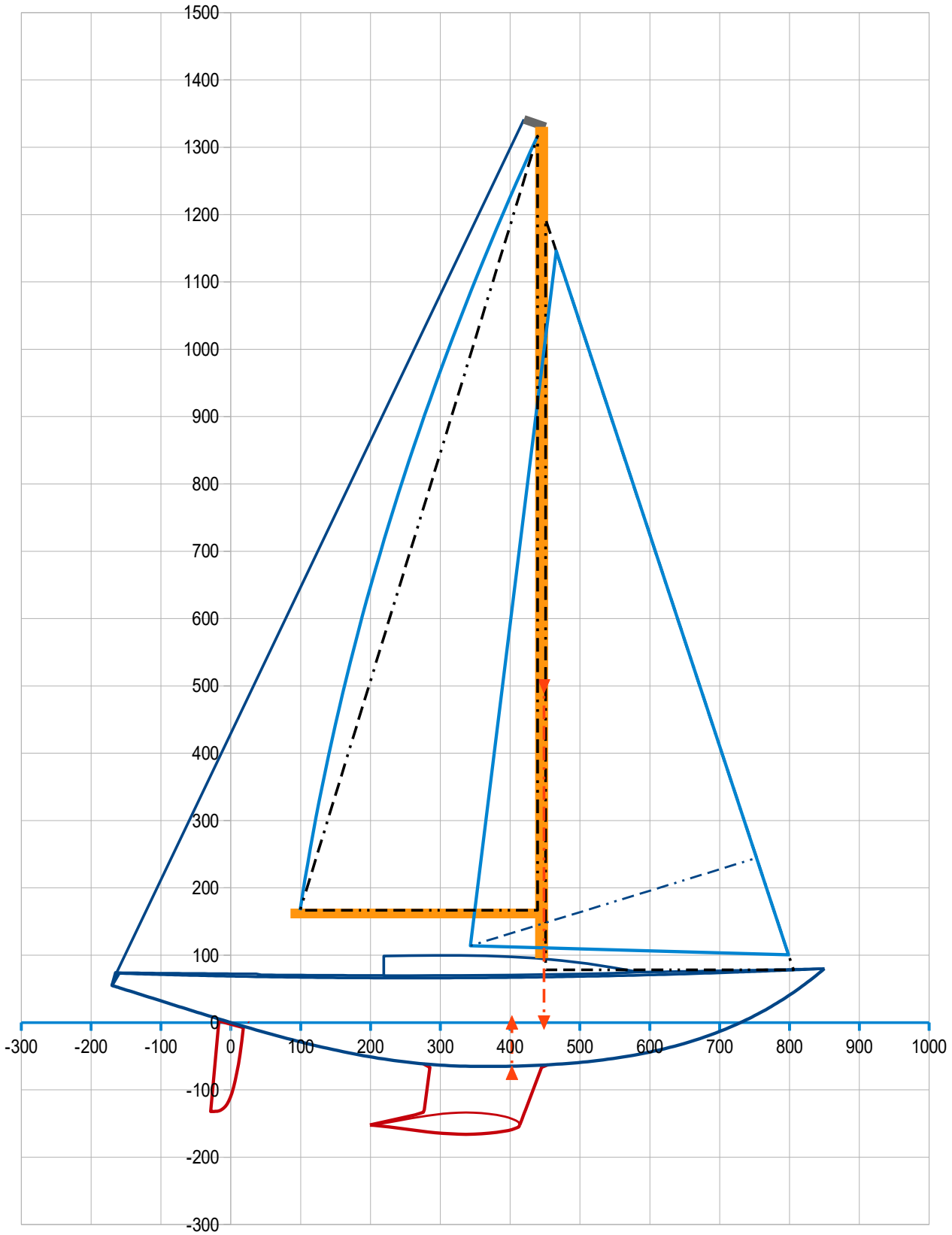
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**3,92354**	**at LCB (m)**	**3,456**	**LCB (%Lwl)**	**47,34**	**at ZCB (m)**	**-0,281**	
(kg)	**4022**	*>> ft*	*11,34*			*>> ft*	*-0,92*	
>> lbs	*8866*							
, of wich Ballast (kg)	**2018**	**at Xg (m)**	**3,500**	**Xg (%Lwl)**	**47,94**	**at Zg (m)**	**-1,288**	
>> lbs	*4448*	*>> ft*	*11,48*			*>> ft*	*-4,23*	
>> % Ballast	50,2							
Sw (m2)	**18,14**	>Sw/D^(2/3)	7,29	Lwl/D^(1/3)	4,63			
>> ft2	*195,26*			***DLR***	***288***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**4022**	**at Xg (m)**	**3,461**	**Xg (%Lwl)**	**47,41**	**at Zg (m)**	**-0,145**

Boat Classic 6m JI SA 47,5 m2 (Main 23,5 m2 + Jib 24,0 m2) >> SA/Sw 2,62 SA/D^(2/3) 19,11



Boat Classic 6m JI at 20° heel , in charge with crew 360 kg sit windward (at Y 1,00 m) :

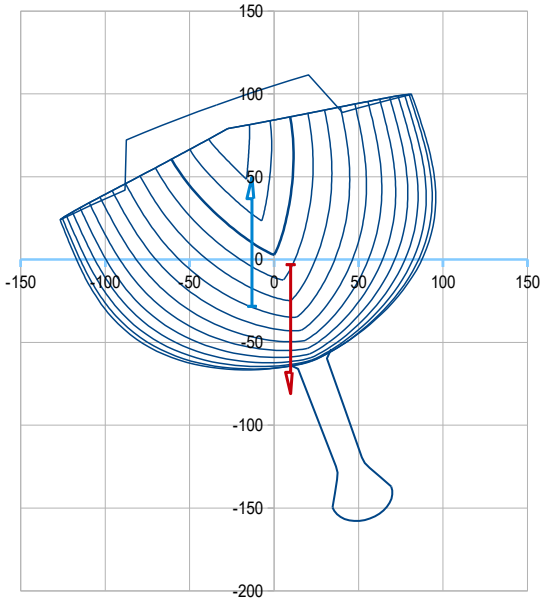
5. Stability and Rigthing Moment with a loading

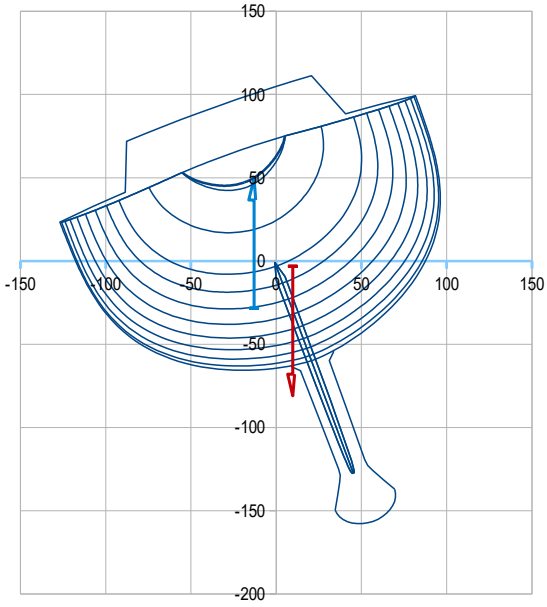
5.1 Mass spreadsheet with input of a load

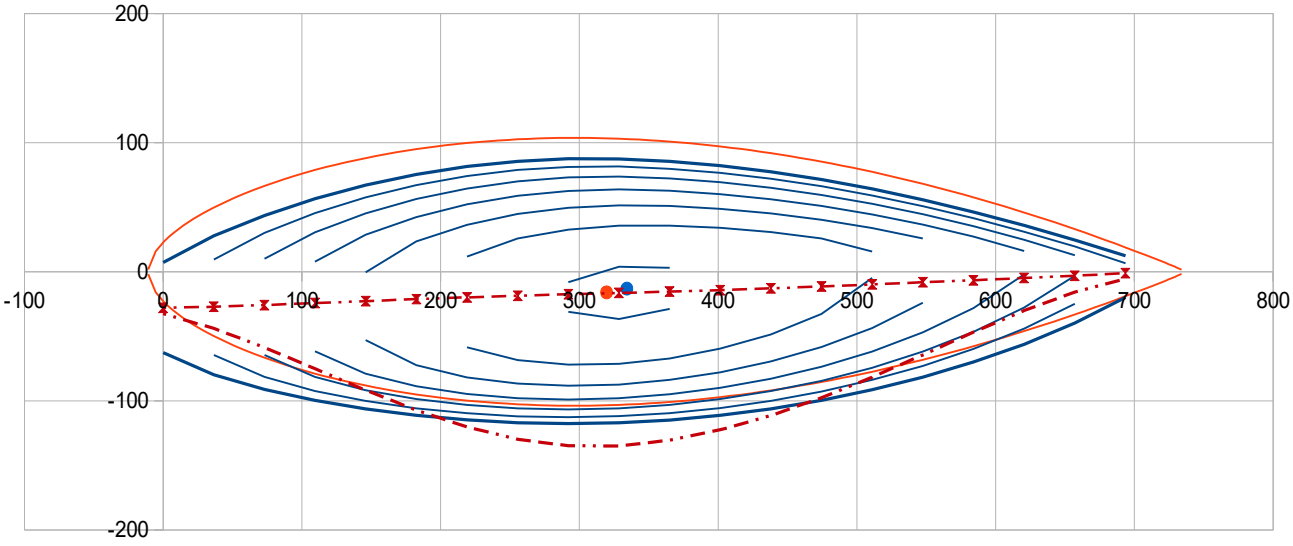
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*4021,85*	*3,461*	*-0,145*	*0*	*from the mass spreadsheet*
Load (kg)	**360,00**	**2,00**	**0,90**	**0,00**	Crew at center
			0,90	**1,00**	Crew sit windward
Total >>> Mass (kg)	**4381,85**	**3,341**	**-0,059**	**0,000**	**Crew at center**
Disp. (m3)	**4,27497**		**-0,059**	**0,082**	**Crew sit windward**

>>> at 20° heel : RM20° = 9,789 kN.m ; Bwl 2,05 m ; Sw20° 19,02 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**4,27497**	**/ Disp. (m3)**	**4,27497**
Height (cm)	**-0,2519**	**Xc heel (m)**	**3,341**	**/ Xg (m)**	**3,341**
Trim (°)	**0,475**	Yc heel (m)	-0,130	Yg heel (m)	0,097
		Zc heel (m)	-0,282	**> GZ (m)**	**0,228**
		Sw heel(m2)	**19,02**	**RM (kN.m)**	**9,789**
		Bwl heel (m)	**2,05**	**FB mini (cm)**	**23,4**
		LCB – LCF (%Lwl)	**2,00**	**Obliquity (°)**	**1,6**

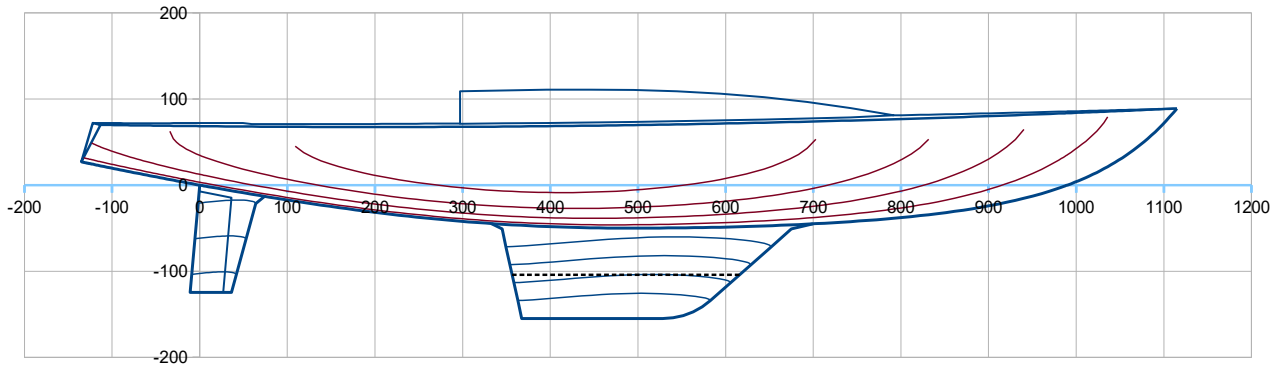


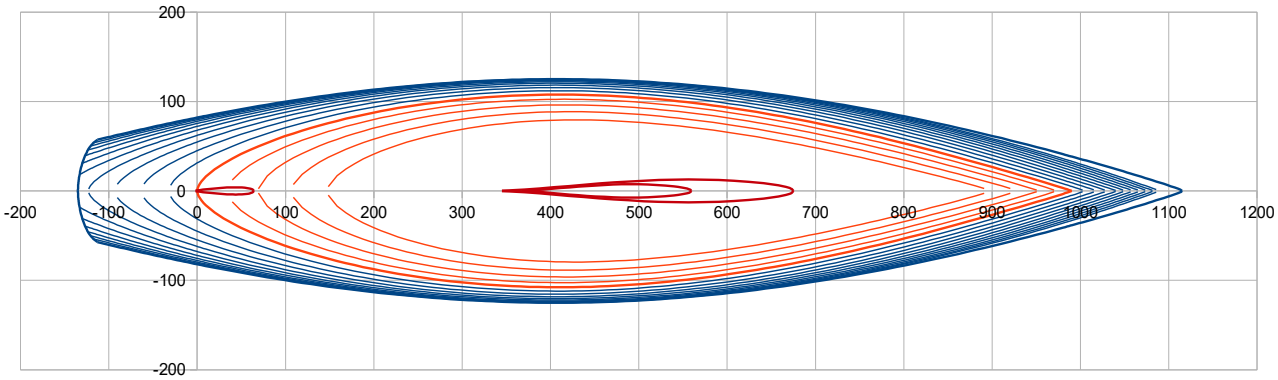


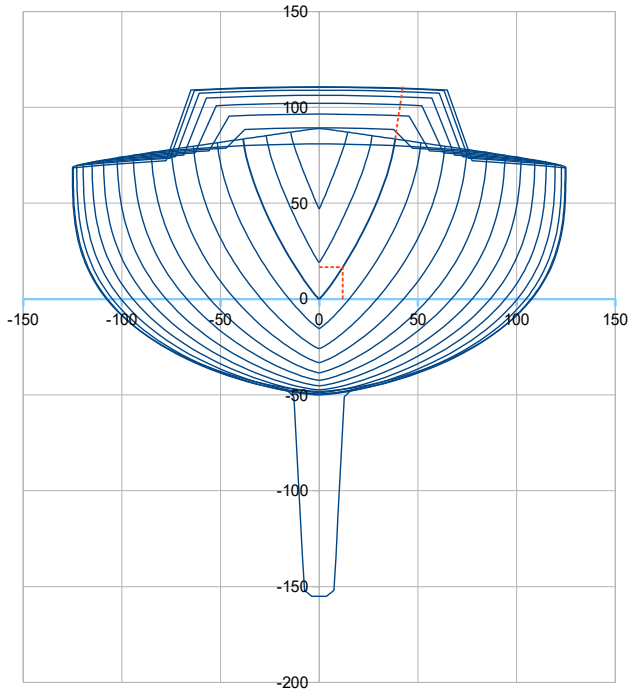


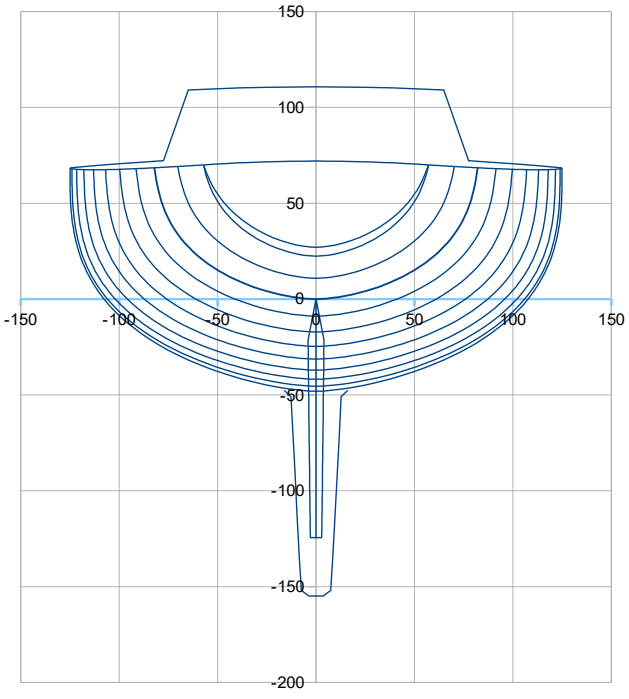
S30, inspired by the S30 / Knud Reimers

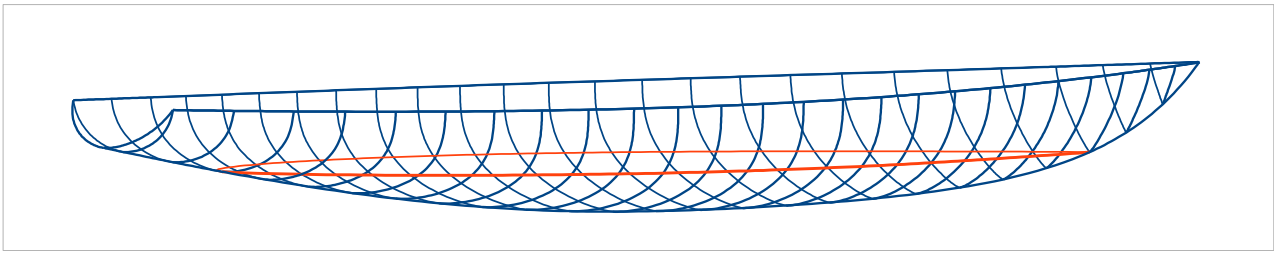
Loa 12,50 m ; Lwl 9,90 m ; Boa 2,50 m ; Draft 1,55 m ; Displacement : 4346 kg ; Ballast : 1501 kg
>> LCB hull 47,6 %Lwl ; Cp hull : 0,539 ; Sw : 23,44 m2 ; DLR : 125 ; Ballast ratio : 34,5 %











Boat S30 hydrostatics data :

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

2.1 Hull

Loa (m)	**12,50**	**Lwl (m)**	**9,90**	> Hull speed (Knots)	7,66	at Froude 0,4		
>> ft	*41,01*		*32,48*					
Boa (m)	**2,50**	**at X (% Lwl)**	**41,0**	Bsheer (m)	2,50	at X (% Lwl)	41,0	
>> ft	*8,20*							
Bwl (m)	**2,16**	**at X (% Lwl)**	**41,0**	> Bwl / Boa	0,862			
>> ft	*7,07*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,500**	**at X (%Lwl)**	**50**		**0,70**	**0,68**	**0,89**	
>> ft	*1,64*			*>> ft*	*2,30*	*2,23*	*2,92*	
Displacement at H0 (m3)	**3,83873**	**at LCB (m)**	**4,712**	**LCB (%Lwl)**	**47,60**	**ZCB (m)**	**-0,170**	
>> lbs	*8674*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,56*	
Cp	**0,539**							
Sf (m2)	**14,51**	**at LCF (m)**	**4,510**	**LCF (%Lwl)**	**45,55**	>>> LCB – LCF (%Lwl)	2,04	
>> ft2	*156,17*	*>> ft*	*14,80*					
Angle Freeboard/Half beam	28,7	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**16,2**	**at 95% Lwl**		
Sw (m2)	**16,43**	>Sw/D^(2/3)	6,70					
>> ft2	*176,82*							
Shull (m2)	**35,90**	**at X (m)**	**4,628**	**Z (m)**	**0,059**			
>> ft2	*386,41*	*>> ft*	*15,18*	*>> ft*	*0,19*			
Sdeck (m2)	**24,11**	**at X (m)**	**4,364**	**Z (m)**	**0,76**			
>> ft2	*259,51*	*>> ft*	*14,32*	*>> ft*	*2,48*			

2.2 Keel

Vol. keel(m3)	**0,36903**	**at X (m)**	**5,133**	**X (%Lwl)**	**51,84**	**Z (m)**	**-0,927**	
		>> ft	*16,84*			*>> ft*	*-3,04*	
Ballast (kg)	**1501,3**	**at X (m)**	**4,969**	**X (%Lwl)**	**50,19**	**Z (m)**	**-1,221**	
>> lbs	*3310*	*>> ft*	*16,30*			*>> ft*	*-4,01*	
Draft oa (m)	**1,55**		**Sw (m2)**	**5,65**		**Sxz (m2)**	**2,93**	
>> ft	*5,09*		*>> ft2*	*60,83*		*>> ft2*	*31,49*	
CLR (m)	**5,47**	**CLR (%Lwl)**	**55,29**	*CLR = Center of Lateral Resistance*				
>> ft	*17,96*	method: keel profile extended to the waterline, CLR at Z 45% draft and					35,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,03269**	**at X (m)**	**0,27**	**X (%Lwl)**	**2,69**	**Z (m)**	**-0,60**	
Sw (m2)	**1,36**	*>> ft*	*0,87*			**Sxz (m2)**	**0,65**	per rudder
>> ft2	*14,64*					*>> ft2*	*7,04*	

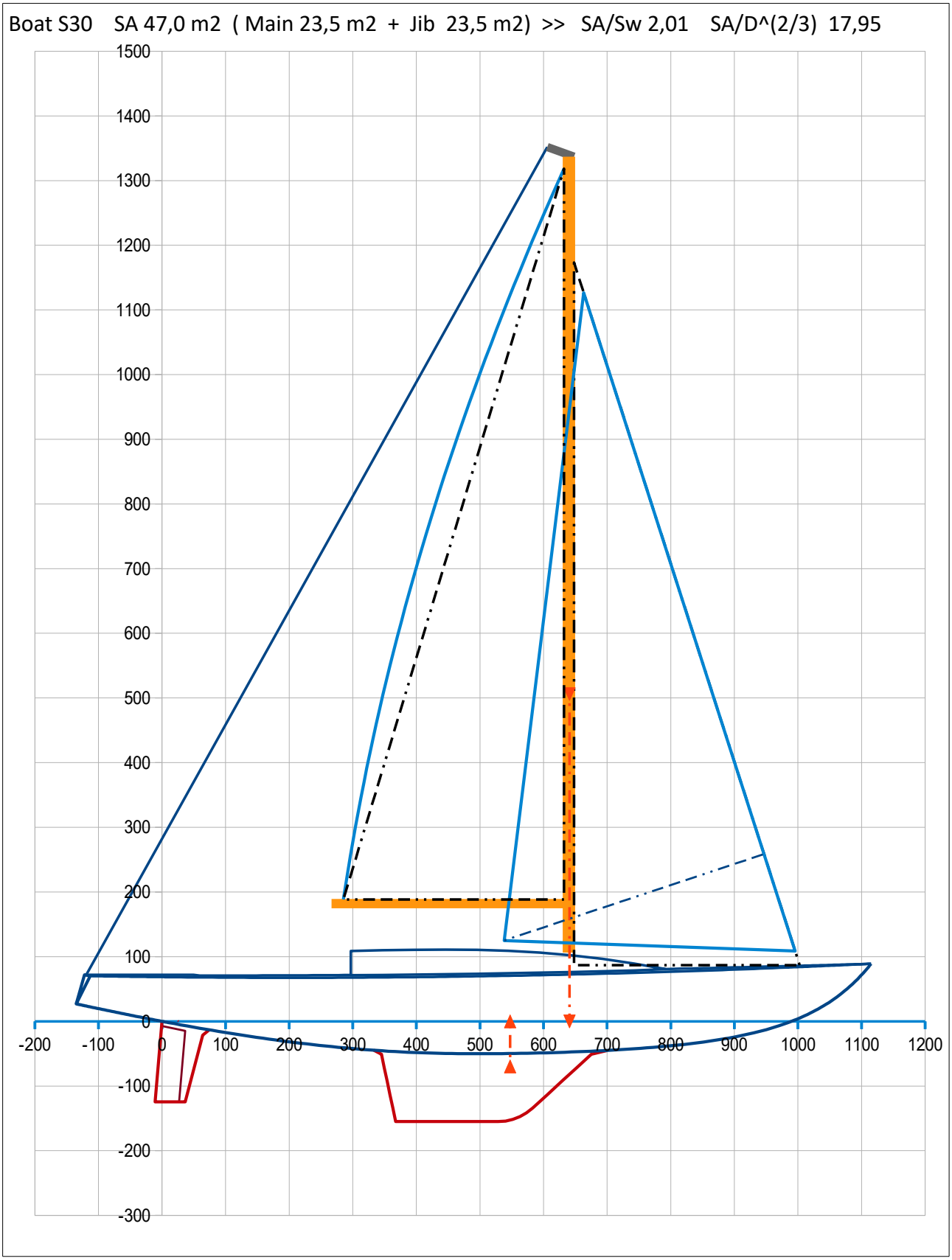
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**4,24045**	**at LCB (m)**	**4,714**	**LCB (%Lwl)**	**47,62**	**at ZCB (m)**	**-0,239**
(kg)	**4346**	*>> ft*	*15,47*			*>> ft*	*-0,78*
>> lbs	*9582*						
, of wich Ballast (kg)	**1501**	**at Xg (m)**	**4,969**	**Xg (%Lwl)**	**50,19**	**at Zg (m)**	**-1,221**
>> lbs	*3310*	*>> ft*	*16,30*			*>> ft*	*-4,01*
>> % Ballast	34,5						
Sw (m2)	**23,44**	>Sw/D^(2/3)	8,95	Lwl/D^(1/3)	6,12		
>> ft2	*252,29*			***DLR***	***125***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**4346**	**at Xg (m)**	**4,722**	**Xg (%Lwl)**	**47,70**	**at Zg (m)**	**-0,071**

Boat S30 SA 47,0 m2 (Main 23,5 m2 + Jib 23,5 m2) >> SA/Sw 2,01 SA/D^(2/3) 17,95



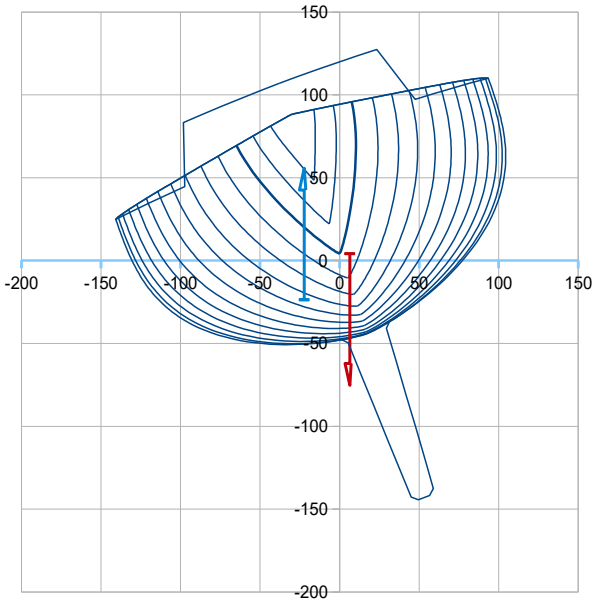
Boat S30 at 20° heel , in charge with crew 300 kg sit windward (at Y 1,00 m) :

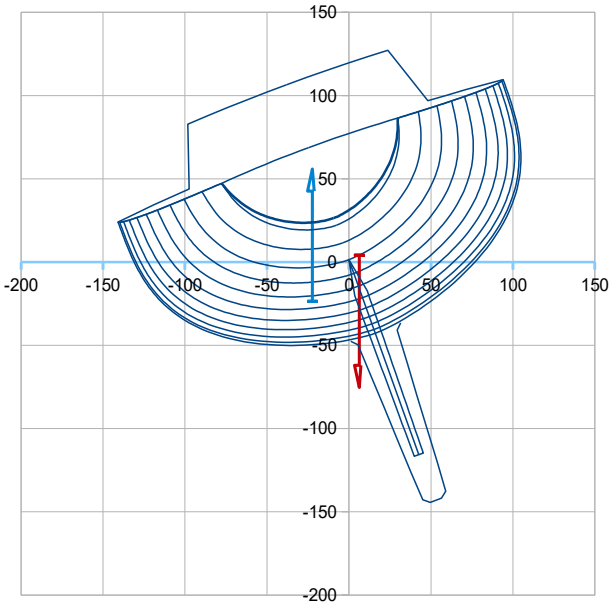
5.1 Mass spreadsheet with input of a load

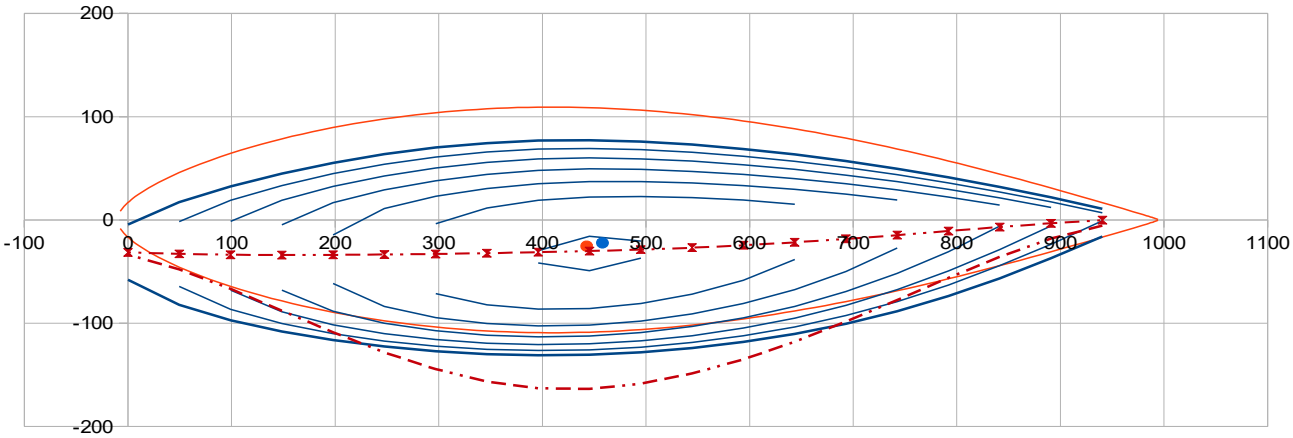
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*4346,31*	*4,722*	*-0,071*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**2,50**	**0,90**	**0,00**	Crew at center
			0,90	**1,00**	Crew sit windward
Total >>> Mass (kg)	**4646,31**	**4,579**	**-0,008**	**0,000**	**Crew at center**
Disp. (m3)	**4,53299**		**-0,008**	**0,065**	**Crew sit windward**

>>> at 20° heel : RM20° = 13,028 kN.m ; Bwl 2,08 m ; Sw20° 23,92 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**4,53299**	**/ Disp. (m3)**	**4,53299**
Height (cm)	**2,7107**	**Xc heel (m)**	**4,579**	**/ Xg (m)**	**4,579**
Trim (°)	**0,159**	Yc heel (m)	-0,222	Yg heel (m)	0,063
		Zc heel (m)	-0,236	**> GZ (m)**	**0,286**
		Sw heel(m2)	**23,92**	**RM (kN.m)**	**13,028**
		Bwl heel (m)	**2,08**	**FB mini (cm)**	**23,9**
		LCB – LCF (%Lwl)	**1,54**	**Obliquity (°)**	**1,8**

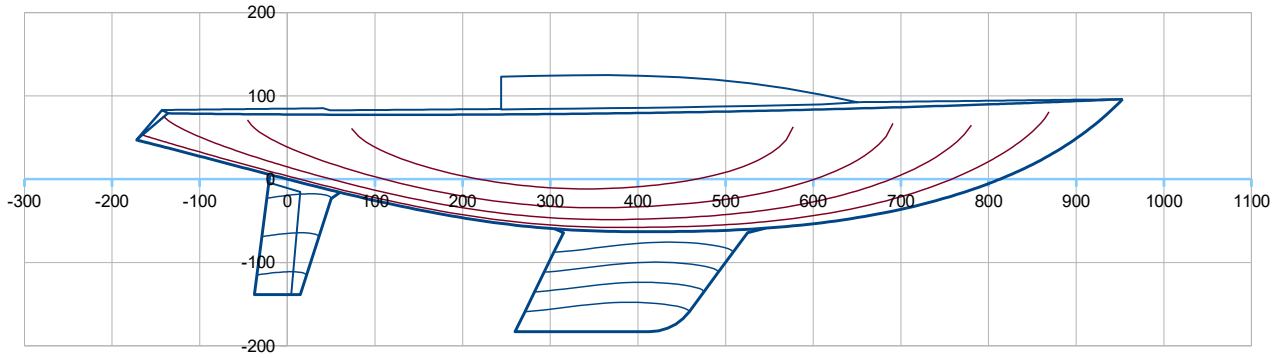


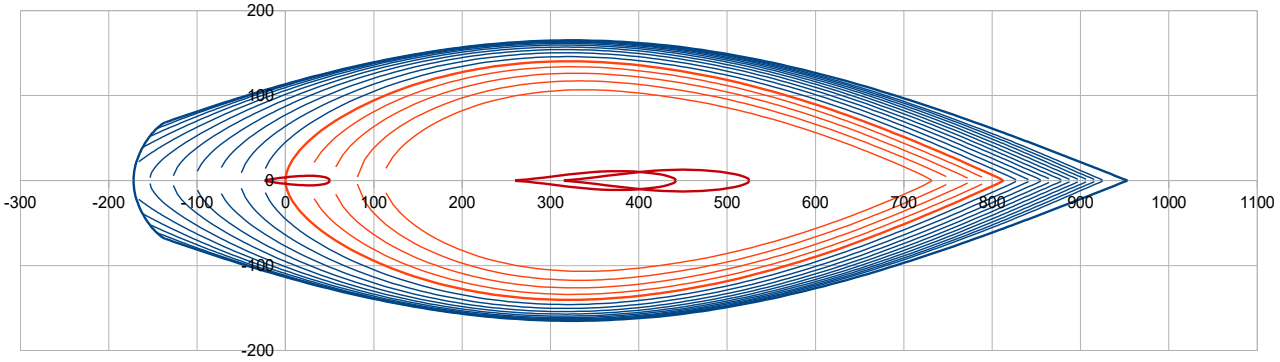


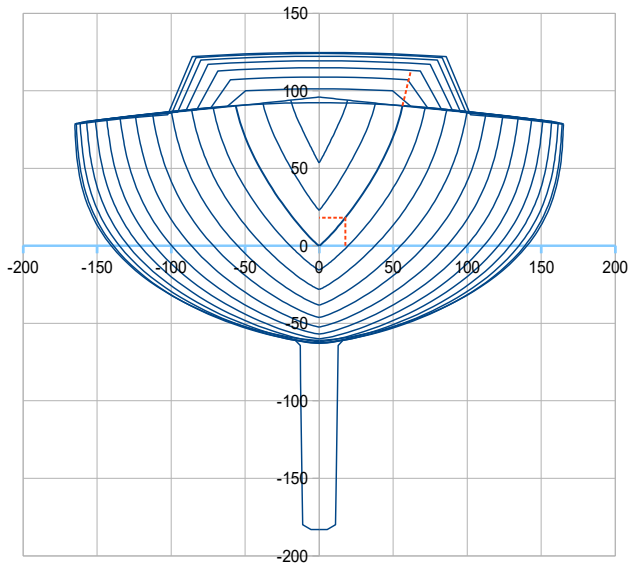


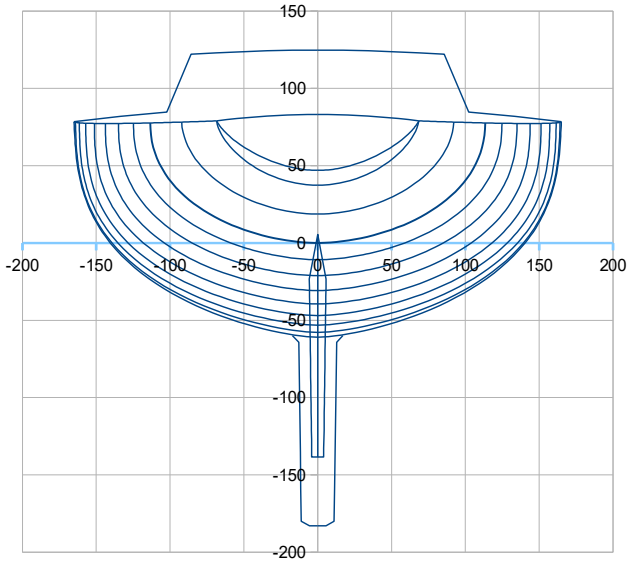
T37, inspired by Tina / Dick Carter

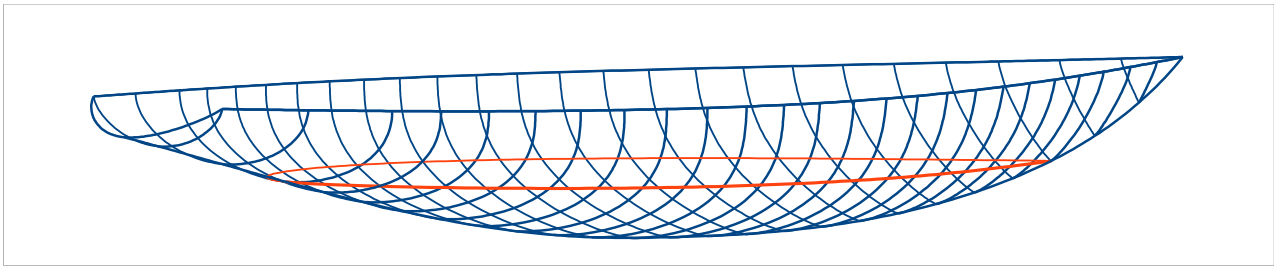
Loa 11,25 m ; Lwl 8,13 m ; B 3,30 m ; Draft 1,83 m ; Displacement : 5671 kg ; Ballast : 2664 kg
>> LCB hull 46,93 %Lwl ; Cp hull : 0,542 ; Sw : 24,20 m2 ; DLR : 294 ; Ballast ratio : 47,0 %











Boat T37 hydrostatics data :

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

2.1 Hull

Loa (m)	**11,25**	**Lwl (m)**	**8,13**	> Hull speed (Knots)	6,94	at Froude 0,4		
>> ft	*36,91*		*26,67*					
Boa (m)	**3,30**	**at X (% Lwl)**	**40,0**	Bsheer (m)	3,30	at X (% Lwl)	40,0	
>> ft	*10,83*							
Bwl (m)	**2,81**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,851			
>> ft	*9,21*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,630**	**at X (%Lwl)**	**50**		**0,79**	**0,78**	**0,96**	
>> ft	*2,07*			*>> ft*	*2,59*	*2,56*	*3,15*	
Displacement at H0 (m3)	**5,11130**	**at LCB (m)**	**3,816**	**LCB (%Lwl)**	**46,93**	**ZCB (m)**	**-0,212**	
>> lbs	*11550*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,70*	
Cp	**0,542**							
Sf (m2)	**15,66**	**at LCF (m)**	**3,657**	**LCF (%Lwl)**	**44,98**	>>> LCB – LCF (%Lwl)	1,95	
>> ft2	*168,61*	*>> ft*	*12,00*					
Angle Freeboard/Half beam	25,4	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**24,5**	**at 95% Lwl**		
Sw (m2)	**17,48**	>Sw/D^(2/3)	5,89					
>> ft2	*188,15*							
Shull (m2)	**37,75**	**at X (m)**	**3,640**	**Z (m)**	**0,041**			
>> ft2	*406,38*	*>> ft*	*11,94*	*>> ft*	*0,14*			
Sdeck (m2)	**26,68**	**at X (m)**	**3,479**	**Z (m)**	**0,86**			
>> ft2	*287,13*	*>> ft*	*11,41*	*>> ft*	*2,81*			

2.2 Keel

Vol. keel(m3)	**0,36490**	**at X (m)**	**4,033**	**X (%Lwl)**	**49,61**	**Z (m)**	**-1,199**	
		>> ft	*13,23*			*>> ft*	*-3,93*	
Ballast (kg)	**2663,8**	**at X (m)**	**4,033**	**X (%Lwl)**	**49,61**	**Z (m)**	**-1,199**	
>> lbs	*5873*	*>> ft*	*13,23*			*>> ft*	*-3,93*	
Draft oa (m)	**1,83**		**Sw (m2)**	**4,99**		**Sxz (m2)**	**2,45**	
>> ft	*6,00*		*>> ft2*	*53,71*		*>> ft2*	*26,35*	
CLR (m)	**4,51**	**CLR (%Lwl)**	**55,43**	*CLR = Center of Lateral Resistance*				
>> ft	*14,78*	method: keel profile extended to the waterline, CLR at Z 45% draft and					30,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,05646**	**at X (m)**	**0,07**	**X (%Lwl)**	**0,82**	**Z (m)**	**-0,67**	
Sw (m2)	**1,73**	*>> ft*	*0,22*			**Sxz (m2)**	**0,83**	per rudder
>> ft2	*18,61*					*>> ft2*	*8,95*	

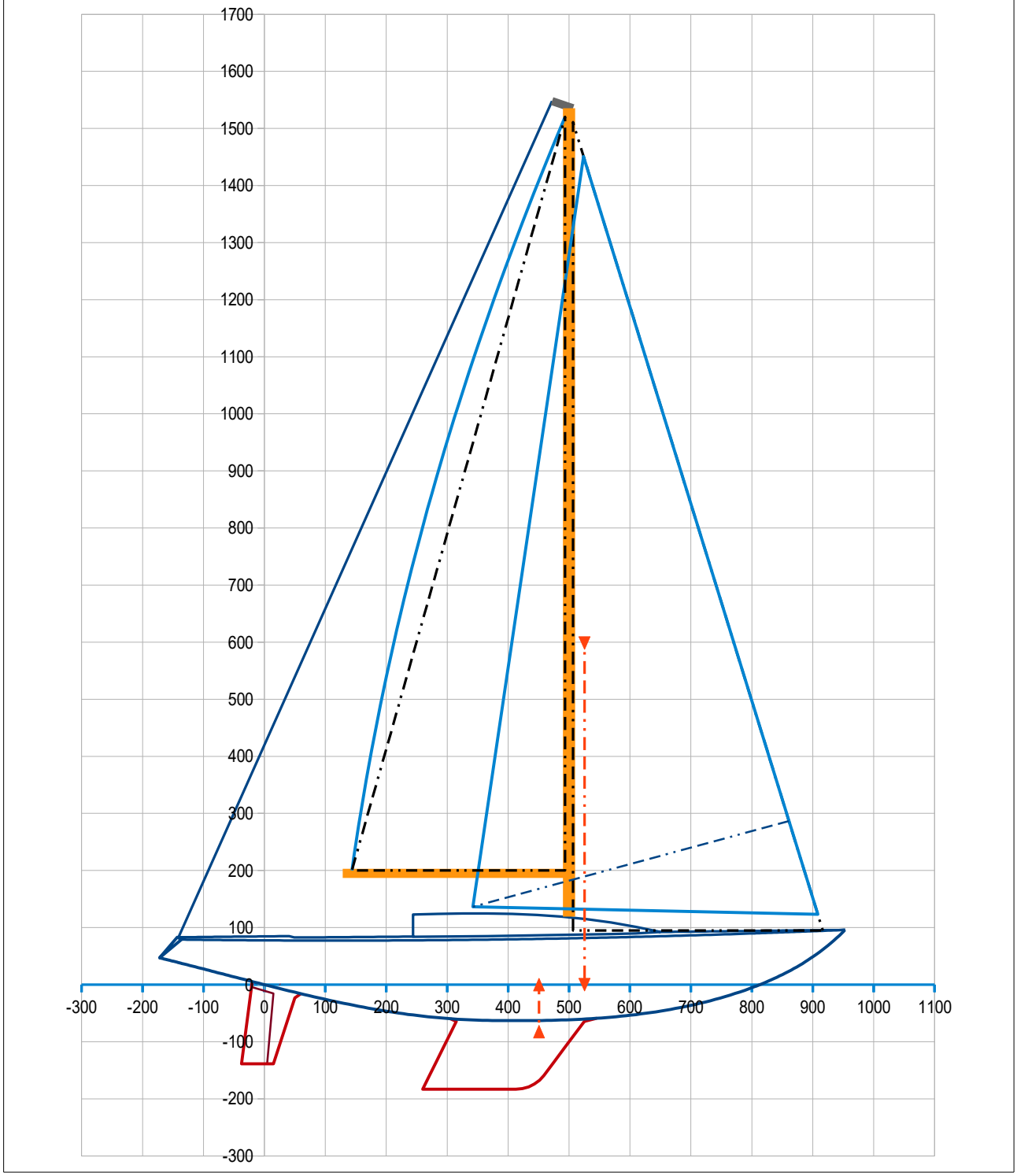
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**5,53266**	**at LCB (m)**	**3,792**	**LCB (%Lwl)**	**46,64**	**at ZCB (m)**	**-0,282**	
(kg)	**5671**	*>> ft*	*12,44*			*>> ft*	*-0,92*	
>> lbs	*12502*							
, of wich Ballast (kg)	**2664**	**at Xg (m)**	**4,033**	**Xg (%Lwl)**	**49,61**	**at Zg (m)**	**-1,199**	
>> lbs	*5873*	*>> ft*	*13,23*			*>> ft*	*-3,93*	
>> % Ballast	47,0							
Sw (m2)	**24,20**	>Sw/D^(2/3)	7,74	Lwl/D^(1/3)	4,60			
>> ft2	*260,47*			***DLR***	***294***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**5671**	**at Xg (m)**	**3,895**	**Xg (%Lwl)**	**47,91**	**at Zg (m)**	**0,007**

Boat T37 SA 66,1 m2 (Main 27,7 m2 + Jib 38,3 m2) >> SA/Sw 2,73 SA/D^(2/3) 21,12



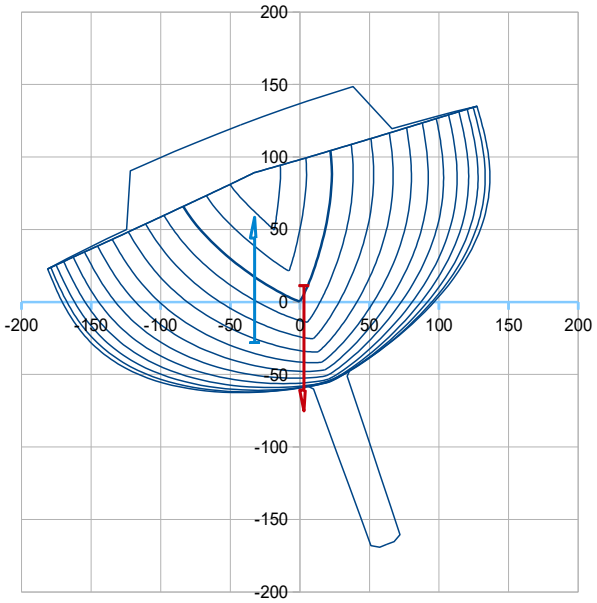
Boat T37 at 20° heel , in charge with crew 300 kg sit windward (at Y 1,00 m) :

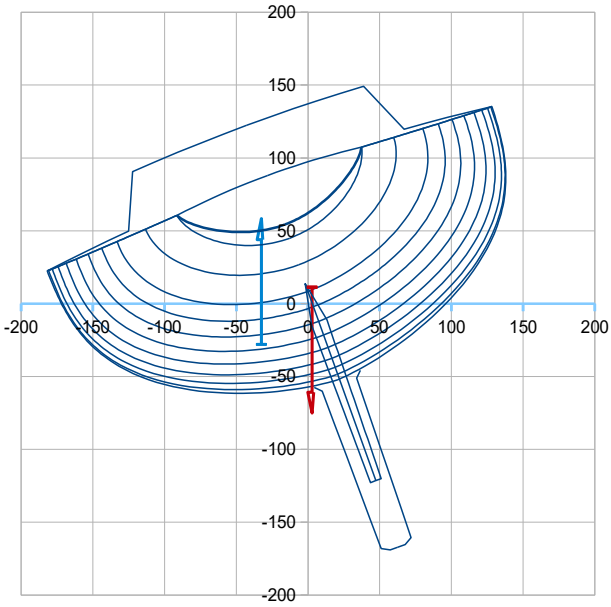
5.1 Mass spreadsheet with input of a load

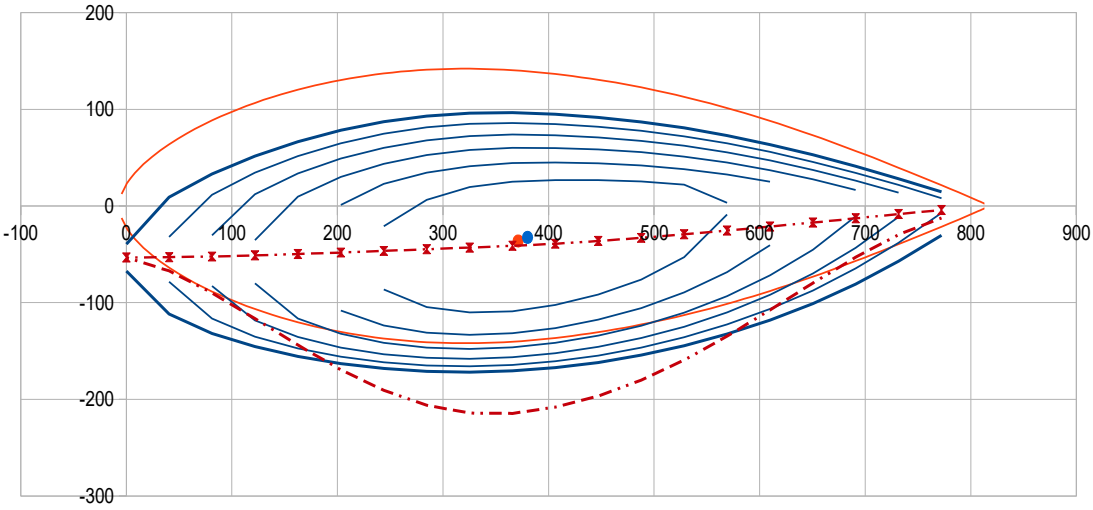
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*5670,76*	*3,895*	*0,007*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**2,00**	**0,90**	**0,00**	Crew at center
			0,90	**1,00**	Crew sit windward
Total >>> Mass (kg)	**5970,76**	**3,800**	**0,052**	**0,000**	**Crew at center**
Disp. (m3)	**5,82513**		**0,052**	**0,050**	**Crew sit windward**

>>> at 20° heel : RM20° = 20,743 kN.m ; Bwl 2,68 m ; Sw20° 24,40 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**5,82513**	**/ Disp. (m3)**	**5,82513**
Height (cm)	**4,663**	**Xc heel (m)**	**3,800**	**/ Xg (m)**	**3,800**
Trim (°)	**-0,57**	Yc heel (m)	-0,325	Yg heel (m)	0,029
		Zc heel (m)	-0,280	**> GZ (m)**	**0,354**
		Sw heel(m2)	**24,40**	**RM (kN.m)**	**20,743**
		Bwl heel (m)	**2,68**	**FB mini (cm)**	**22,4**
		LCB – LCF (%Lwl)	**1,10**	**Obliquity (°)**	**3,1**

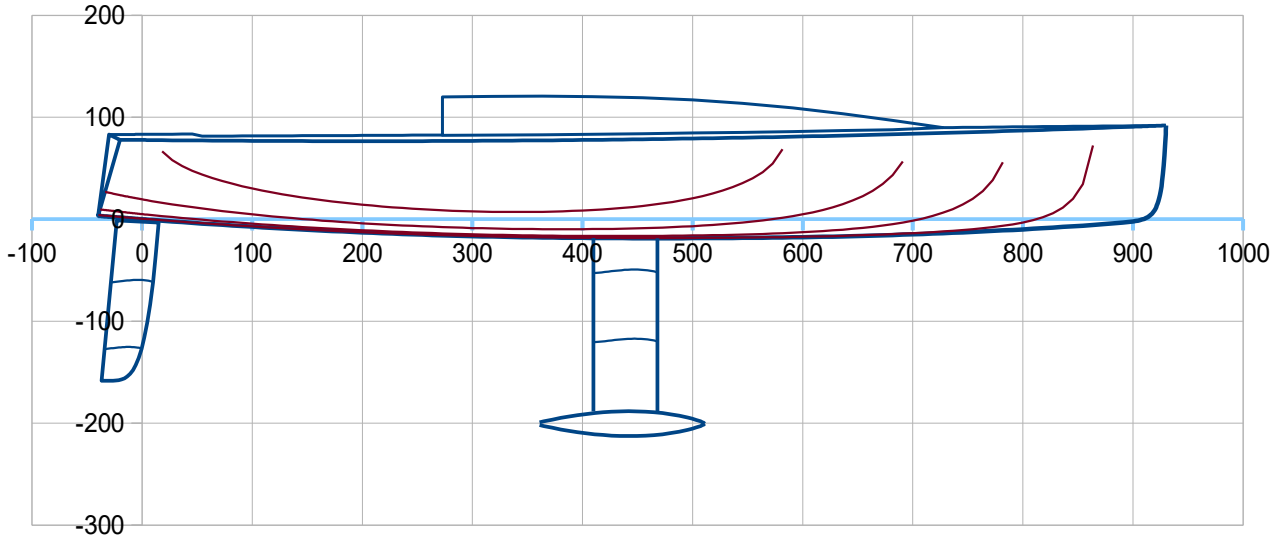


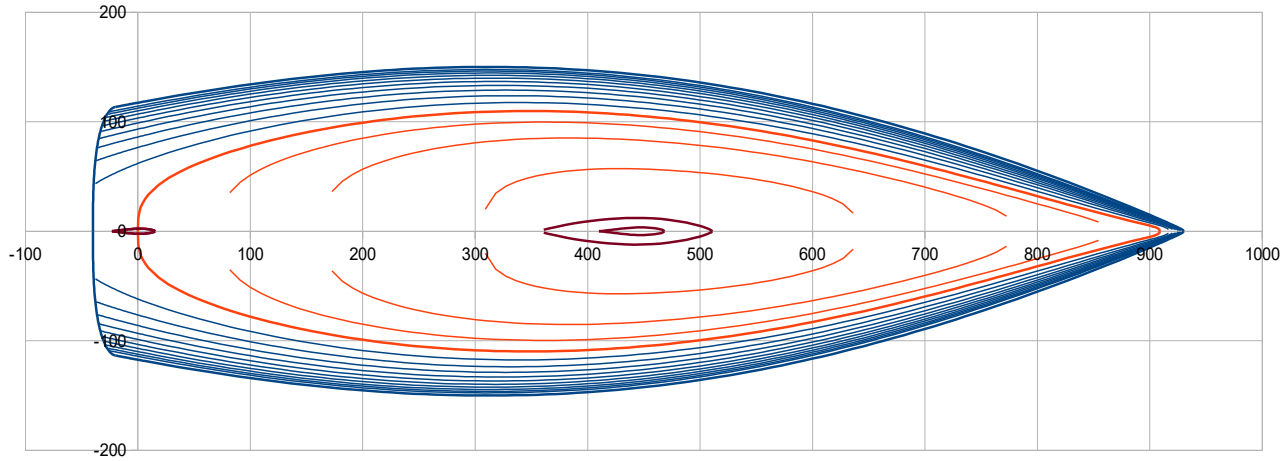


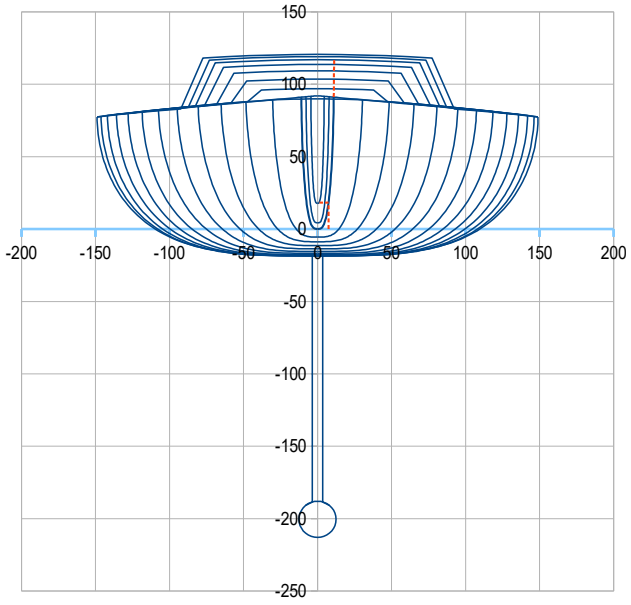


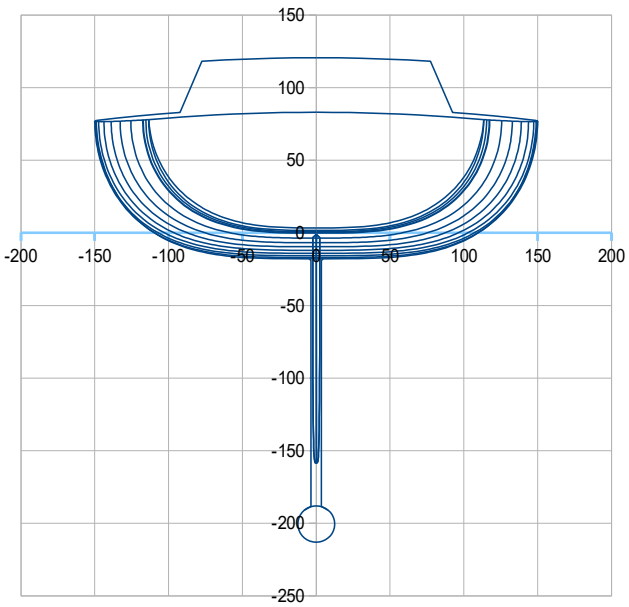
M32, inspired by Melges 32 / Reichel Pugh

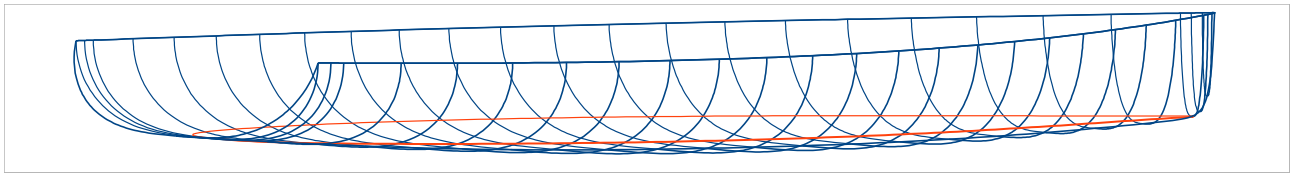
Loa 9,70 m ; Lwl 9,09 m ; B 3,00 m ; Draft 2,13 m ; Displacement : 1741 kg ; Ballast : 775 kg
>> LCB hull 46,82 %Lwl ; Cp hull : 0,560 ; Sw : 18,09 m2 ; DLR : 65 ; Ballast ratio : 44,5 %











Boat M32 hydrostatics data :

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

2.1 Hull

Loa (m)	**9,70**	**Lwl (m)**	**9,09**	> Hull speed (Knots)	7,34	at Froude 0,4		
>> ft	*31,82*		*29,82*					
Boa (m)	**3,00**	**at X (% Lwl)**	**34,0**	Bsheer (m)	3,00	at X (% Lwl)	34,0	
>> ft	*9,84*							
Bwl (m)	**2,20**	**at X (% Lwl)**	**38,0**	> Bwl / Boa	0,732			
>> ft	*7,20*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,186**	**at X (%Lwl)**	**52**		**0,78**	**0,77**	**0,92**	
>> ft	*0,61*			*>> ft*	*2,56*	*2,53*	*3,02*	
Displacement at H0 (m3)	**1,59826**	**at LCB (m)**	**4,256**	**LCB (%Lwl)**	**46,82**	**ZCB (m)**	**-0,070**	
>> lbs	*3612*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,23*	
Cp	**0,560**							
Sf (m2)	**13,88**	**at LCF (m)**	**3,966**	**LCF (%Lwl)**	**43,63**	>>> LCB – LCF (%Lwl)	3,19	
>> ft2	*149,36*	*>> ft*	*13,01*					
Angle Freeboard/Half beam	27,4	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**14,7**	**at 95% Lwl**		
Sw (m2)	**14,16**	>Sw/D^(2/3)	10,36					
>> ft2	*152,41*							
Shull (m2)	**32,63**	**at X (m)**	**4,136**	**Z (m)**	**0,148**			
>> ft2	*351,27*	*>> ft*	*13,57*	*>> ft*	*0,48*			
Sdeck (m2)	**23,01**	**at X (m)**	**3,807**	**Z (m)**	**0,84**			
>> ft2	*247,63*	*>> ft*	*12,49*	*>> ft*	*2,75*			

2.2 Keel

Vol. keel(m3)	**0,08424**	**at X (m)**	**4,417**	**X (%Lwl)**	**48,59**	**Z (m)**	**-1,490**	
		>> ft	*14,49*			*>> ft*	*-4,89*	
Ballast (kg)	**775,0**	**at X (m)**	**4,412**	**X (%Lwl)**	**48,54**	**Z (m)**	**-1,597**	
>> lbs	*1709*	*>> ft*	*14,47*			*>> ft*	*-5,24*	
Draft oa (m)	**2,13**		**Sw (m2)**	**2,78**		**Sxz (m2)**	**1,24**	
>> ft	*6,99*		*>> ft2*	*29,89*		*>> ft2*	*13,37*	
CLR (m)	**4,54**	**CLR (%Lwl)**	**49,89**	*CLR = Center of Lateral Resistance*				
>> ft	*14,88*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,01562**	**at X (m)**	**-0,08**	**X (%Lwl)**	**-0,89**	**Z (m)**	**-0,72**	
Sw (m2)	**1,16**	*>> ft*	*-0,27*			**Sxz (m2)**	**0,56**	per rudder
>> ft2	*12,44*					*>> ft2*	*5,98*	

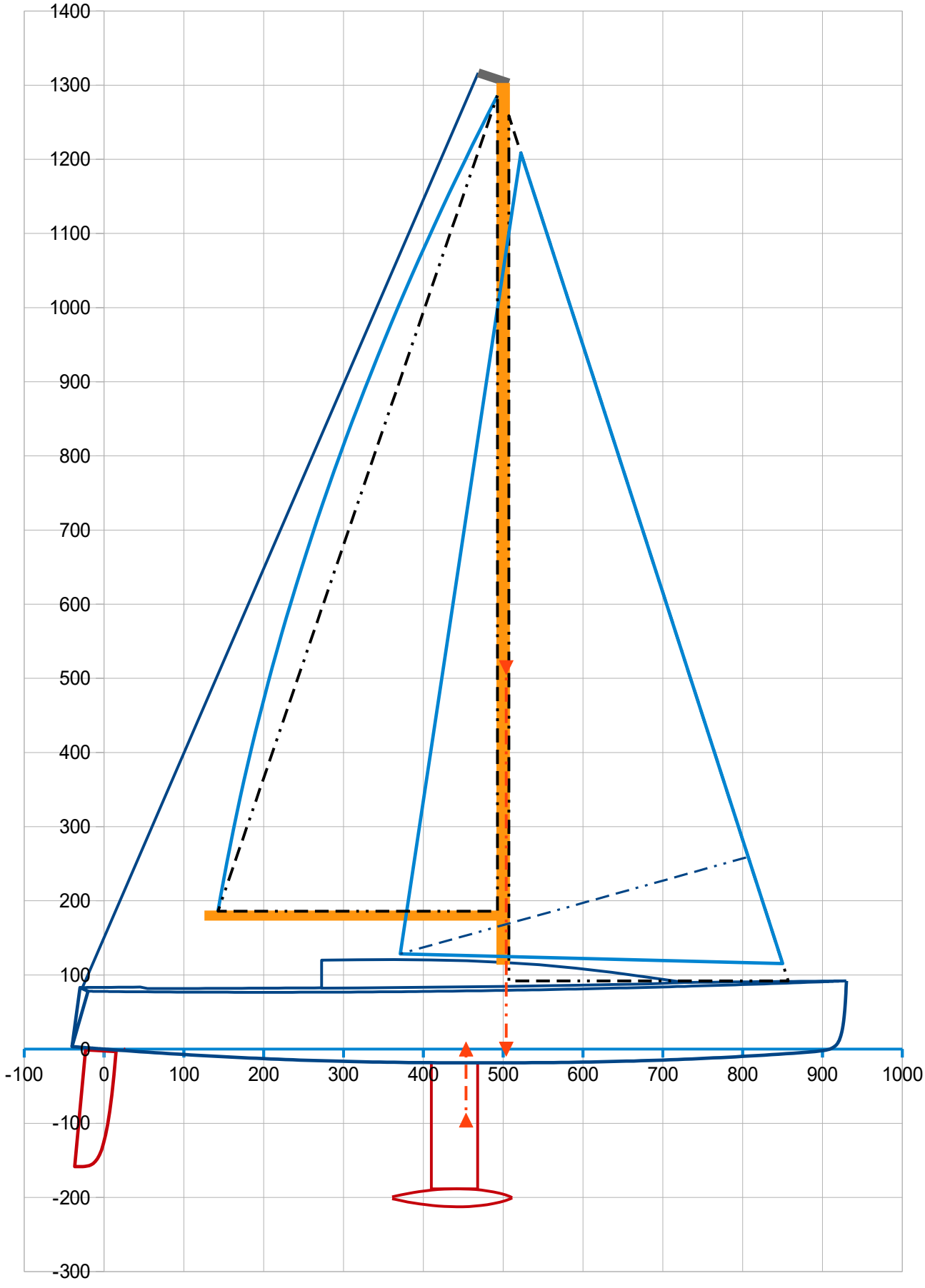
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**1,69812**	**at LCB (m)**	**4,224**	**LCB (%Lwl)**	**46,47**	**at ZCB (m)**	**-0,147**	
(kg)	**1741**	*>> ft*	*13,86*			*>> ft*	*-0,48*	
>> lbs	*3837*							
, of wich Ballast (kg)	**775**	**at Xg (m)**	**4,412**	**Xg (%Lwl)**	**48,54**	**at Zg (m)**	**-1,597**	
>> lbs	*1709*	*>> ft*	*14,47*			*>> ft*	*-5,24*	
>> % Ballast	44,5							
Sw (m2)	**18,09**	>Sw/D^(2/3)	12,71	Lwl/D^(1/3)	7,62			
>> ft2	*194,73*			***DLR***	***65***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**1741**	**at Xg (m)**	**4,220**	**Xg (%Lwl)**	**46,43**	**at Zg (m)**	**-0,194**

Boat M32 : SA 49,7 m2 (Main 23,1 m2 + Jib 26,6 m2) >> SA/Sw 2,75 SA/D^(2/3) 34,95



Boat M32 at 20° heel , in charge with crew 600 kg sit windward at Y 1,40 m :

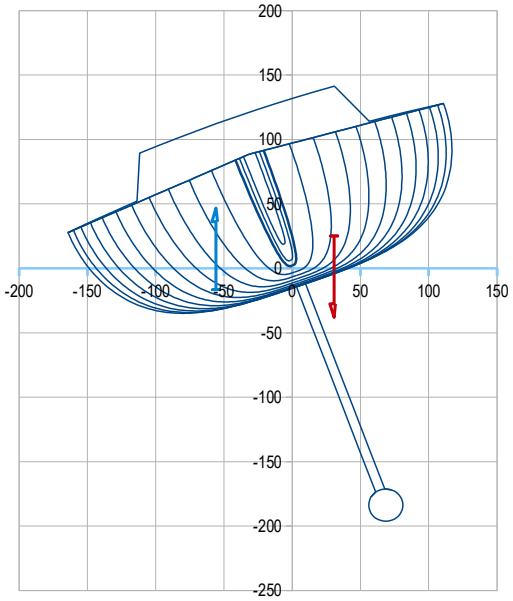
5. Stability and Rigthing Moment with a loading

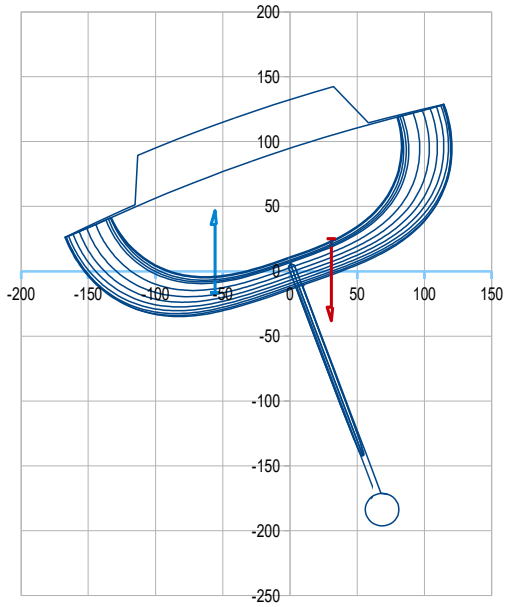
5.1 Mass spreadsheet with input of a load

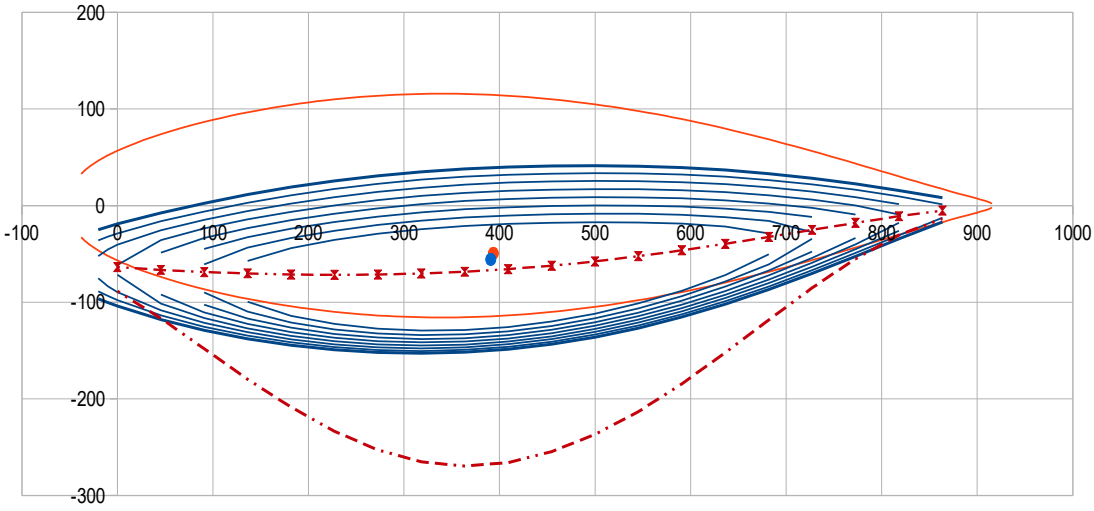
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*1740,89*	*4,220*	*-0,194*	*0*	*from the mass spreadsheet*
Load (kg)	**600,00**	**3,00**	**0,90**	**0,00**	Crew at center
			0,90	**1,40**	Crew sit windward
Total >>> Mass (kg)	**2340,89**	**3,907**	**0,086**	**0,000**	**Crew at center**
Disp. (m3)	**2,28380**		**0,086**	**0,359**	**Crew sit windward**

>>> at 20° heel : RM20° = 19,856 kN.m ; Bwl 1,90 m ; Sw20° 17,46 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**2,28380**	**/ Disp. (m3)**	**2,28380**
Height (cm)	**4,5882**	**Xc heel (m)**	**3,907**	**/ Xg (m)**	**3,907**
Trim (°)	**-0,29**	Yc heel (m)	-0,557	Yg heel (m)	0,308
		Zc heel (m)	-0,165	**> GZ (m)**	**0,865**
		Sw heel(m2)	**17,46**	**RM (kN.m)**	**19,856**
		Bwl heel (m)	**1,90**	**FB mini (cm)**	**26,2**
		LCB – LCF (%Lwl)	**-0,30**	**Obliquity (°)**	**4,2**

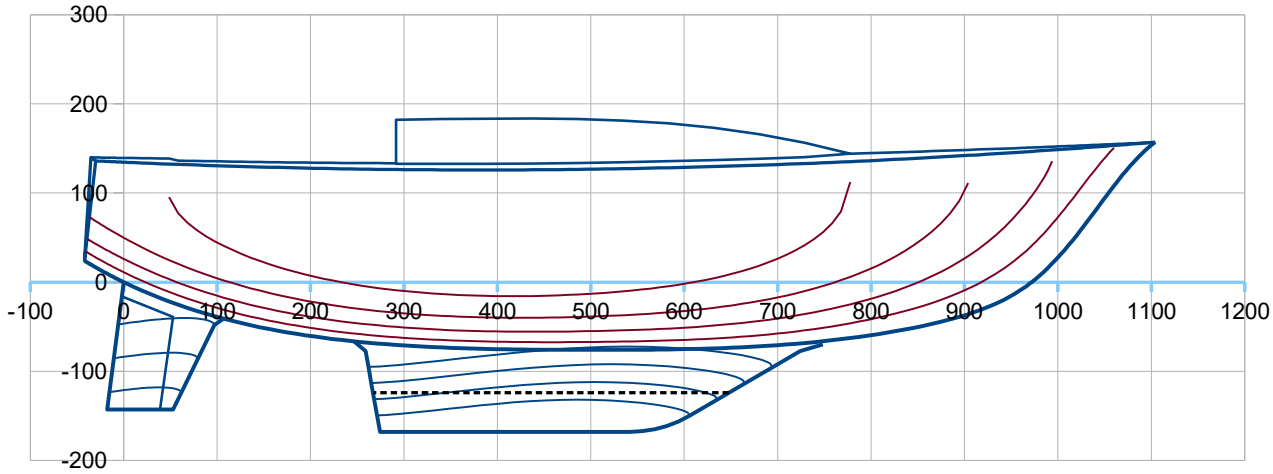


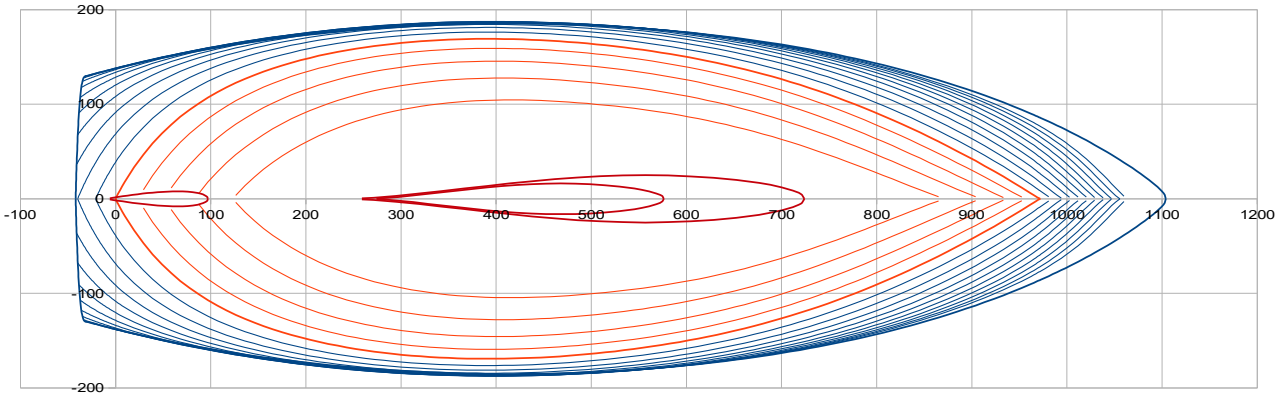


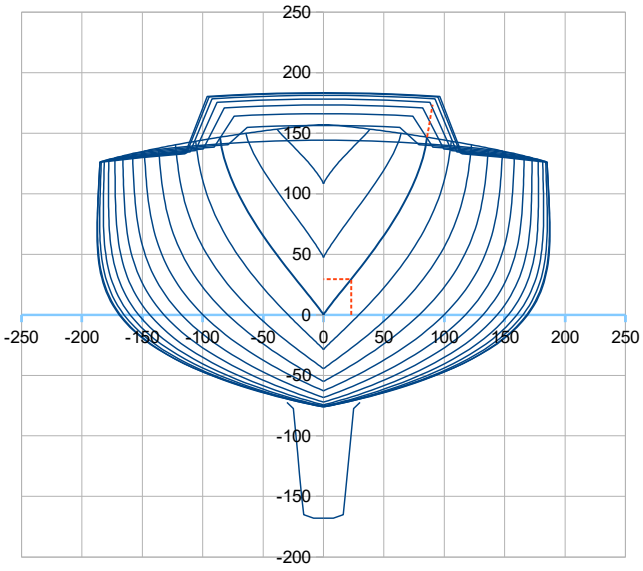


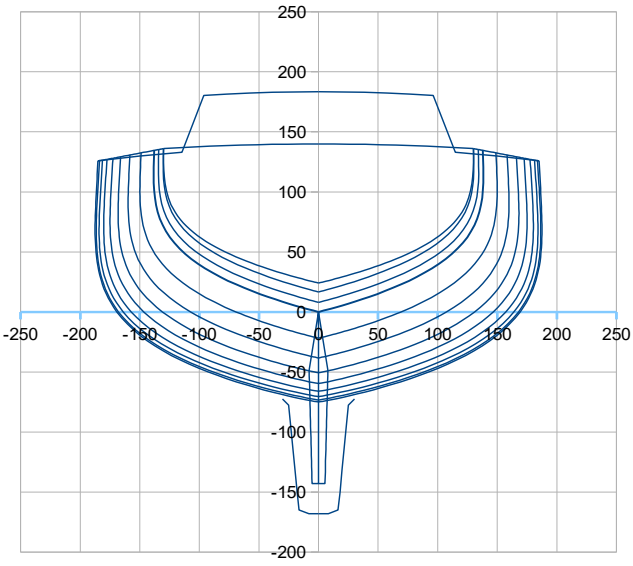
Blue Water 39, inspired by Corbin 39 / Robert Dufour – Marius Corbin

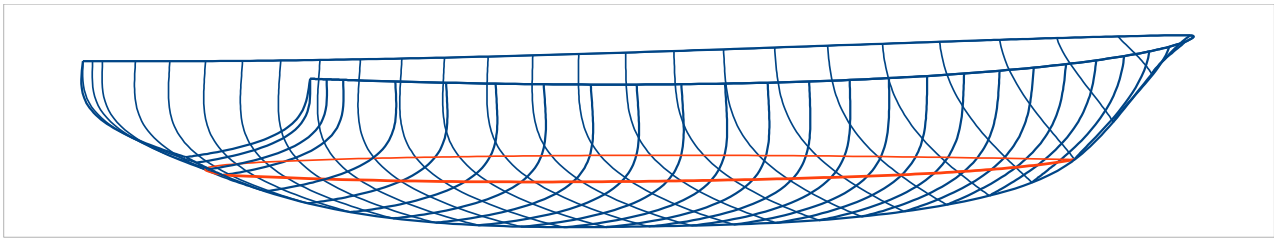
Loa 11,46 m ; Lwl 9,72 m ; B 3,75 m ; Draft 1,68 m ; Displacement : 10933 kg ; Ballast : 4078 kg
>> LCB hull 47,10 %Lwl ; Cp hull (%): 0,599 ; Sw : 36,38 m2 ; DLR : 332 ; Ballast ratio : 37,3 %











Blue Water 39 hydrostatics data :

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

2.1 Hull

Loa (m)	**11,46**	**Lwl (m)**	**9,72**	> Hull speed (Knots)	7,59	at Froude 0,4		
>> ft	*37,60*		*31,89*					
Boa (m)	**3,75**	**at X (% Lwl)**	**43,0**	Bsheer (m)	3,70	at X (% Lwl)	43,0	
>> ft	*12,30*							
Bwl (m)	**3,38**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,902			
>> ft	*11,10*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,760**	**at X (%Lwl)**	**50**		**1,36**	**1,26**	**1,57**	
>> ft	*2,49*			*>> ft*	*4,46*	*4,13*	*5,15*	
Displacement at H0 (m3)	**9,59637**	**at LCB (m)**	**4,578**	**LCB (%Lwl)**	**47,10**	**ZCB (m)**	**-0,257**	
>> lbs	*21685*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,84*	
Cp	**0,599**							
Sf (m2)	**23,58**	**at LCF (m)**	**4,478**	**LCF (%Lwl)**	**46,07**	>>> LCB – LCF (%Lwl)	1,04	
>> ft2	*253,77*	*>> ft*	*14,69*					
Angle Freeboard/Half beam	34,2	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**30,0**	**at 95% Lwl**		
Sw (m2)	**26,49**	>Sw/D^(2/3)	5,87					
>> ft2	*285,18*							
Shull (m2)	**58,15**	**at X (m)**	**4,797**	**Z (m)**	**0,159**			
>> ft2	*625,94*	*>> ft*	*15,74*	*>> ft*	*0,52*			
Sdeck (m2)	**35,80**	**at X (m)**	**4,703**	**Z (m)**	**1,40**			
>> ft2	*385,35*	*>> ft*	*15,43*	*>> ft*	*4,58*			

2.2 Keel

Vol. keel(m3)	**0,96453**	**at X (m)**	**4,957**	**X (%Lwl)**	**51,00**	**Z (m)**	**-1,150**	
		>> ft	*16,26*			*>> ft*	*-3,77*	
Ballast (kg)	**4077,6**	**at X (m)**	**4,728**	**X (%Lwl)**	**48,64**	**Z (m)**	**-1,411**	
>> lbs	*8990*	*>> ft*	*15,51*			*>> ft*	*-4,63*	
Draft oa (m)	**1,68**		**Sw (m2)**	**7,66**		**Sxz (m2)**	**3,84**	
>> ft	*5,51*		*>> ft2*	*82,47*		*>> ft2*	*41,35*	
CLR (m)	**5,63**	**CLR (%Lwl)**	**57,94**	*CLR = Center of Lateral Resistance*				
>> ft	*18,48*	method: keel profile extended to the waterline, CLR at Z 45% draft and					35,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,10500**	**at X (m)**	**0,38**	**X (%Lwl)**	**3,95**	**Z (m)**	**-0,74**	
Sw (m2)	**2,22**	*>> ft*	*1,26*			**Sxz (m2)**	**1,07**	per rudder
>> ft2	*23,93*					*>> ft2*	*11,50*	

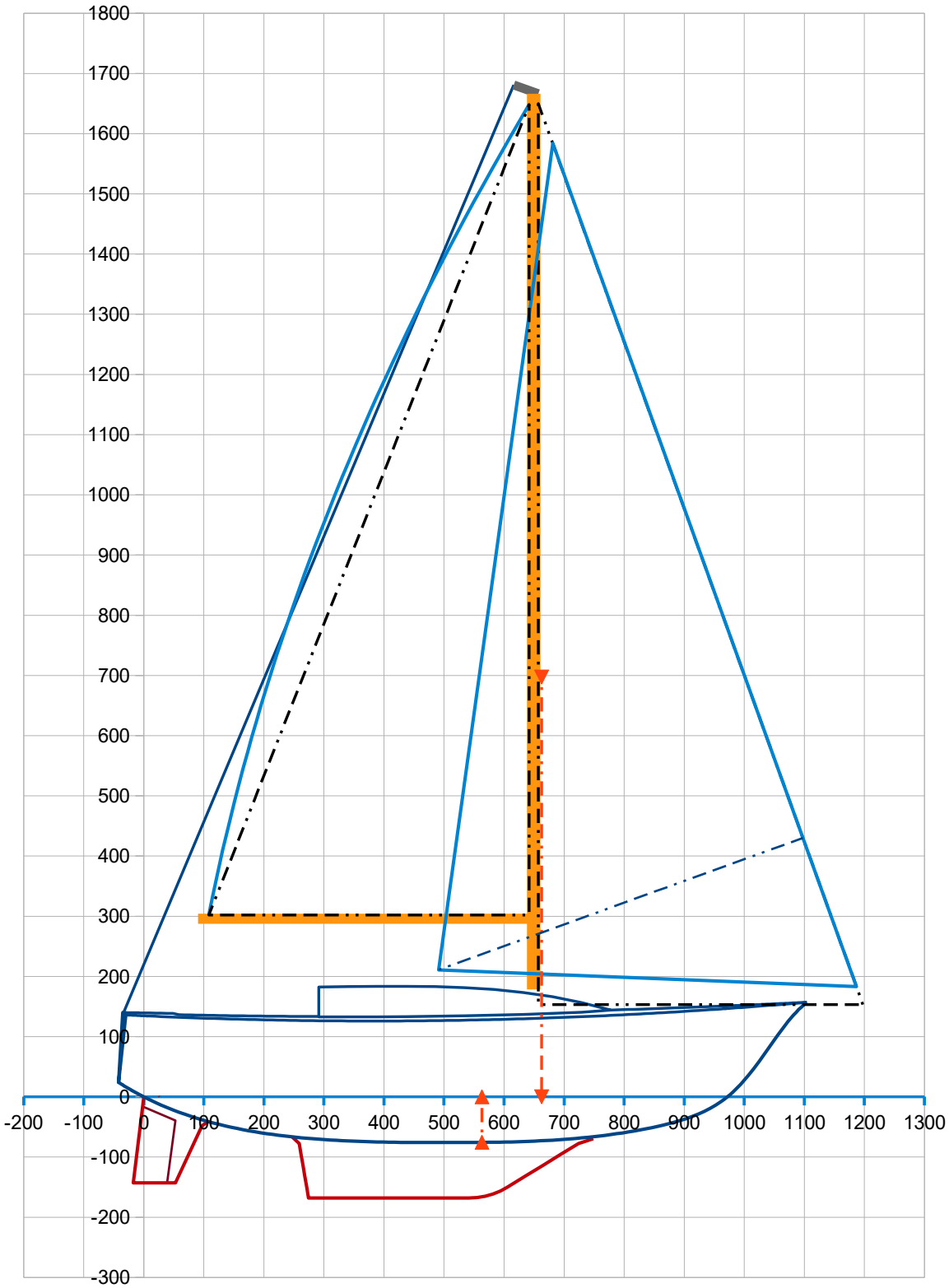
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**10,66590**	**at LCB (m)**	**4,571**	**LCB (%Lwl)**	**47,03**	**at ZCB (m)**	**-0,343**
(kg)	**10933**	*>> ft*	*15,00*			*>> ft*	*-1,12*
>> lbs	*24102*						
, of wich Ballast (kg)	**4078**	**at Xg (m)**	**4,728**	**Xg (%Lwl)**	**48,64**	**at Zg (m)**	**-1,411**
>> lbs	*8990*	*>> ft*	*15,51*			*>> ft*	*-4,63*
>> % Ballast	37,3						
Sw (m2)	**36,38**	>Sw/D^(2/3)	7,51	Lwl/D^(1/3)	4,42		
>> ft2	*391,59*			***DLR***	***332***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**10933**	**at Xg (m)**	**4,676**	**Xg (%Lwl)**	**48,11**	**at Zg (m)**	**-0,082**

Blue water 39 SA 92,1 m2 (Main 43,1 m2 + Genoa 49,0 m2) >> SA/Sw 2,53 SA/D^(2/3) 19,01



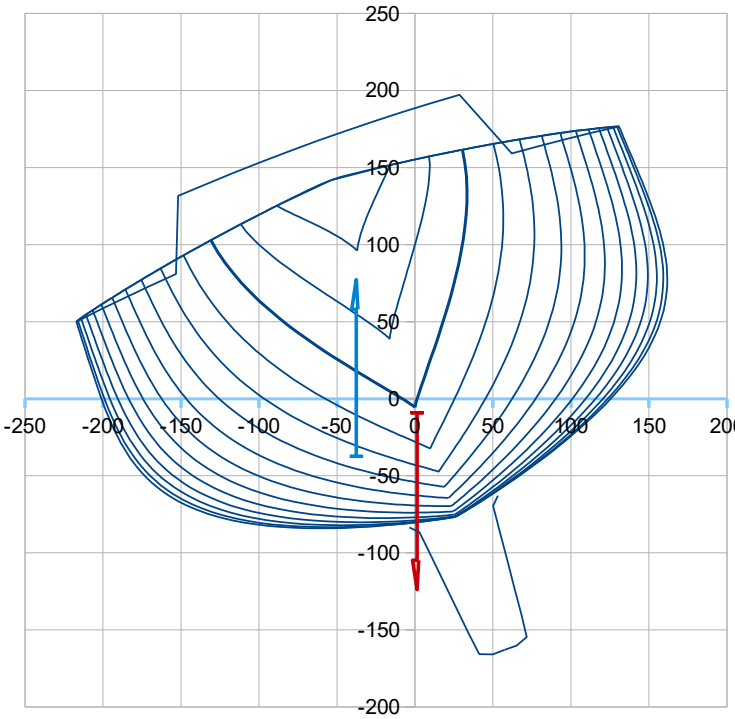
At 20° heel angle with a loading of 3060 kg >>> Displacement 13 993 kg

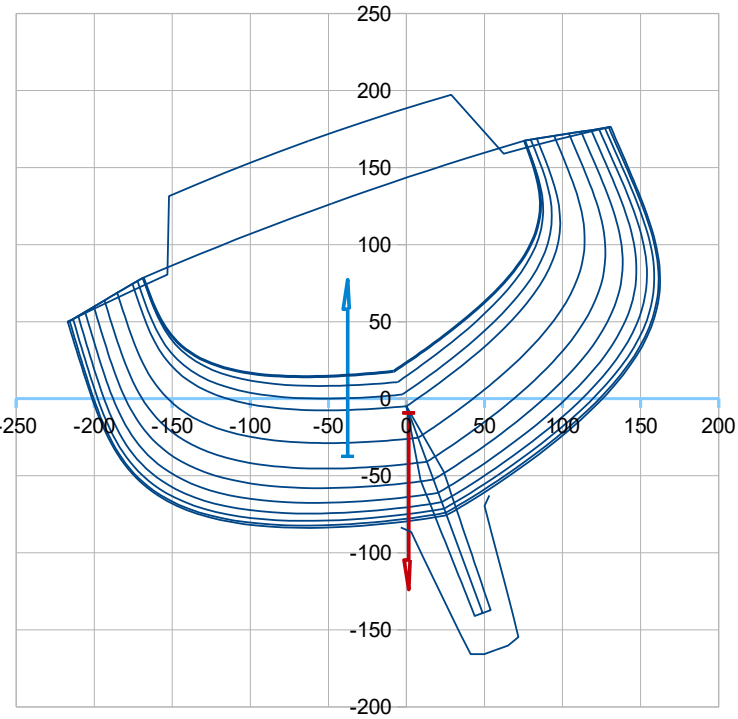
5.1 Mass spreadsheet with input of a load

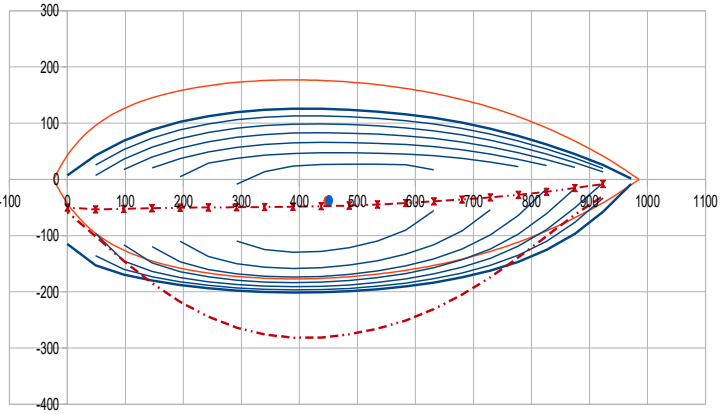
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*10932,82*	*4,676*	*-0,082*	*0*	*from the mass spreadsheet*
Load (kg)	**3060,00**	**3,92**	**0,10**	**0,00**	Crew at center
			0,10	**0,00**	Crew sit windward
Total >>> Mass (kg)	**13992,82**	**4,511**	**-0,042**	**0,000**	**Crew at center**
Disp. (m3)	**13,65153**		**-0,042**	**0,000**	**Crew sit windward**

>>> at 20° heel : RM20° = 13,028 kN.m ; Bwl 2,08 m ; Sw20° 23,92 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**13,65152**	**/ Disp. (m3)**	**13,65153**
Height (cm)	**-5,1783**	**Xc heel (m)**	**4,511**	**/ Xg (m)**	**4,511**
Trim (°)	**-0,045**	Yc heel (m)	-0,376	Yg heel (m)	0,014
		Zc heel (m)	-0,375	**> GZ (m)**	**0,390**
		Sw heel(m2)	**39,12**	**RM (kN.m)**	**53,514**
		Bwl heel (m)	**3,27**	**FB mini (cm)**	**49,9**
		LCB – LCF (%Lwl)	**0,34**	**Obliquity (°)**	**1,8**

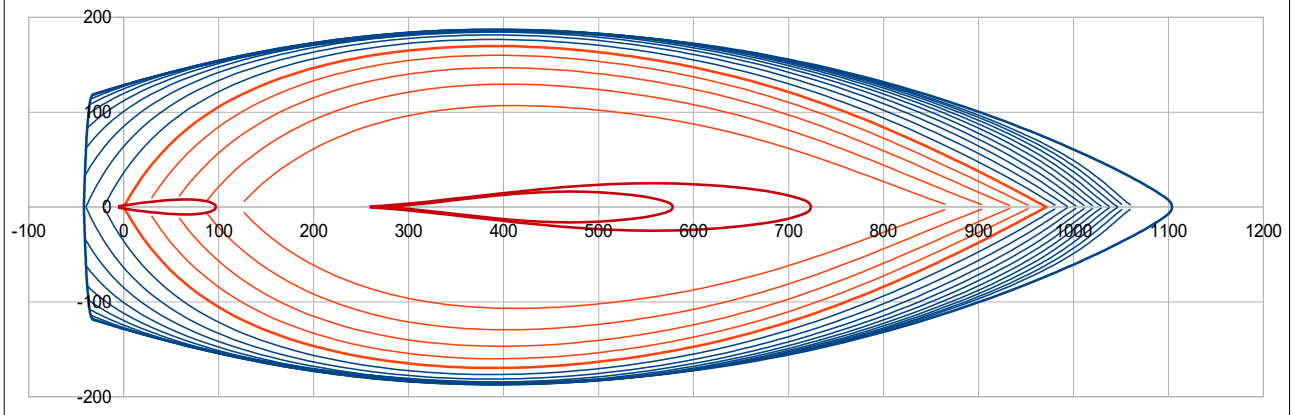




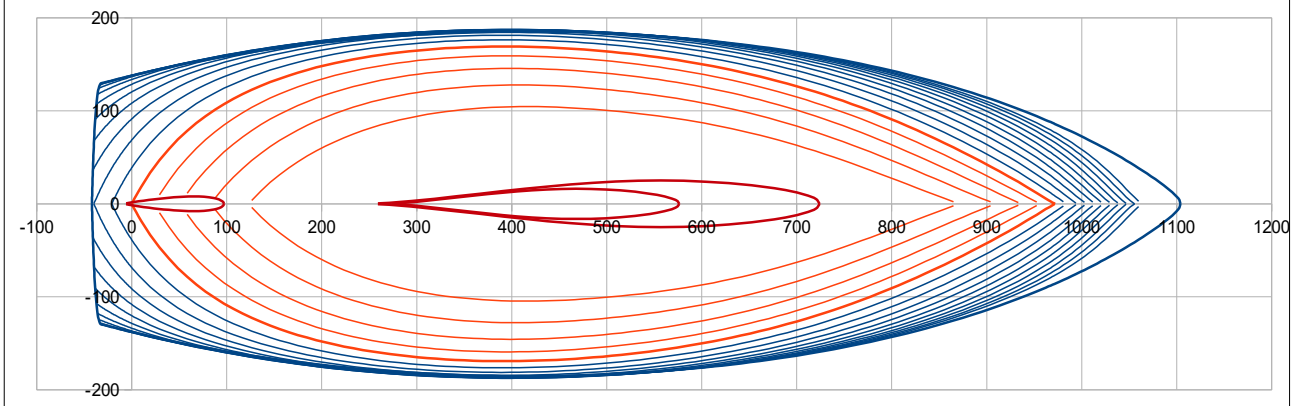


Within Blue Water 39, **we use negative values for « Cor Pui liv »** acting on the sheer line roundness towards the ends to give a « barge » shape. Demonstration of its influence through 3 examples (inc. a slight adjustment of the hull draft **Tc** to keep constant the displacement) :

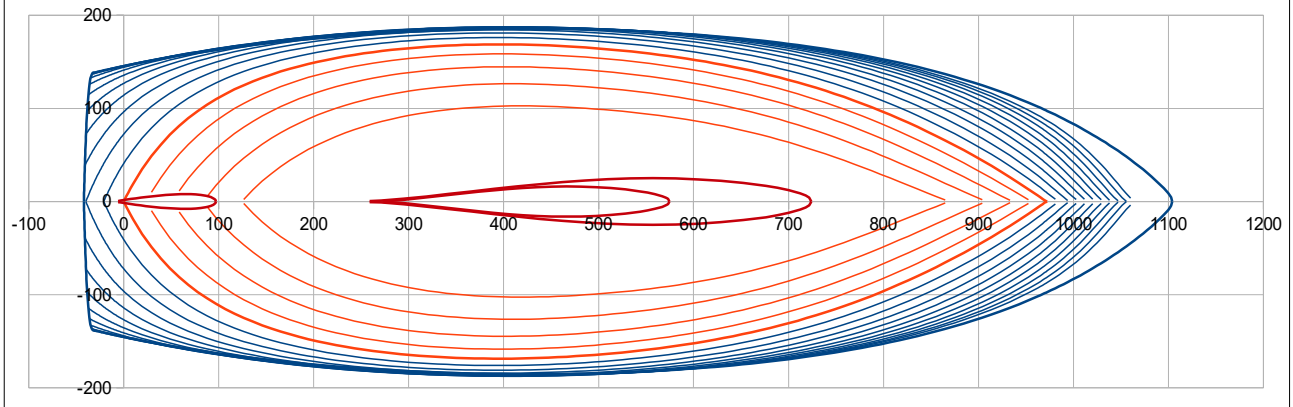
Cor pui liv = 0 and Tc = 0,773 m >>> Cp = 0,587



Cor pui liv = - 0,04 and Tc = 0,760 m >>> Cp = 0,599 (Blue water 39 choice)

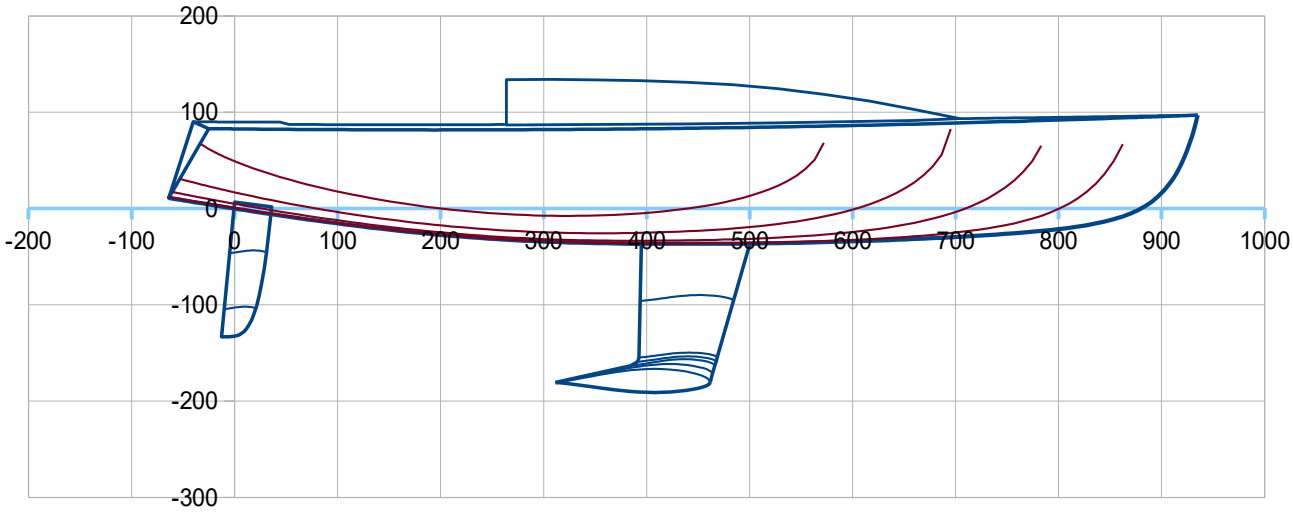


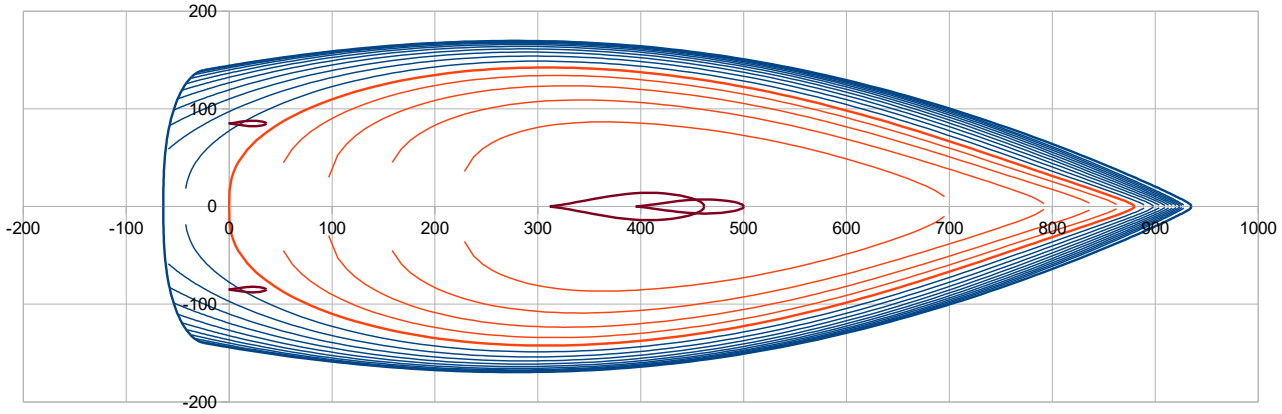
Cor pui liv = - 0,08 and Tc = 0,750 m >>> Cp = 0,608

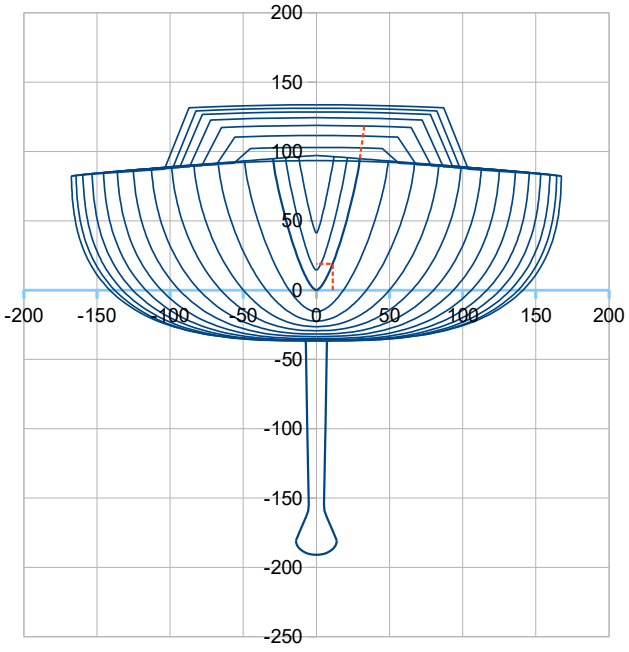


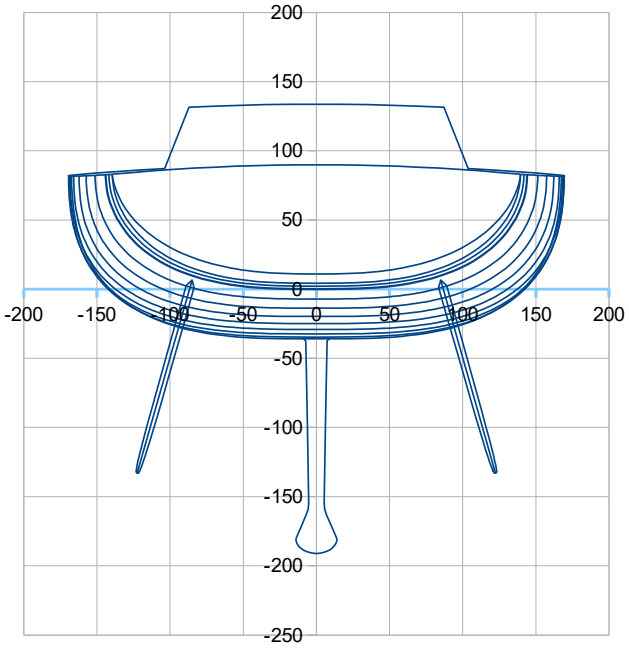
T10, inspired by Tofinou 10 / Joubert – Nivelt

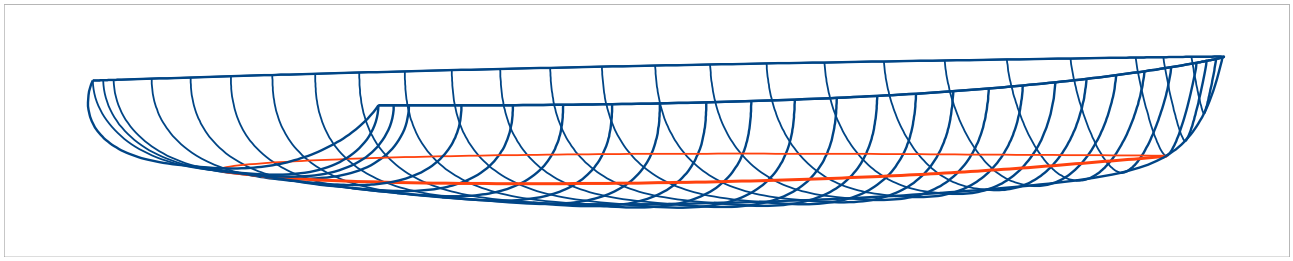
Loa 9,99 m ; Lwl 8,80 m ; B 3,39 m ; Draft 1,91 m ; Displacement : 4208 kg ; Ballast : 1210 kg
>> LCB hull 45,88 %Lwl ; Cp hull (%): 0,563 ; Sw : 24,03 m2 ; DLR : 172 ; Ballast ratio : 28,8 %











T10 hydrostatics data :

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

2.1 Hull

Loa (m)	**9,99**	**Lwl (m)**	**8,80**	> Hull speed (Knots)	7,22	at Froude 0,4		
>> ft	*32,78*		*28,87*					
Boa (m)	**3,39**	**at X (% Lwl)**	**32,0**	Bsheer (m)	3,39	at X (% Lwl)	32,0	
>> ft	*11,12*							
Bwl (m)	**2,85**	**at X (% Lwl)**	**35,0**	> Bwl / Boa	0,840			
>> ft	*9,34*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,366**	**at X (%Lwl)**	**50**		**0,83**	**0,82**	**0,97**	
>> ft	*1,20*			*>> ft*	*2,72*	*2,69*	*3,18*	
Displacement at H0 (m3)	**3,93773**	**at LCB (m)**	**4,037**	**LCB (%Lwl)**	**45,88**	**ZCB (m)**	**-0,139**	
>> lbs	*8898*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,45*	
Cp	**0,563**							
Sf (m2)	**17,45**	**at LCF (m)**	**3,767**	**LCF (%Lwl)**	**42,81**	>>> LCB – LCF (%Lwl)	3,06	
>> ft2	*187,82*	*>> ft*	*12,36*					
Angle Freeboard/Half beam	26,2	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**19,6**	**at 95% Lwl**		
Sw (m2)	**18,45**	>Sw/D^(2/3)	7,40					
>> ft2	*198,63*							
Shull (m2)	**37,78**	**at X (m)**	**3,969**	**Z (m)**	**0,081**			
>> ft2	*406,61*	*>> ft*	*13,02*	*>> ft*	*0,27*			
Sdeck (m2)	**26,63**	**at X (m)**	**3,742**	**Z (m)**	**0,89**			
>> ft2	*286,70*	*>> ft*	*12,28*	*>> ft*	*2,92*			

2.2 Keel

Vol. keel(m3)	**0,13767**	**at X (m)**	**4,342**	**X (%Lwl)**	**49,34**	**Z (m)**	**-1,198**	
		>> ft	*14,25*			*>> ft*	*-3,93*	
Ballast (kg)	**1210,2**	**at X (m)**	**4,303**	**X (%Lwl)**	**48,89**	**Z (m)**	**-1,294**	
>> lbs	*2668*	*>> ft*	*14,12*			*>> ft*	*-4,25*	
Draft oa (m)	**1,91**		**Sw (m2)**	**3,64**		**Sxz (m2)**	**1,36**	
>> ft	*6,27*		*>> ft2*	*39,17*		*>> ft2*	*14,61*	
CLR (m)	**4,64**	**CLR (%Lwl)**	**52,70**	*CLR = Center of Lateral Resistance*				
>> ft	*15,21*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**2**							
Volume (m3)	**0,03002**	**at X (m)**	**0,14**	**X (%Lwl)**	**1,60**	**Z (m)**	**-0,58**	
Sw (m2)	**1,94**	*>> ft*	*0,46*			**Sxz (m2)**	**0,47**	per rudder
>> ft2	*20,87*					*>> ft2*	*5,02*	

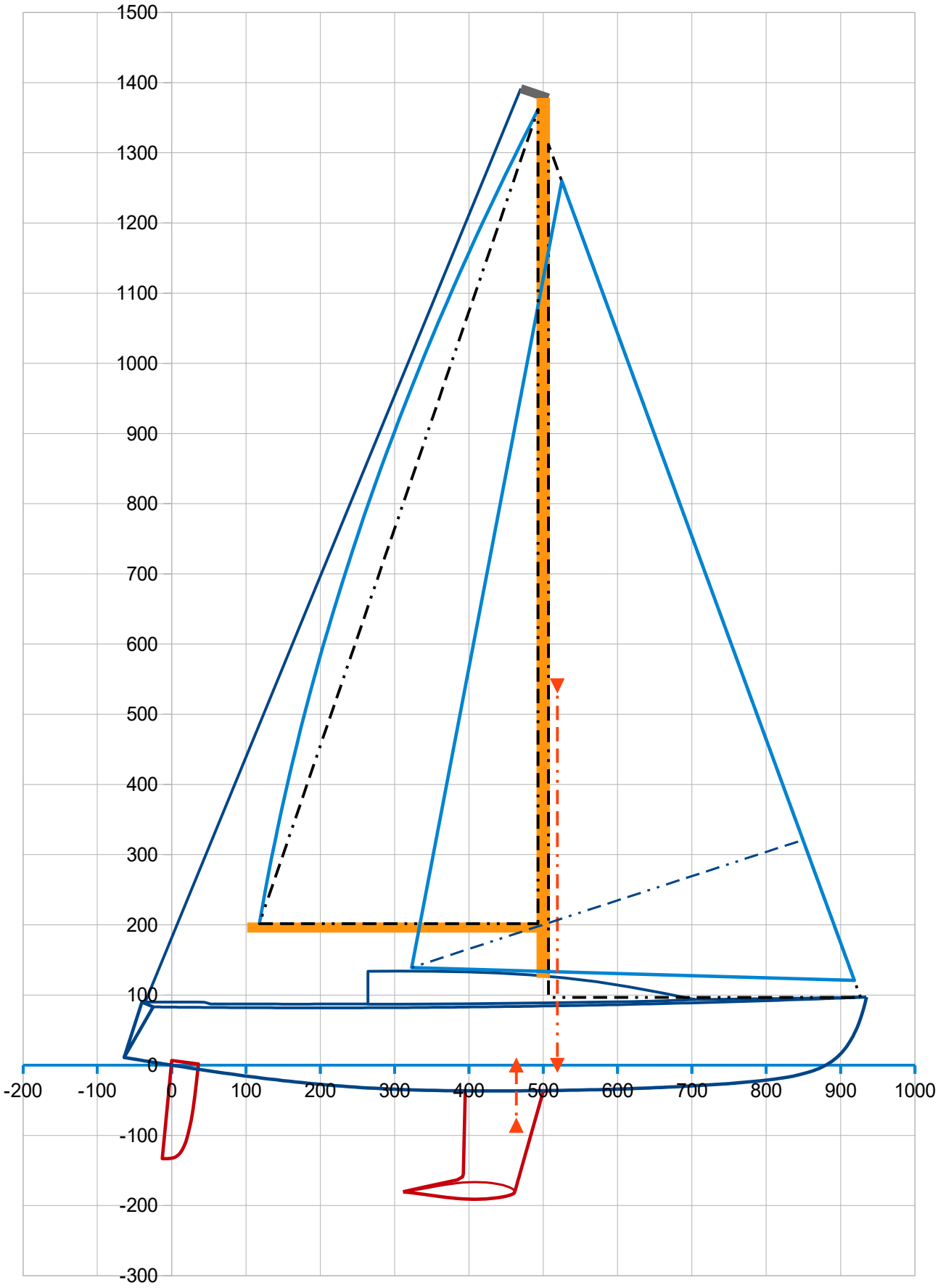
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**4,10541**	**at LCB (m)**	**4,019**	**LCB (%Lwl)**	**45,67**	**at ZCB (m)**	**-0,177**
(kg)	**4208**	*>> ft*	*13,19*			*>> ft*	*-0,58*
>> lbs	*9277*						
, of wich Ballast (kg)	**1210**	**at Xg (m)**	**4,303**	**Xg (%Lwl)**	**48,89**	**at Zg (m)**	**-1,294**
>> lbs	*2668*	*>> ft*	*14,12*			*>> ft*	*-4,25*
>> % Ballast	28,8						
Sw (m2)	**24,03**	>Sw/D^(2/3)	9,37	Lwl/D^(1/3)	5,50		
>> ft2	*258,67*			***DLR***	***172***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**4208**	**at Xg (m)**	**4,021**	**Xg (%Lwl)**	**45,69**	**at Zg (m)**	**0,146**

Boat T10 : SA 60,6 m2 (Main 26,1 m2 + Jib 34,5 m2) >> SA/Sw 2,52 SA/D^(2/3) 23,64



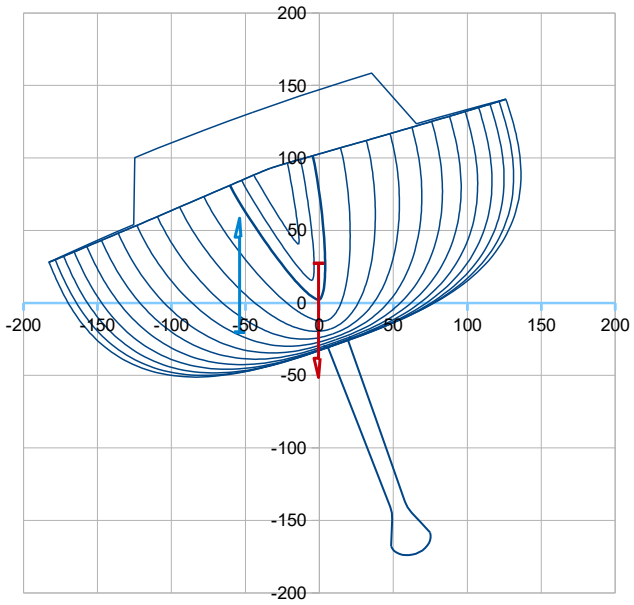
Boat T10 at 20° heel , in charge with crew 300 kg sit windward (at Y 1,00 m) :

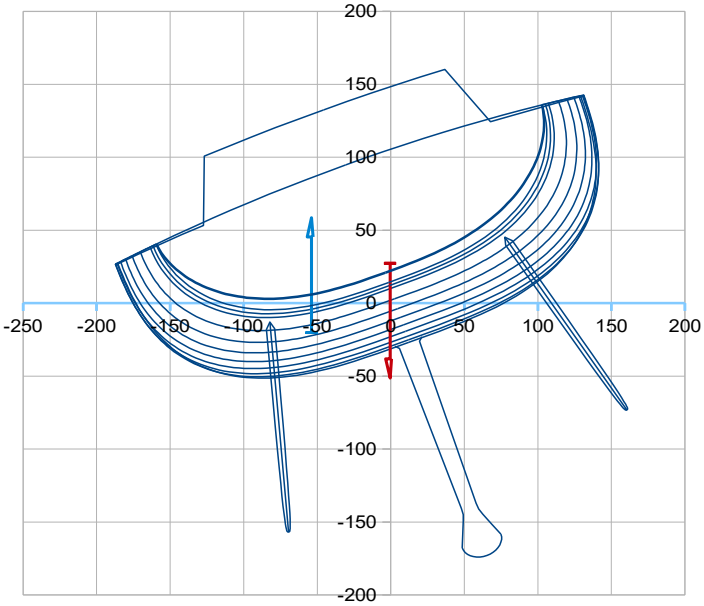
5.1 Mass spreadsheet with input of a load

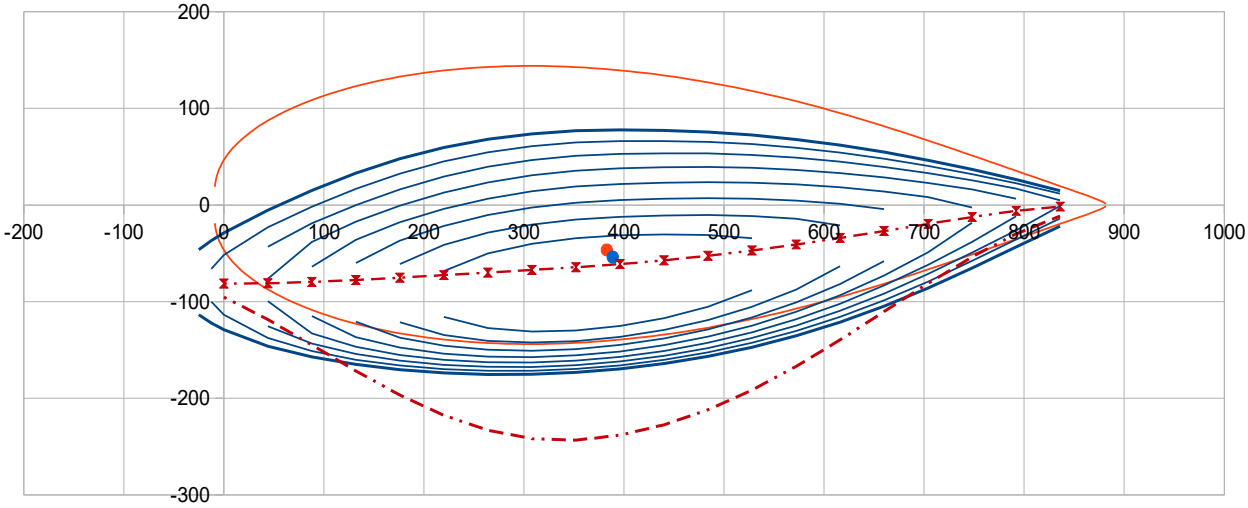
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*4208,23*	*4,021*	*0,146*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**2,00**	**0,90**	**0,00**	Crew at center
			0,90	**1,00**	Crew sit windward
Total >>> Mass (kg)	**4508,23**	**3,886**	**0,197**	**0,000**	**Crew at center**
Disp. (m3)	**4,39827**		**0,197**	**0,067**	**Crew sit windward**

>>> at 20° heel : RM20° = 23,627 kN.m ; Bwl 2,50 m ; Sw20° 23,20 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**4,39827**	**/ Disp. (m3)**	**4,39827**
Height (cm)	**6,4419**	**Xc heel (m)**	**3,886**	**/ Xg (m)**	**3,886**
Trim (°)	**-0,505**	Yc heel (m)	-0,539	Yg heel (m)	-0,005
		Zc heel (m)	-0,202	**> GZ (m)**	**0,534**
		Sw heel(m2)	**23,20**	**RM (kN.m)**	**23,627**
		Bwl heel (m)	**2,50**	**FB mini (cm)**	**26,5**
		LCB – LCF (%Lwl)	**0,67**	**Obliquity (°)**	**5,1**

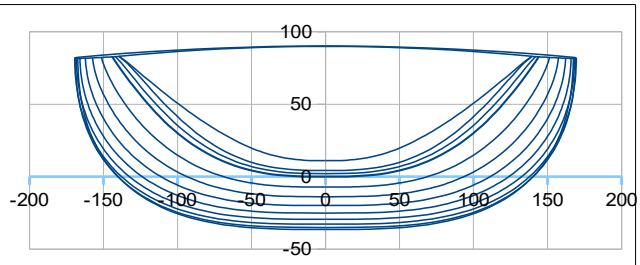


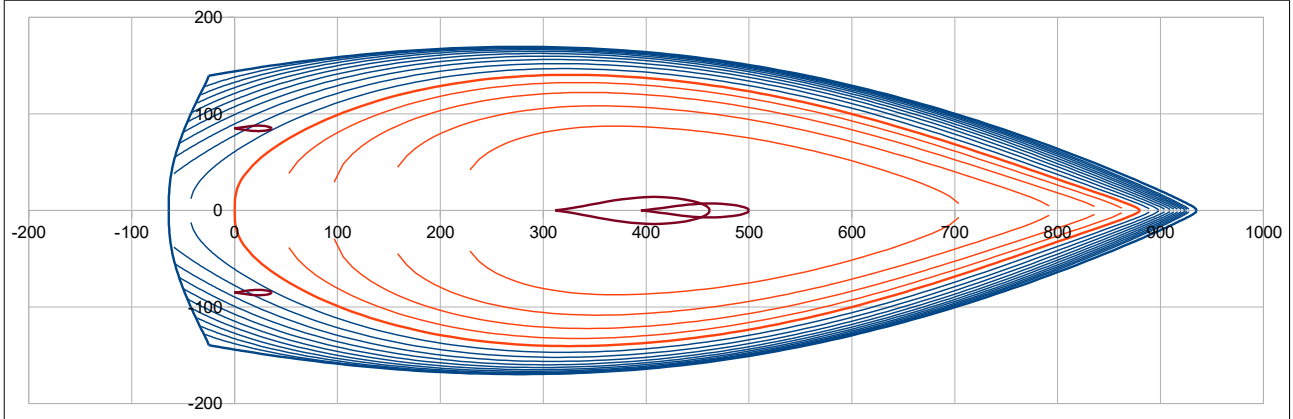




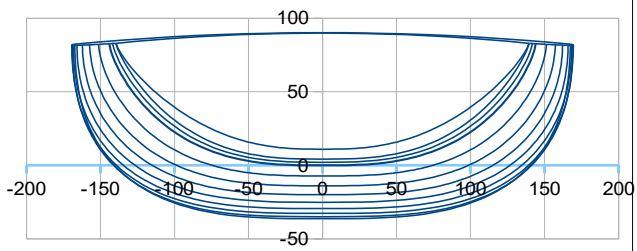
Within T10, one can illustrate by images **the influence of aft value of PE1 on the rear transom and waterlines.** Done with hull draft Tc adjustement to keep constant the displacement.

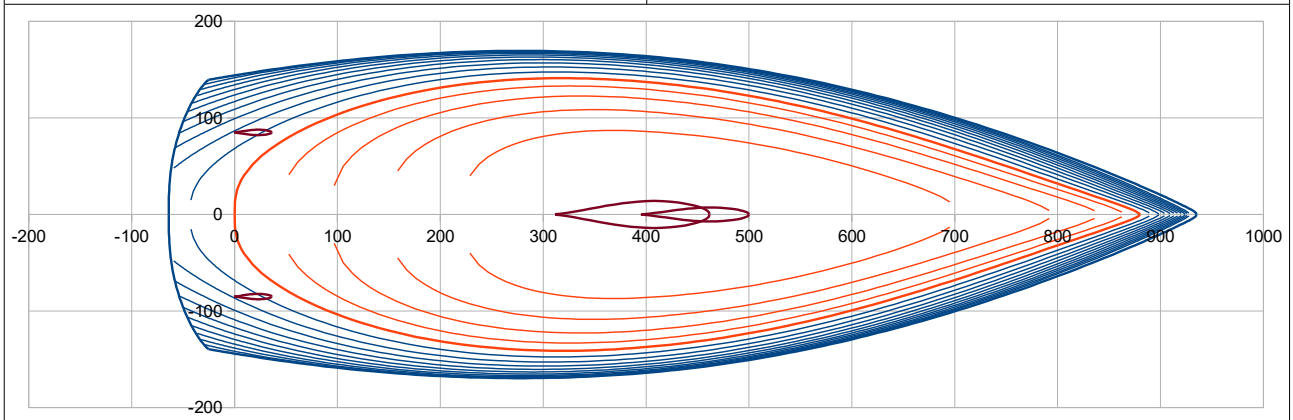
Aft PE1 = 0,5 and Tc = 0,371 m
>>>
LCB hull = 46,57 % Lwl
Cp hull = 0,562
Sw hull = 18,17 m2



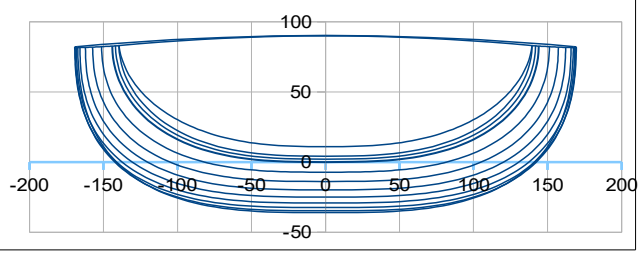


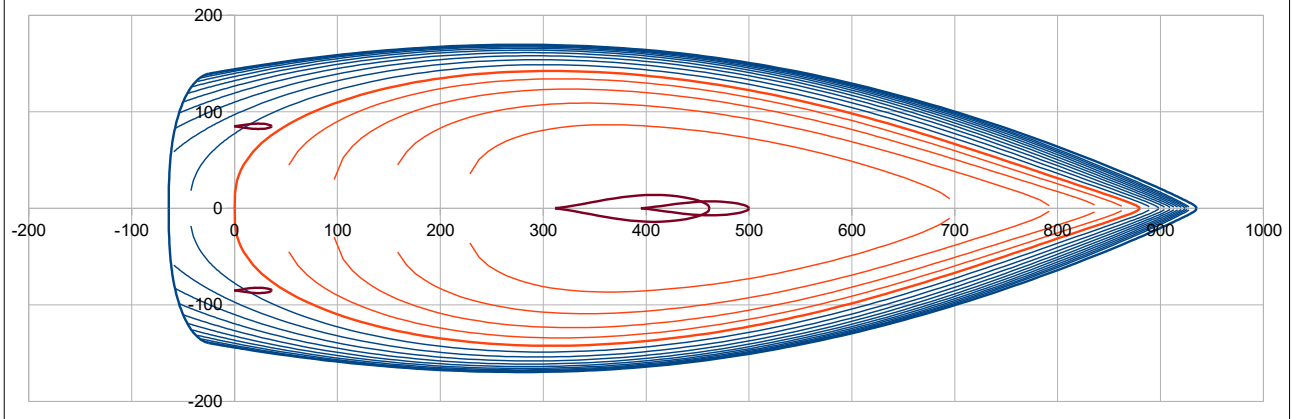
Aft PE1 = 1,0 and Tc = 0,369 m
>>>
LCB hull = 46,29 % Lwl
Cp hull = 0,563
Sw hull = 18,27 m2





Aft PE1 = 1,8 and Tc = 0,366 m
>>>
LCB hull = 45,88 % Lwl
Cp hull = 0,563
Sw hull = 18,45 m2
(T10 Choice)





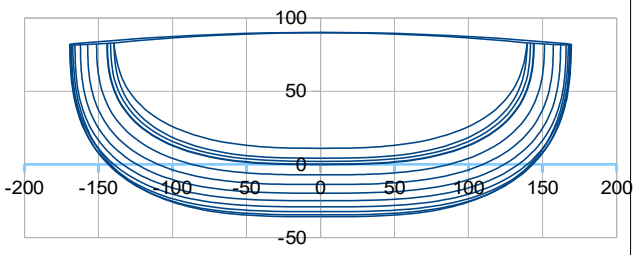
Aft PE1 = 2,5 and Tc = 0,364 m

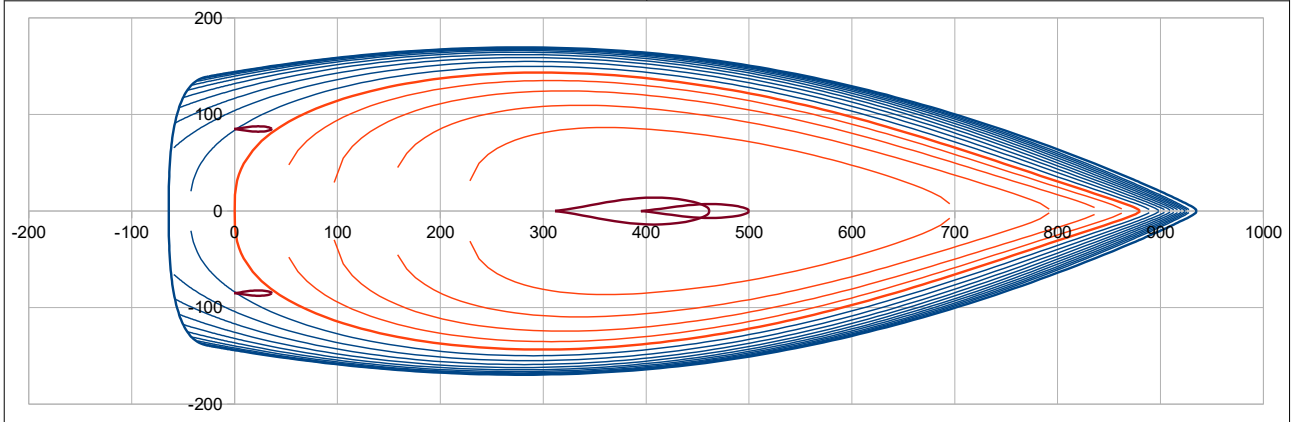
>>>

LCB hull = 45,55 % Lwl

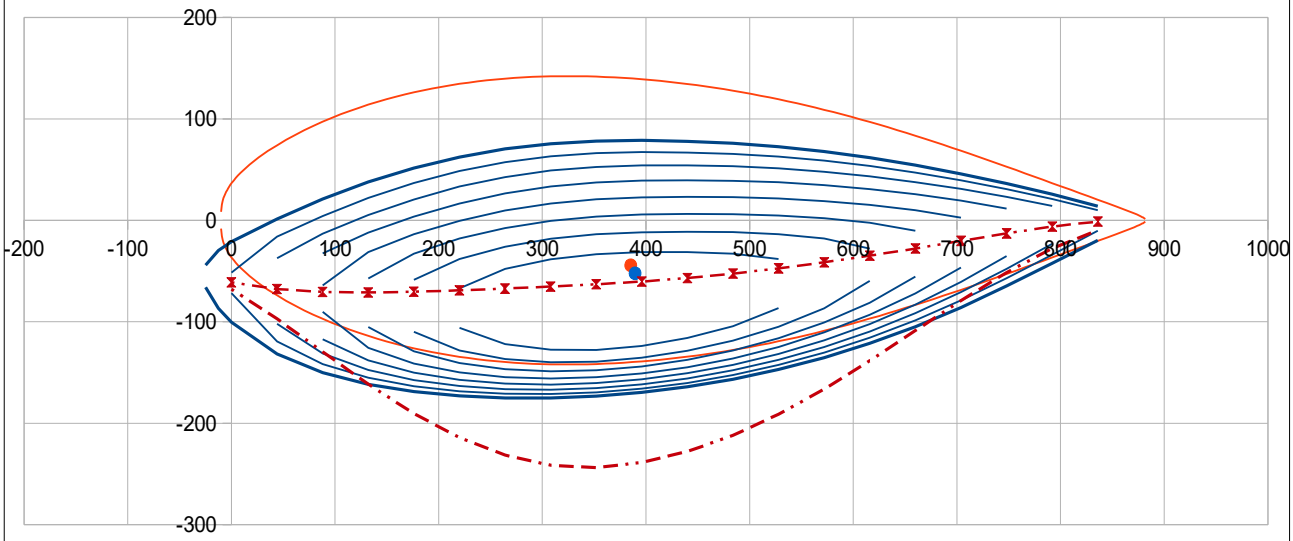
Cp hull = 0,563

Sw hull = 18,59 m2

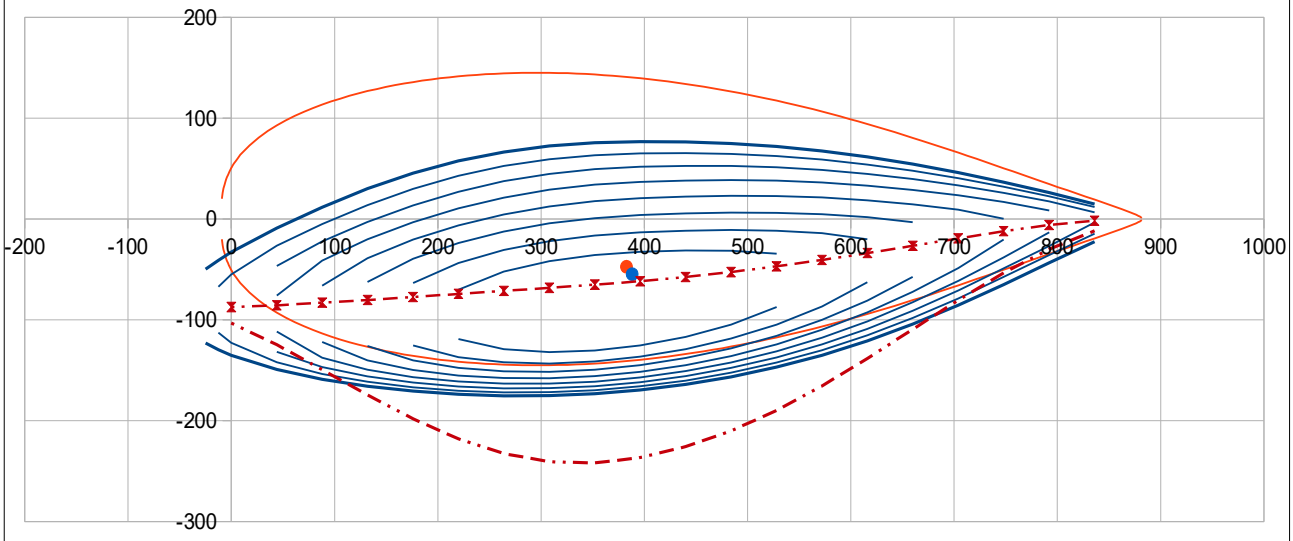




Comparison of the 20° heeled hull with the 2 extremes rear transom shape



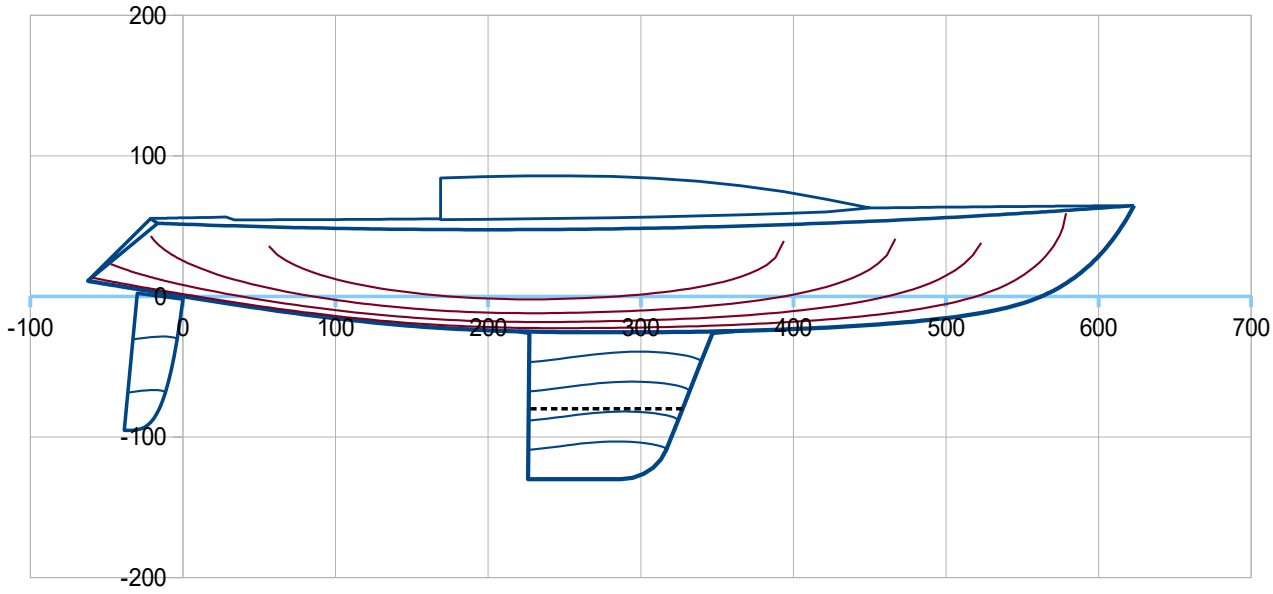
With Aft PE1 = 0,5

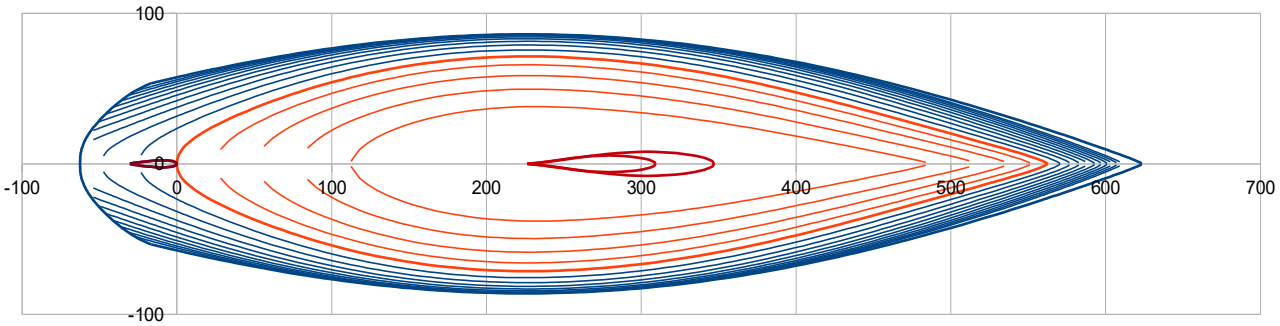


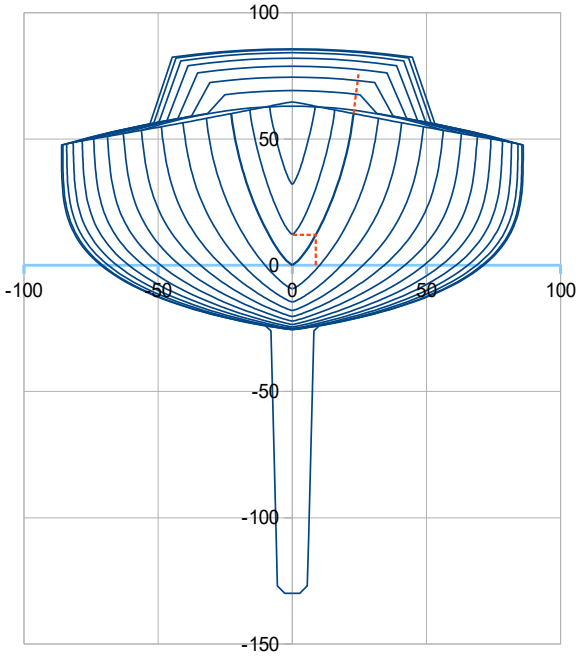
With Aft PE1 = 2,5

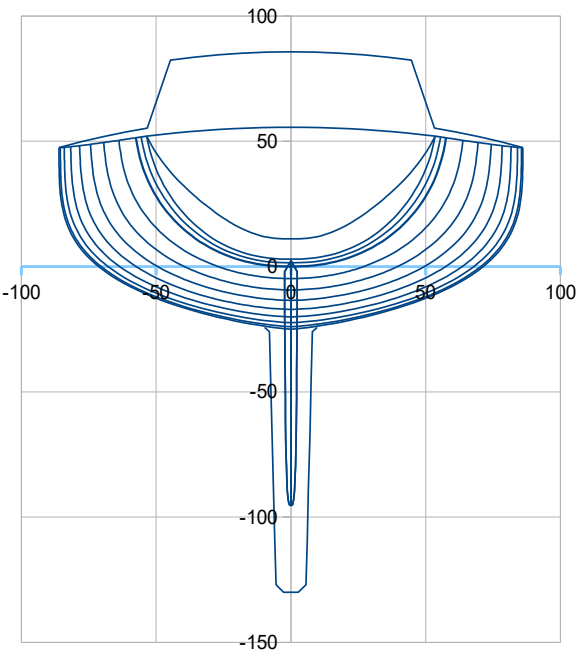
Dolfi 22,5, inspired by 15m2 SNS designs

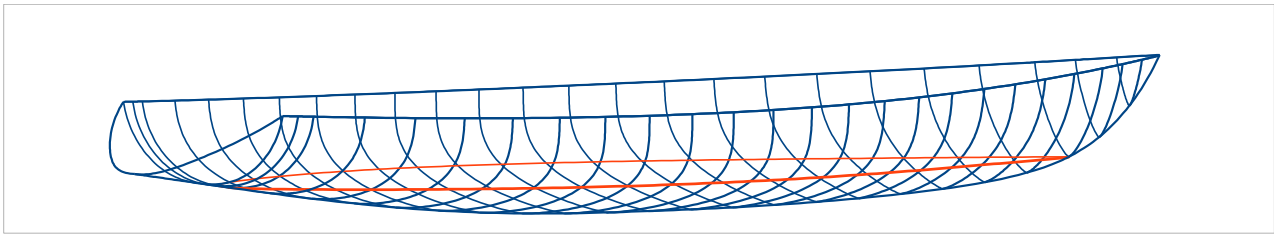
Loa 6,86 m ; Lwl 5,63 m ; B 1,72 m ; Draft 1,30 m ; Displacement : 837 kg ; Ballast : 416 kg
>> LCB hull 46,84 %Lwl ; Cp hull : 0,55 ; Sw : 8,54 m2 ; DLR : 131 ; Ballast ratio : 49,7 %











Dolfi 22,5 hydrostatics data :

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

2.1 Hull

Loa (m)	**6,86**	**Lwl (m)**	**5,63**	> Hull speed (Knots)	5,78	at Froude 0,4		
>> ft	*22,50*		*18,45*					
Boa (m)	**1,72**	**at X (% Lwl)**	**40,0**	Bsheer (m)	1,72	at X (% Lwl)	40,0	
>> ft	*5,64*							
Bwl (m)	**1,43**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,829			
>> ft	*4,68*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,255**	**at X (%Lwl)**	**51,5**		**0,52**	**0,47**	**0,646140857**	
>> ft	*0,84*			*>> ft*	*1,71*	*1,56*	*2,12*	
Displacement at H0 (m3)	**0,71613**	**at LCB (m)**	**2,635**	**LCB (%Lwl)**	**46,84**	**ZCB (m)**	**-0,085**	
>> lbs	*1618*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,28*	
Cp	**0,550**							
Sf (m2)	**5,37**	**at LCF (m)**	**2,541**	**LCF (%Lwl)**	**45,18**	>>> LCB – LCF (%Lwl)	1,66	
>> ft2	*57,81*	*>> ft*	*8,34*					
Angle Freeboard/Half beam	28,9	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**16,5**	**at 95% Lwl**		
Sw (m2)	**5,82**	>Sw/D^(2/3)	7,27					
>> ft2	*62,64*							
Shull (m2)	**13,35**	**at X (m)**	**2,669**	**Z (m)**	**0,070**			
>> ft2	*143,68*	*>> ft*	*8,76*	*>> ft*	*0,23*			
Sdeck (m2)	**9,03**	**at X (m)**	**2,577**	**Z (m)**	**0,56**			
>> ft2	*97,21*	*>> ft*	*8,46*	*>> ft*	*1,85*			

2.2 Keel

Vol. keel(m3)	**0,09406**	**at X (m)**	**2,869**	**X (%Lwl)**	**51,01**	**Z (m)**	**-0,709**	
		>> ft	*9,41*			*>> ft*	*-2,33*	
Ballast (kg)	**416,4**	**at X (m)**	**2,806**	**X (%Lwl)**	**49,89**	**Z (m)**	**-1,002**	
>> lbs	*918*	*>> ft*	*9,21*			*>> ft*	*-3,29*	
Draft oa (m)	**1,30**		**Sw (m2)**	**2,21**		**Sxz (m2)**	**1,07**	
>> ft	*4,27*		*>> ft2*	*23,79*		*>> ft2*	*11,55*	
CLR (m)	**3,08**	**CLR (%Lwl)**	**54,77**	*CLR = Center of Lateral Resistance*				
>> ft	*10,11*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,00684**	**at X (m)**	**-0,18**	**X (%Lwl)**	**-3,22**	**Z (m)**	**-0,40**	
Sw (m2)	**0,52**	*>> ft*	*-0,59*			**Sxz (m2)**	**0,25**	per rudder
>> ft2	*5,55*					*>> ft2*	*2,67*	

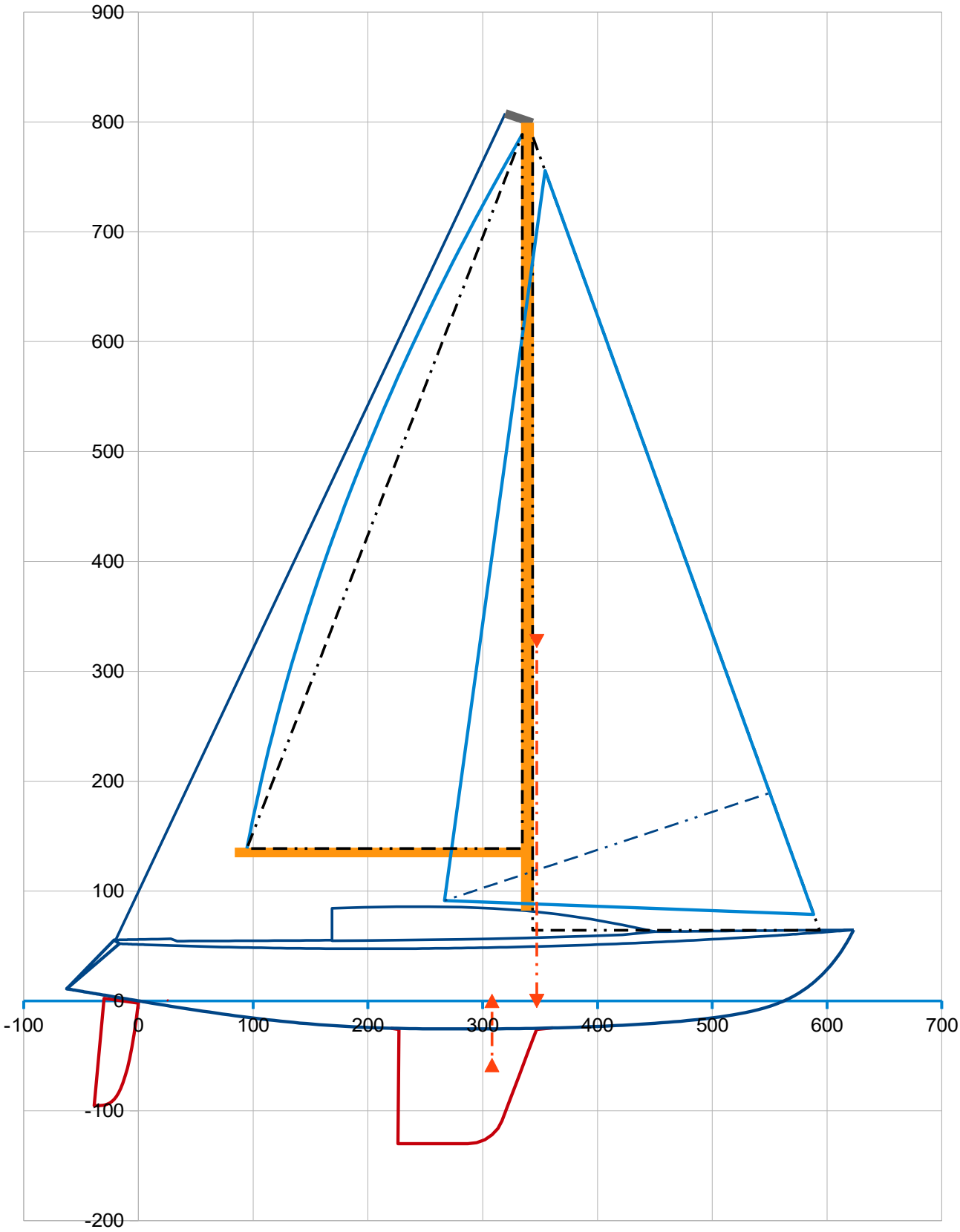
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**0,81703**	**at LCB (m)**	**2,638**	**LCB (%Lwl)**	**46,90**	**at ZCB (m)**	**-0,160**
(kg)	**837**	*>> ft*	*8,66*			*>> ft*	*-0,52*
>> lbs	*1846*						
, of wich Ballast (kg)	**416**	**at Xg (m)**	**2,806**	**Xg (%Lwl)**	**49,89**	**at Zg (m)**	**-1,002**
>> lbs	*918*	*>> ft*	*9,21*			*>> ft*	*-3,29*
>> % Ballast	49,7						
Sw (m2)	**8,54**	>Sw/D^(2/3)	9,78	Lwl/D^(1/3)	6,02		
>> ft2	*91,97*			***DLR***	***131***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**837**	**at Xg (m)**	**2,712**	**Xg (%Lwl)**	**48,21**	**at Zg (m)**	**-0,258**

Dolfi 22,5 SA 20,3 m2 (Main 9,37 m2 + Jib 10,96 m2) >> SA/Sw 2,38 SA/D^(2/3) 23,25



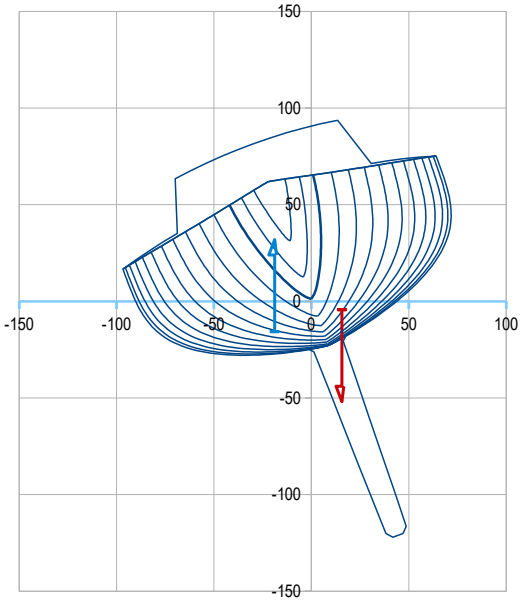
Dolfi 22,5 at 20° heel , in charge with crew 160 kg sit windward (at Y 0,80 m) :

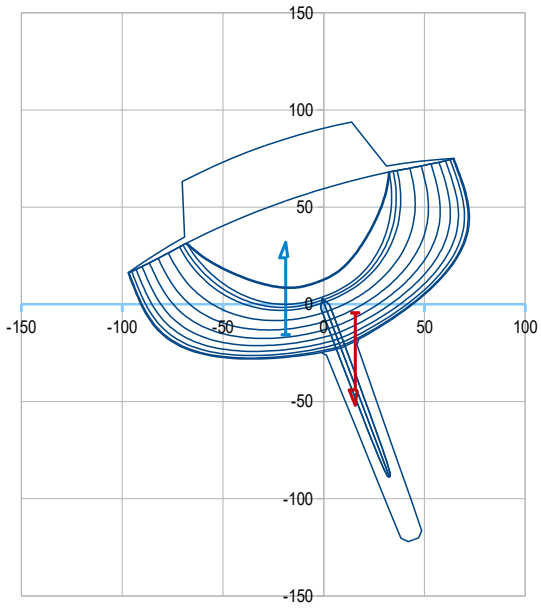
5.1 Mass spreadsheet with input of a load

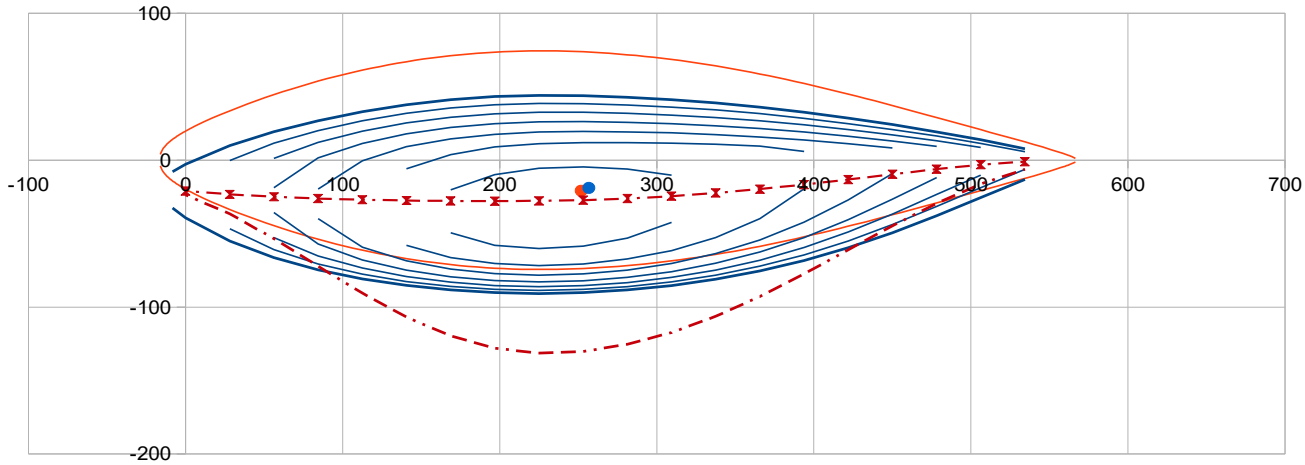
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*836,74*	*2,712*	*-0,258*	*0*	*from the mass spreadsheet*
Load (kg)	**160,00**	**1,80**	**0,70**	**0,00**	Crew at center
			0,70	**0,80**	Crew sit windward
Total >>> Mass (kg)	**996,74**	**2,566**	**-0,104**	**0,000**	**Crew at center**
Disp. (m3)	**0,97243**		**-0,104**	**0,128**	**Crew sit windward**

>>> at 20° heel : RM20° = 3,373 kN.m ; Bwl 1,35 m ; Sw20° 8,81 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**0,97243**	**/ Disp. (m3)**	**0,97243**
Height (cm)	**1,046**	**Xc heel (m)**	**2,566**	**/ Xg (m)**	**2,566**
Trim (°)	**0,025**	Yc heel (m)	-0,189	Yg heel (m)	0,156
		Zc heel (m)	-0,156	**> GZ (m)**	**0,345**
		Sw heel(m2)	**8,81**	**RM (kN.m)**	**3,373**
		Bwl heel (m)	**1,35**	**FB mini (cm)**	**16,3**
		LCB – LCF (%Lwl)	**0,86**	**Obliquity (°)**	**2,3**

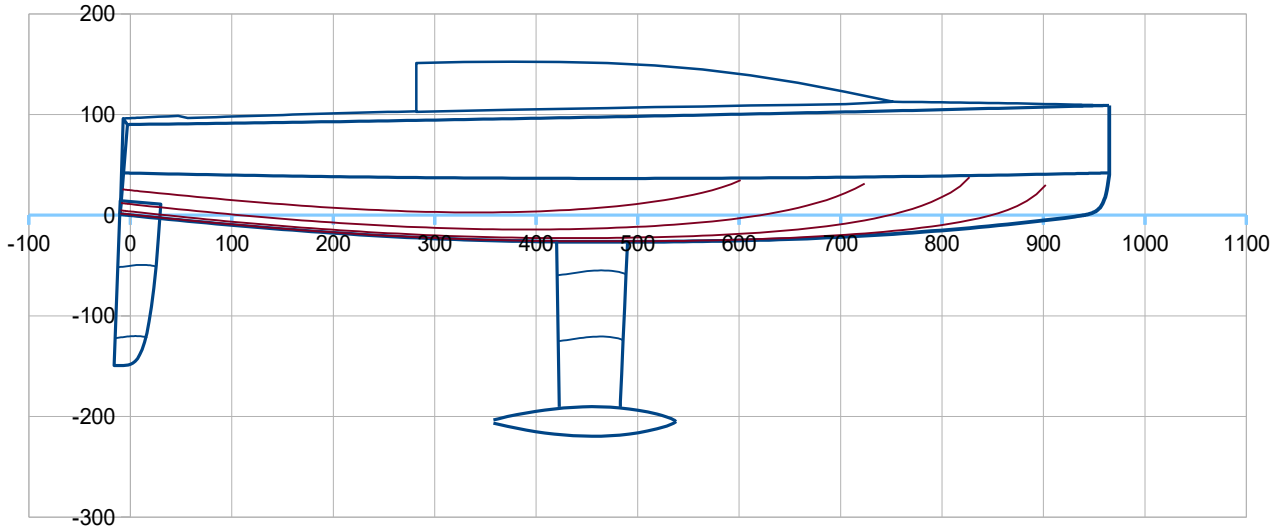


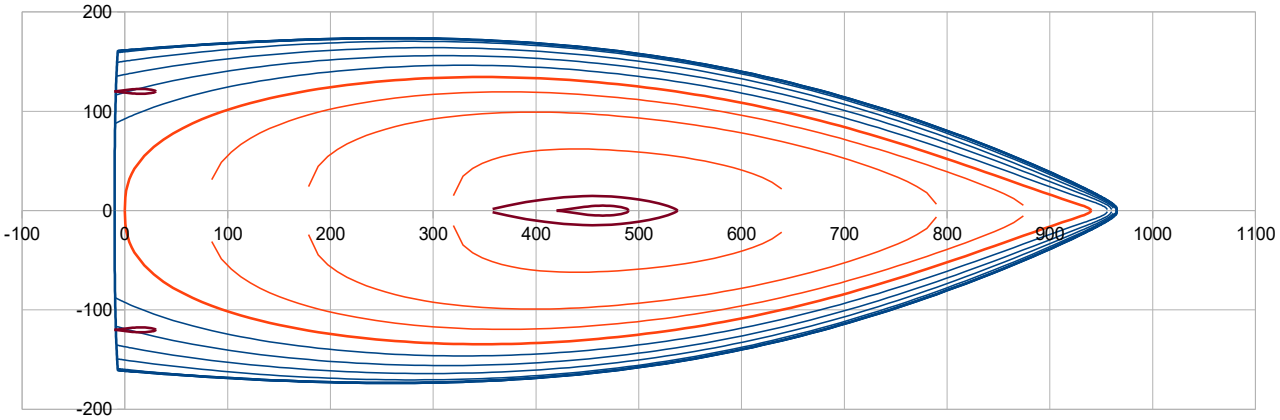


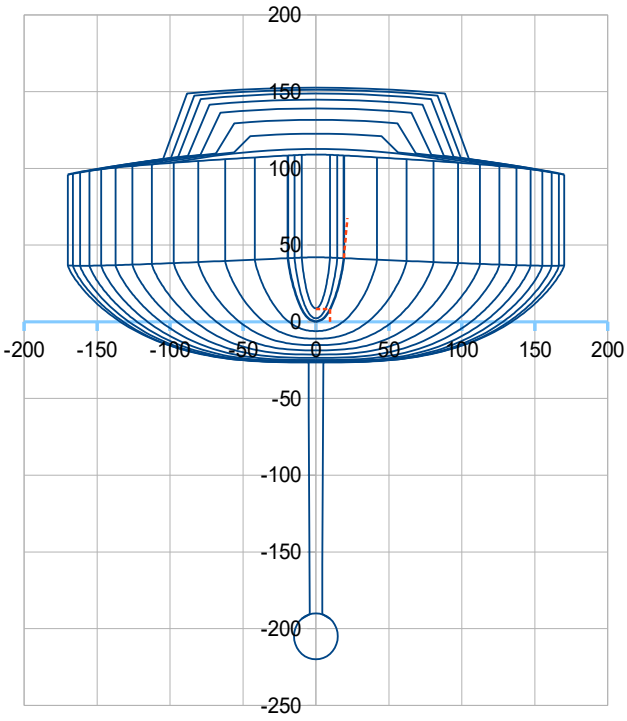


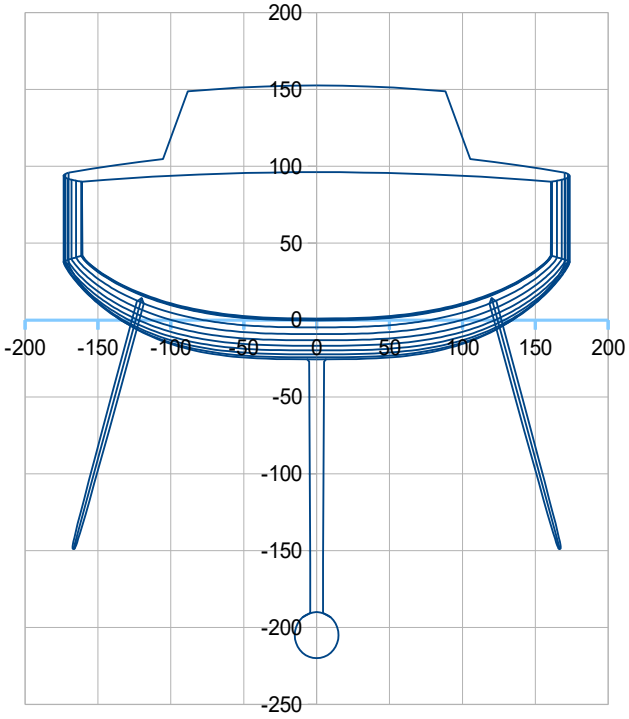
Dolfi 32S, inspired by Beneteau Figaro III / VPLP

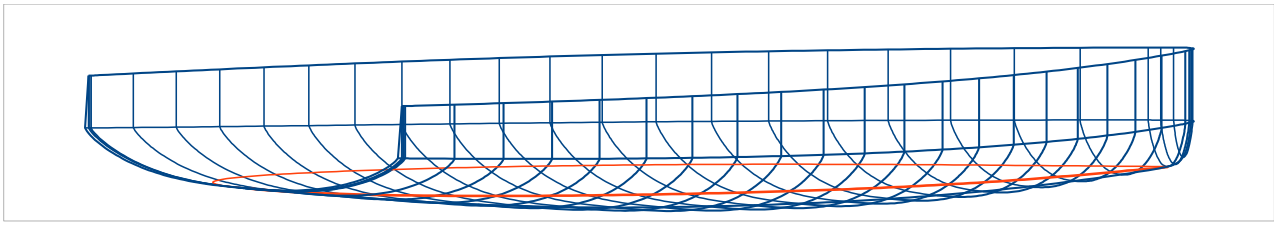
Loa 9,75 m ; Lwl 9,40 m ; B 3,47 m ; Draft 2,20 m ; Displacement : 3017 kg ; Ballast : 1248 kg
>> LCB hull 46,62 %Lwl ; Cp hull : 0,560 ; Sw : 24,18 m2 ; DLR : 101 ; Ballast ratio : 41,4 %











Dolfi 32S Hydrostatics data

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

2.1 Hull

Loa (m)	**9,75**	**Lwl (m)**	**9,40**	> Hull speed (Knots)	7,47	at Froude 0,4			
>> ft	*31,99*		*30,84*						
Boa (m)	**3,47**	**at X (% Lwl)**	**28,0**	Bsheer (m)	3,47	at X (% Lwl)	28,0		
>> ft	*11,38*								
Bwl (m)	**2,69**	**at X (% Lwl)**	**37,0**	> Bwl / Boa	0,775				
>> ft	*8,82*			**Freeboards (m) >**		**Aft**	**Midship**	**Fore**	
Tc (m)	**0,265**	**at X (%Lwl)**	**50**			**0,90**	**0,95**	**1,09**	
>> ft	*0,87*				*>> ft*	*2,95*	*3,12*	*3,58*	
Displacement at H0 (m3)	**2,77851**	**at LCB (m)**	**4,382**	**LCB (%Lwl)**	**46,62**	**ZCB (m)**	**-0,097**		
>> lbs	*6279*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,32*		
Cp	**0,560**								
Sf (m2)	**18,06**	**at LCF (m)**	**4,096**	**LCF (%Lwl)**	**43,57**	>>> LCB – LCF (%Lwl)	3,05		
>> ft2	*194,37*	*>> ft*	*13,44*						
Angle Freeboard/Half beam	29,4	(°), at section C4 (40% Lwl)			**Half entry angle (°)**	**19,6**	**at 95% Lwl**		
Sw (m2)	**18,45**	>Sw/D^(2/3)	9,33						
>> ft2	*198,59*								
Shull (m2)	**41,51**	**at X (m)**	**4,362**	**Z (m)**	**0,167**				
>> ft2	*446,80*	*>> ft*	*14,31*	*>> ft*	*0,55*				
Sdeck (m2)	**28,18**	**at X (m)**	**3,988**	**Z (m)**	**1,02**				
>> ft2	*303,34*	*>> ft*	*13,09*	*>> ft*	*3,33*				

2.2 Keel

Vol. keel(m3)	**0,13298**	**at X (m)**	**4,555**	**X (%Lwl)**	**48,46**	**Z (m)**	**-1,560**	
		>> ft	*14,94*			*>> ft*	*-5,12*	
Ballast (kg)	**1248,1**	**at X (m)**	**4,547**	**X (%Lwl)**	**48,37**	**Z (m)**	**-1,669**	
>> lbs	*2752*	*>> ft*	*14,92*			*>> ft*	*-5,47*	
Draft oa (m)	**2,20**		**Sw (m2)**	**3,30**		**Sxz (m2)**	**1,44**	
>> ft	*7,22*		*>> ft2*	*35,51*		*>> ft2*	*15,46*	
CLR (m)	**4,70**	**CLR (%Lwl)**	**50,05**	*CLR = Center of Lateral Resistance*				
>> ft	*15,43*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**2**							
Volume (m3)	**0,03226**	**at X (m)**	**0,08**	**X (%Lwl)**	**0,90**	**Z (m)**	**-0,58**	
Sw (m2)	**2,43**	*>> ft*	*0,28*			**Sxz (m2)**	**0,58**	per rudder
>> ft2	*26,14*					*>> ft2*	*6,28*	

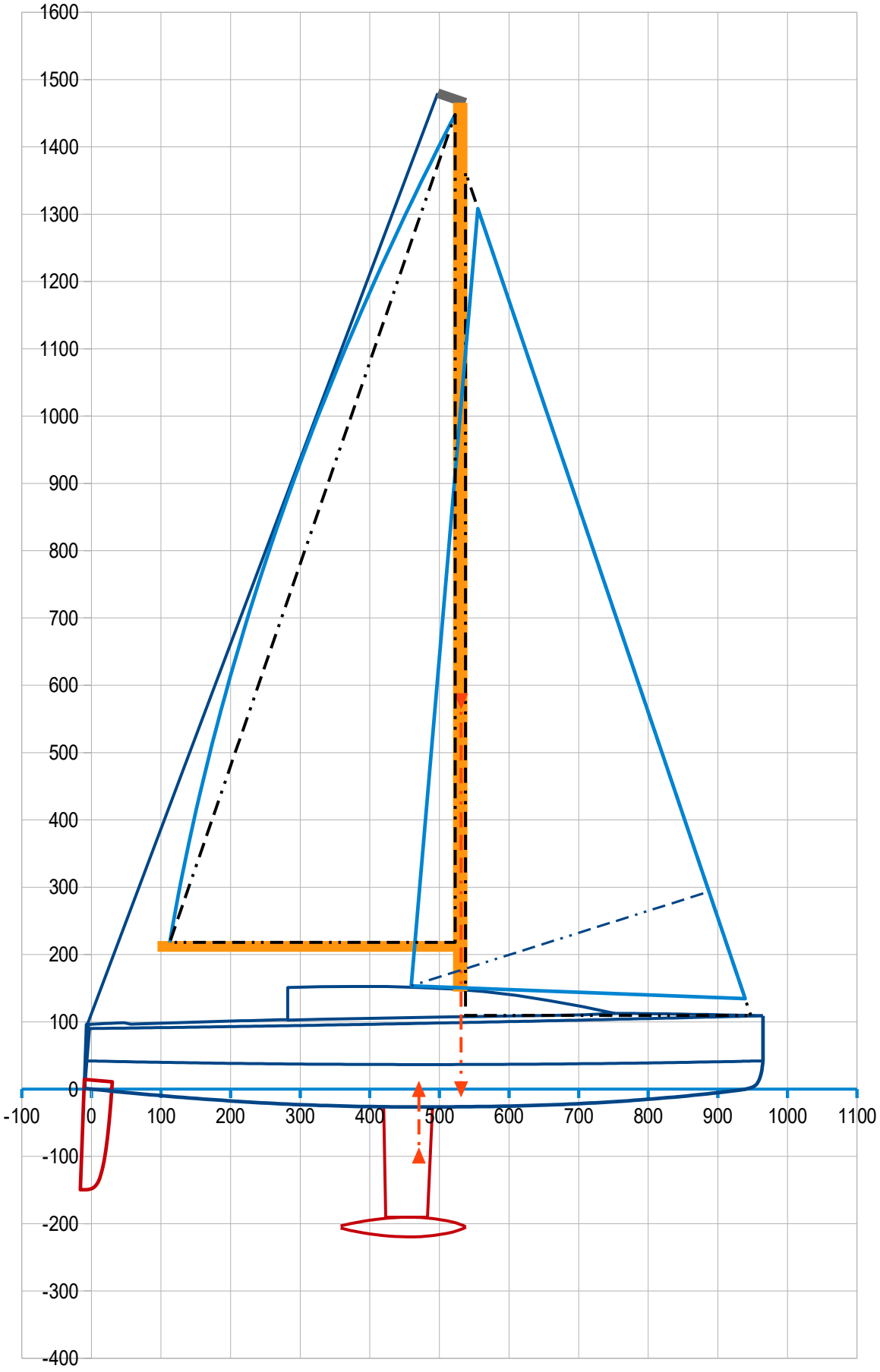
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**2,94375**	**at LCB (m)**	**4,343**	**LCB (%Lwl)**	**46,20**	**at ZCB (m)**	**-0,168**
(kg)	**3017**	*>> ft*	*14,25*			*>> ft*	*-0,55*
>> lbs	*6652*						
, of wich Ballast (kg)	**1248**	**at Xg (m)**	**4,547**	**Xg (%Lwl)**	**48,37**	**at Zg (m)**	**-1,669**
>> lbs	*2752*	*>> ft*	*14,92*			*>> ft*	*-5,47*
>> % Ballast	41,4						
Sw (m2)	**24,18**	>Sw/D^(2/3)	11,77	Lwl/D^(1/3)	6,56		
>> ft2	*260,23*			***DLR***	***101***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**3017**	**at Xg (m)**	**4,303**	**Xg (%Lwl)**	**45,77**	**at Zg (m)**	**-0,180**

Dolfi 32S SA 58,6 m2 (Main 30,3 m2 + Jib 28,3 m2) >> SA/Sw 2,42 SA/D^(2/3) 28,54



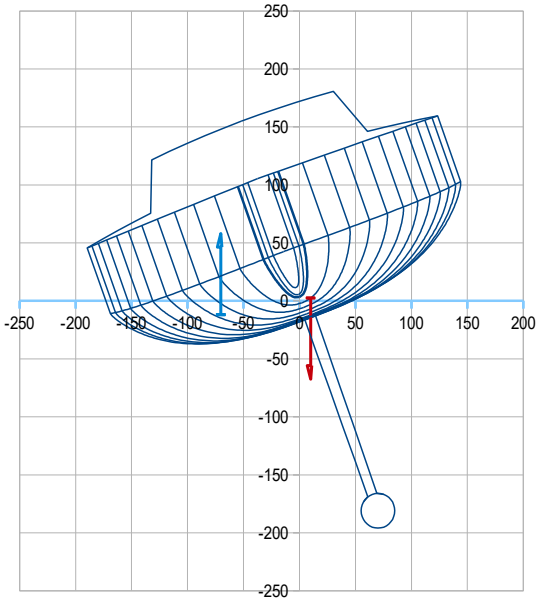
Dolfi 32S at 20° heel , in charge with crew 160 kg sit windward (at Y 1,25 m) :

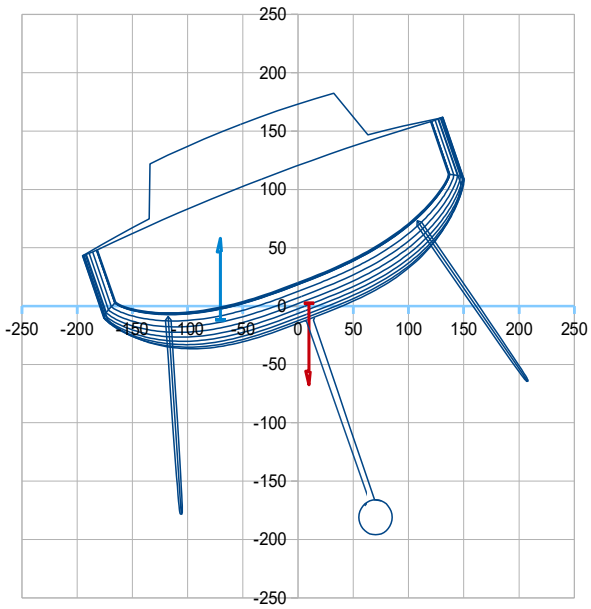
5.1 Mass spreadsheet with input of a load

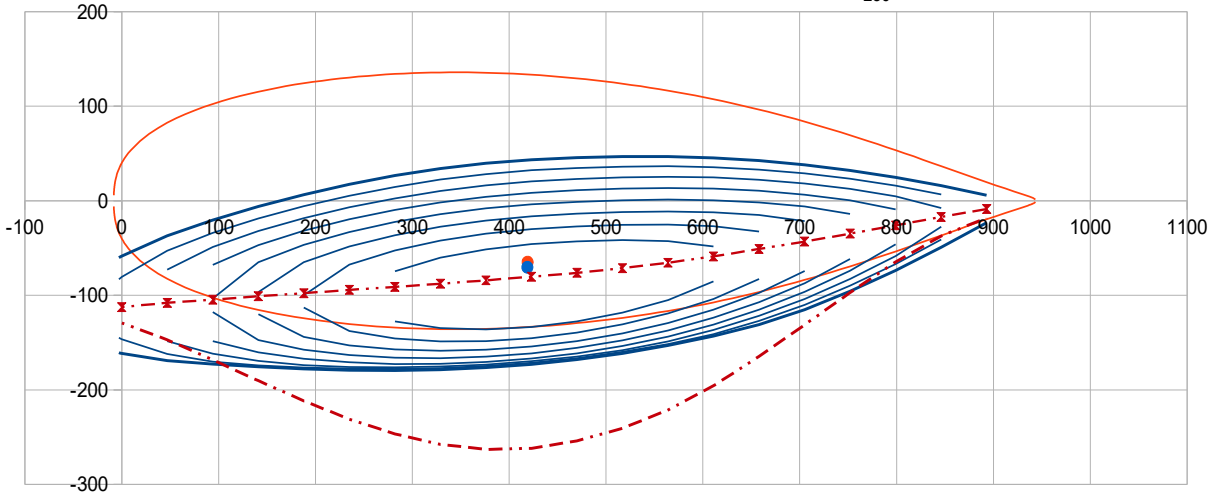
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*3016,95*	*4,303*	*-0,180*	*0*	*from the mass spreadsheet*
Load (kg)	**160,00**	**2,00**	**1,00**	**0,00**	Crew at center
			1,00	**1,25**	Crew sit windward
Total >>> Mass (kg)	**3176,95**	**4,187**	**-0,120**	**0,000**	**Crew at center**
Disp. (m3)	**3,09946**		**-0,120**	**0,063**	**Crew sit windward**

>>> at 20° heel : RM20° = 25,032 kN.m ; Bwl 2,17 m ; Sw20° 21,39 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**3,09945**	**/ Disp. (m3)**	**3,09946**
Height (cm)	**11,4701**	**Xc heel (m)**	**4,187**	**/ Xg (m)**	**4,187**
Trim (°)	**-0,920**	Yc heel (m)	-0,703	Yg heel (m)	0,100
		Zc heel (m)	-0,119	**> GZ (m)**	**0,803**
		Sw heel(m2)	**21,39**	**RM (kN.m)**	**25,032**
		Bwl heel (m)	**2,17**	**FB mini (cm)**	**43,1**
		LCB – LCF (%Lwl)	**-0,03**	**Obliquity (°)**	**6,1**

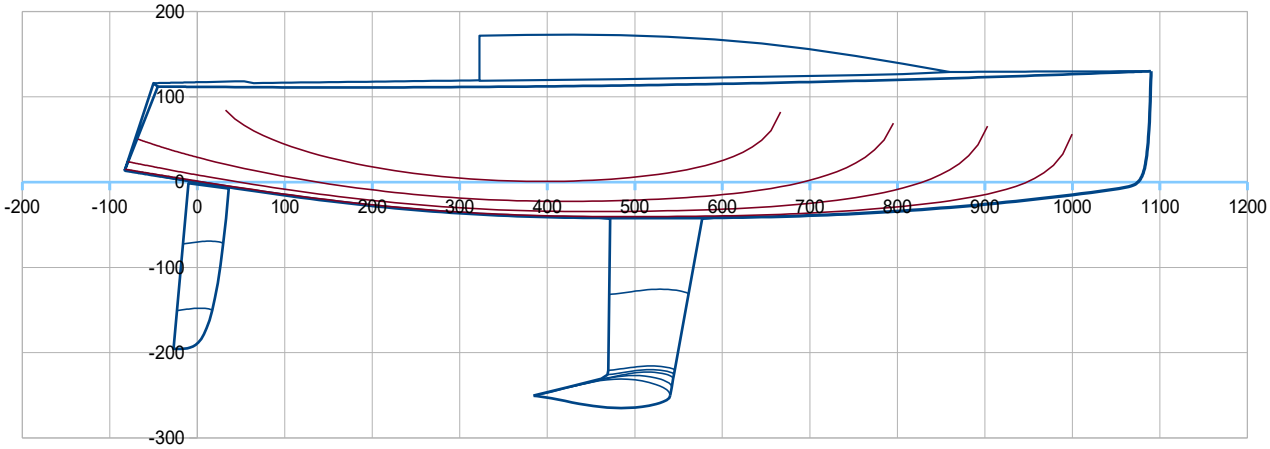


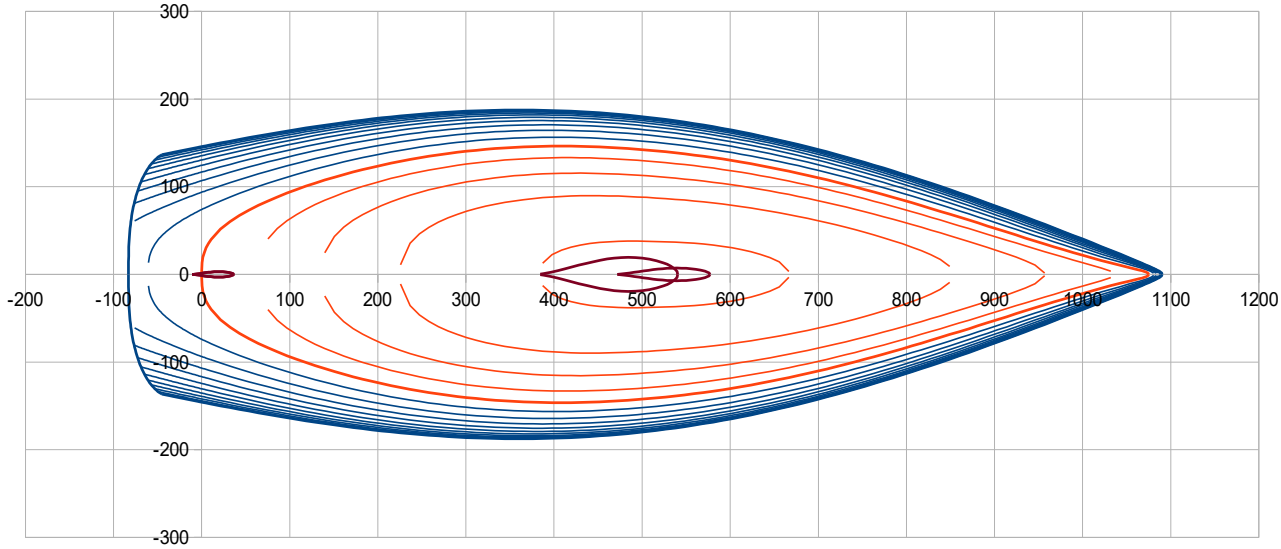


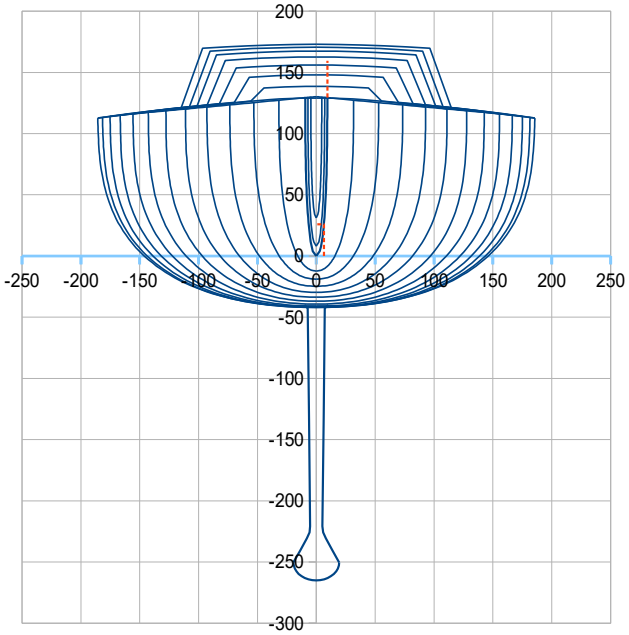


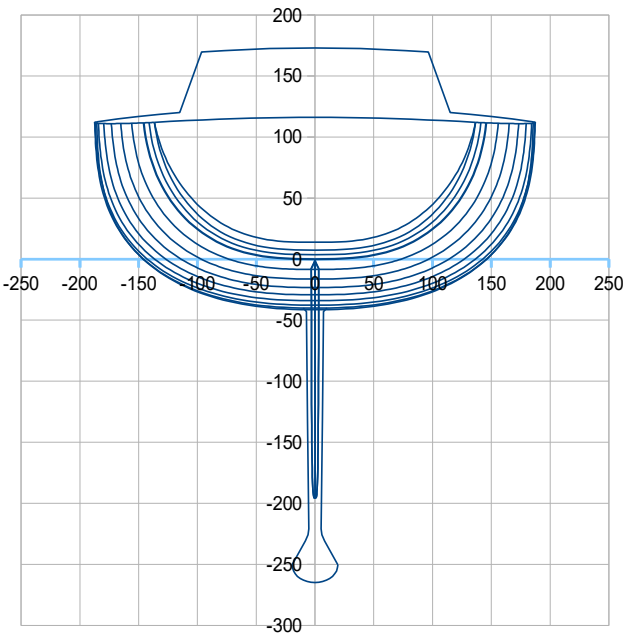
Syd 38, inspired by Sydney 38 / Murray Burns Dovell

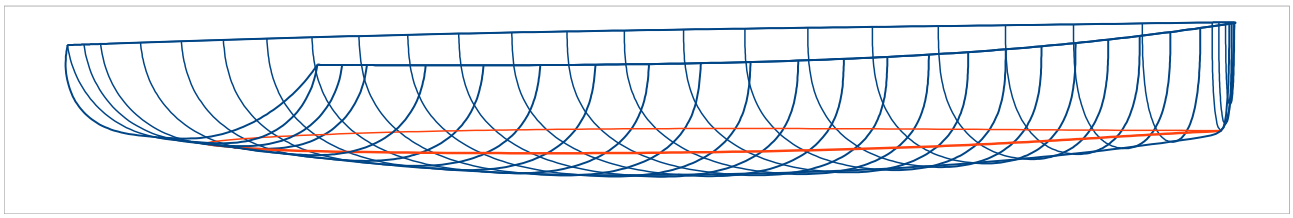
Loa 11,73 m ; Lwl 10,75 m ; B 3,75 m ; Draft 2,65 m ; Displacement : 5640 kg ; Ballast : 1930 kg
>> LCB hull 45,63 %Lwl ; Cp hull : 0,554 ; Sw : 29,55 m2 ; DLR : 127 ; Ballast ratio : 34,2 %







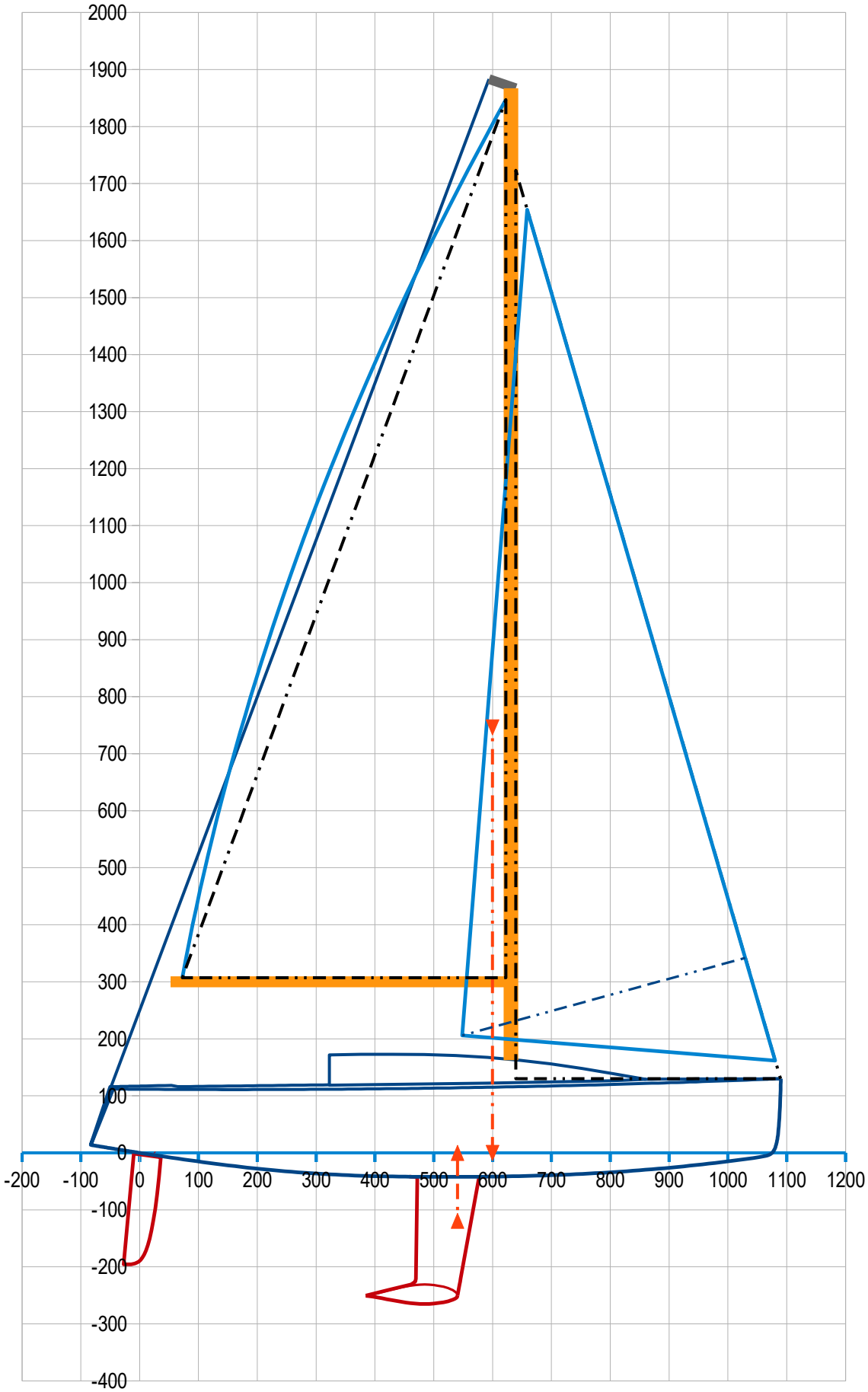




Syd 38 hydrostatics data :

2. Data sum-up and results of hydrostatic and surfaces calculations								
2.1 Hull								
Loa (m)	**11,73**	**Lwl (m)**	**10,75**	> Hull speed (Knots)	7,98	at Froude 0,4		
>> ft	*38,48*		*35,27*					
Boa (m)	**3,75**	**at X (% Lwl)**	**34,0**	Bsheer (m)	3,75	at X (% Lwl)	34,0	
>> ft	*12,30*							
Bwl (m)	**2,93**	**at X (% Lwl)**	**38,0**	> Bwl / Boa	0,780			
>> ft	*9,60*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,420**	**at X (%Lwl)**	**50**		**1,12**	**1,12**	**1,3**	
>> ft	*1,38*			*>> ft*	*3,67*	*3,67*	*4,27*	
Displacement at H0 (m3)	**5,25618**	**at LCB (m)**	**4,905**	**LCB (%Lwl)**	**45,63**	**ZCB (m)**	**-0,153**	
>> lbs	*11877*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,50*	
Cp	**0,554**							
Sf (m2)	**21,38**	**at LCF (m)**	**4,658**	**LCF (%Lwl)**	**43,33**	>>> LCB – LCF (%Lwl)	2,30	
>> ft2	*230,09*	*>> ft*	*15,28*					
Angle Freeboard/Half beam	31,2	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**15,2**	**at 95% Lwl**		
Sw (m2)	**22,69**	>Sw/D^(2/3)	7,50					
>> ft2	*244,19*							
Shull (m2)	**53,38**	**at X (m)**	**4,811**	**Z (m)**	**0,190**			
>> ft2	*574,54*	*>> ft*	*15,78*	*>> ft*	*0,62*			
Sdeck (m2)	**34,29**	**at X (m)**	**4,354**	**Z (m)**	**1,20**			
>> ft2	*369,06*	*>> ft*	*14,28*	*>> ft*	*3,94*			
2.2 Keel								
Vol. keel(m3)	**0,21707**	**at X (m)**	**5,097**	**X (%Lwl)**	**47,41**	**Z (m)**	**-1,689**	
		>> ft	*16,72*			*>> ft*	*-5,54*	
Ballast (kg)	**1930,4**	**at X (m)**	**5,055**	**X (%Lwl)**	**47,02**	**Z (m)**	**-1,830**	
>> lbs	*4256*	*>> ft*	*16,58*			*>> ft*	*-6,00*	
Draft oa (m)	**2,65**		**Sw (m2)**	**5,19**		**Sxz (m2)**	**1,96**	
>> ft	*8,69*		*>> ft2*	*55,86*		*>> ft2*	*21,05*	
CLR (m)	**5,40**	**CLR (%Lwl)**	**50,27**	*CLR = Center of Lateral Resistance*				
>> ft	*17,73*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord
2.3 Rudder(s)								
Number	**1**							
Volume (m3)	**0,02892**	**at X (m)**	**0,08**	**X (%Lwl)**	**0,71**	**Z (m)**	**-0,89**	
Sw (m2)	**1,68**	*>> ft*	*0,25*			**Sxz (m2)**	**0,81**	per rudder
>> ft2	*18,05*					*>> ft2*	*8,68*	
2.4 Hull + Keel + Rudder(s)								
Displacement at H0 (m3)	**5,50218**	**at LCB (m)**	**4,887**	**LCB (%Lwl)**	**45,46**	**at ZCB (m)**	**-0,218**	
(kg)	**5640**	*>> ft*	*16,03*			*>> ft*	*-0,71*	
>> lbs	*12433*							
, of wich Ballast (kg)	**1930**	**at Xg (m)**	**5,055**	**Xg (%Lwl)**	**47,02**	**at Zg (m)**	**-1,830**	
>> lbs	*4256*	*>> ft*	*16,58*			*>> ft*	*-6,00*	
>> % Ballast	34,2							
Sw (m2)	**29,55**	>Sw/D^(2/3)	9,48	Lwl/D^(1/3)	6,09			
>> ft2	*318,11*			***DLR***	***127***	*M(lbs/2240)/(Lwl(ft)/100)^3*		
2.5 Data from the mass spreadsheet								
Light boat:	**M (kg)**	**5640**	**at Xg (m)**	**4,873**	**Xg (%Lwl)**	**45,33**	**at Zg (m)**	**-0,012**

Syd 38 SA 90,4 m2 (Main 50,9 m2 + Jib 39,5 m2) >> SA/Sw 3,06 SA/D^(2/3) 29,00



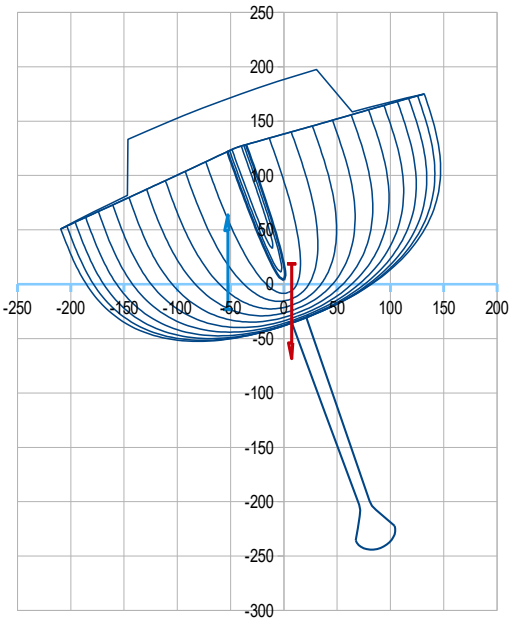
Dolfi Syd38 at 20° heel , in charge with crew 145 kg sit windward (at Y 1,50 m) :

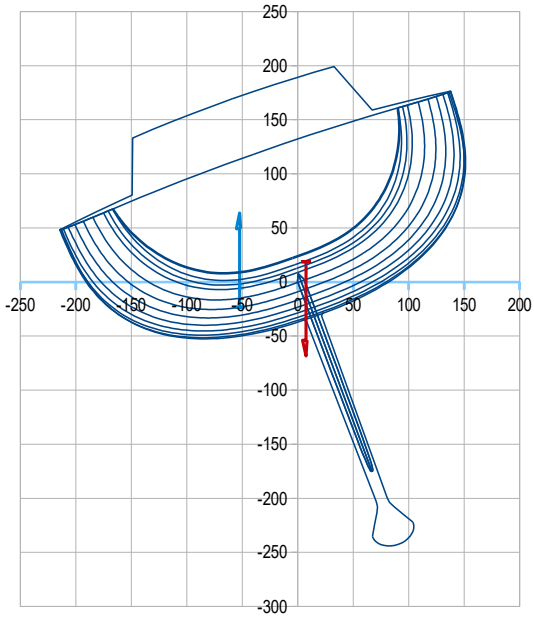
5.1 Mass spreadsheet with input of a load

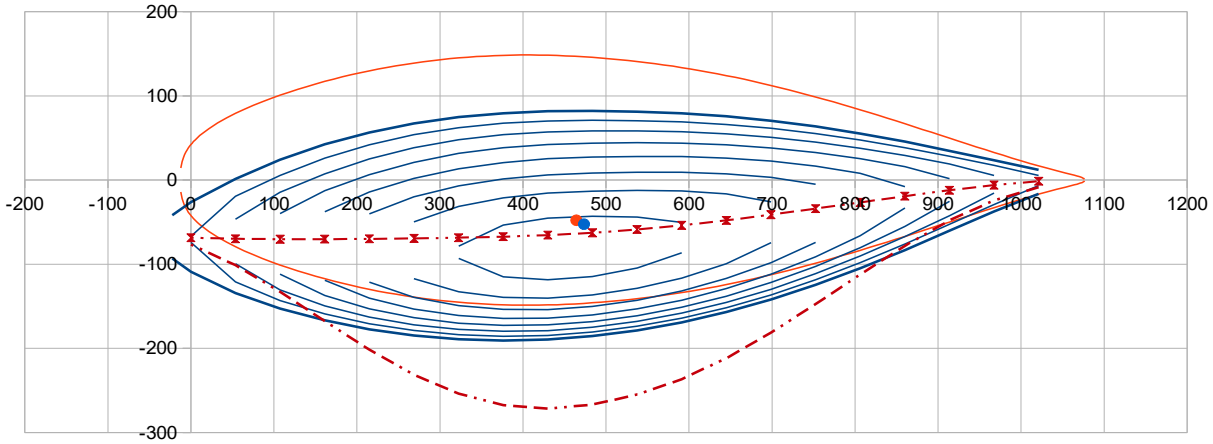
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*5639,61*	*4,873*	*-0,012*	*0*	*from the mass spreadsheet*
Load (kg)	**450,00**	**3,00**	**1,35**	**0,00**	Crew at center
			1,35	**1,50**	Crew sit windward
Total >>> Mass (kg)	**6089,61**	**4,734**	**0,088**	**0,000**	**Crew at center**
Disp. (m3)	**5,94109**		**0,088**	**0,111**	**Crew sit windward**

>>> at 20° heel : RM20° = 35,718 kN.m ; Bwl 2,71 m ; Sw20° 29,17 m2

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**5,94110**	**/ Disp. (m3)**	**5,94109**
Height (cm)	**6,4450**	**Xc heel (m)**	**4,734**	**/ Xg (m)**	**4,734**
Trim (°)	**-0,276**	Yc heel (m)	-0,524	Yg heel (m)	0,074
		Zc heel (m)	-0,232	**> GZ (m)**	**0,598**
		Sw heel(m2)	**29,17**	**RM (kN.m)**	**35,718**
		Bwl heel (m)	**2,71**	**FB mini (cm)**	**48,1**
		LCB – LCF (%Lwl)	**0,86**	**Obliquity (°)**	**3,8**

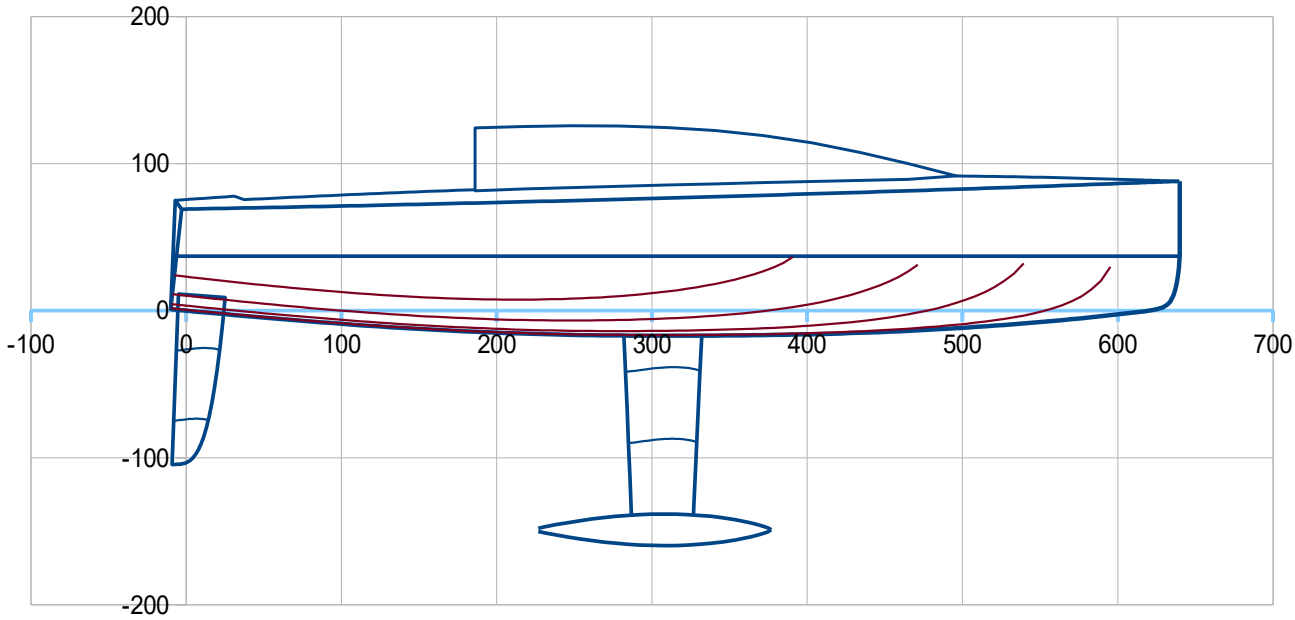


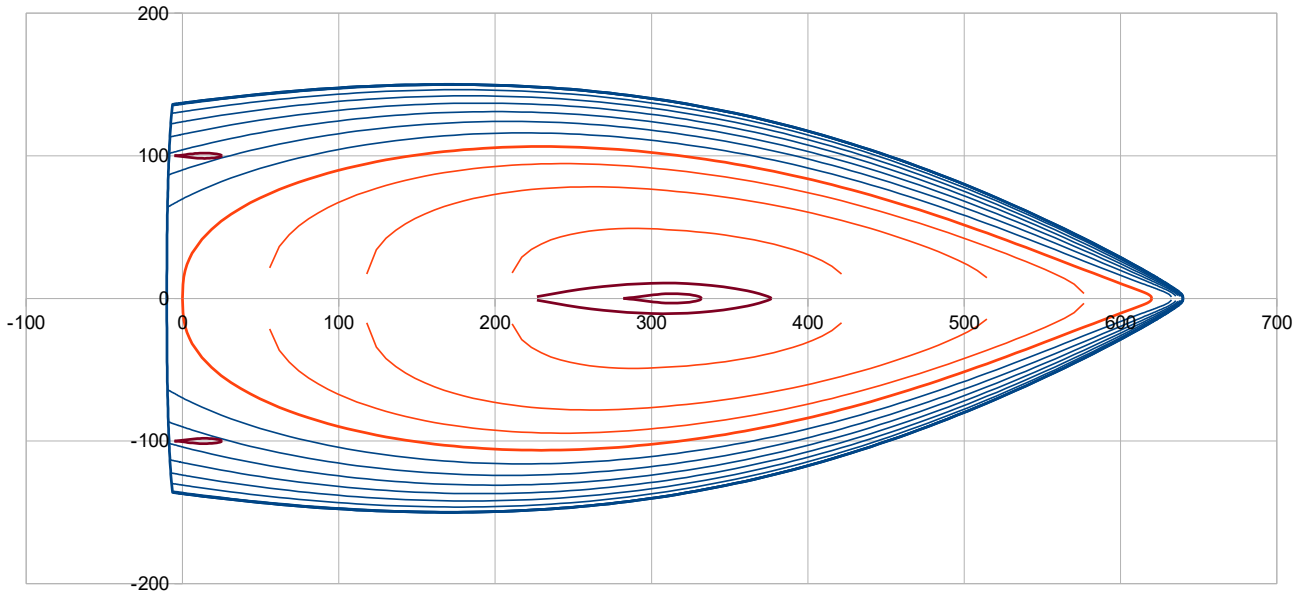


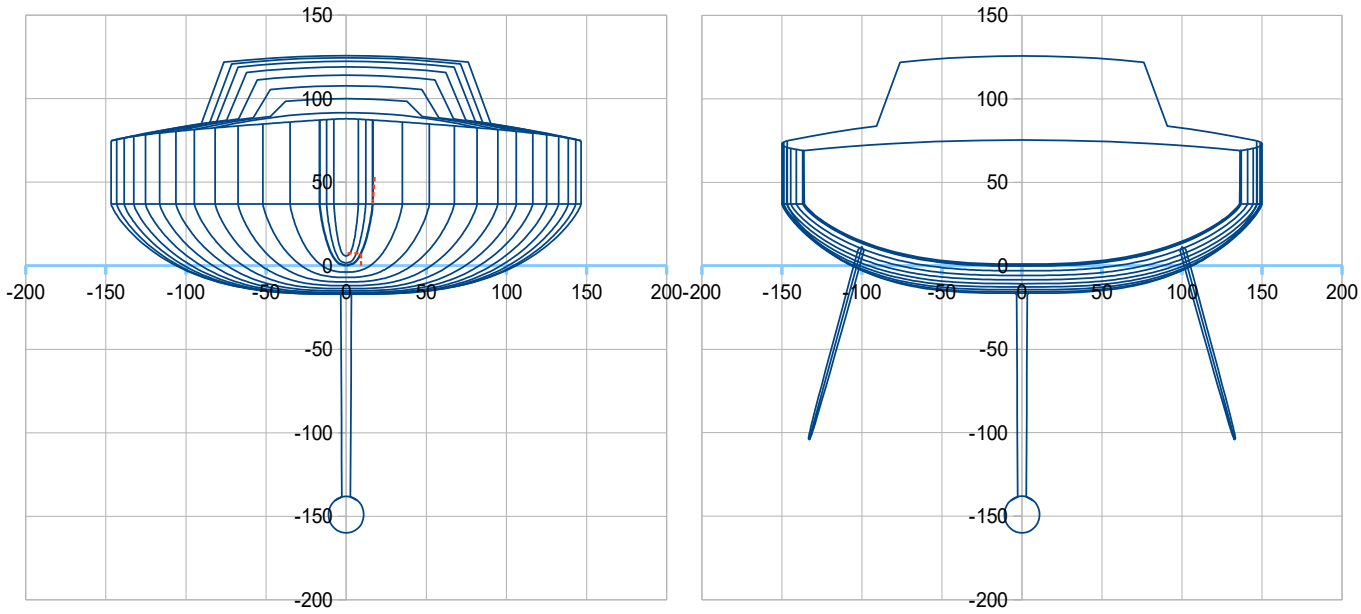


Mini 650, with a classic bow

Loa 6,5 m ; Lwl 6,2 m ; B 3,00 m ; Draft 1,60 m ; Displacement : 1012 kg ; Ballast : 503 kg
>> LCB hull 46,70 %Lwl ; Cp hull : 0,557 ; Sw : 12,46 m2 ; DLR : 118 ; Ballast ratio : 49,7 %



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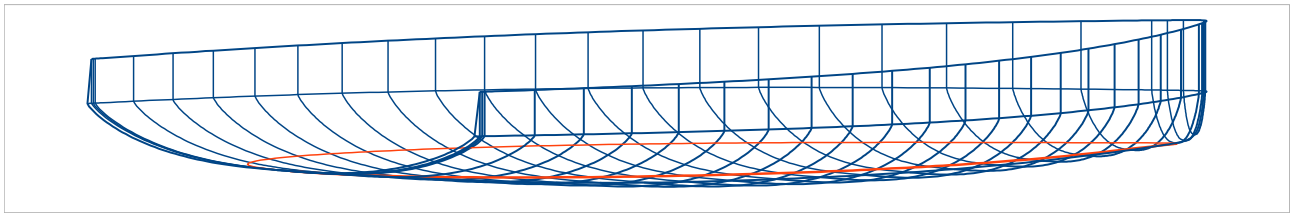


Mini 650 Hydrostatics data

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

2.1 Hull

Loa (m)	**6,50**	**Lwl (m)**	**6,20**	> Hull speed (Knots)	6,06	at Froude 0,4		
>> ft	*21,33*		*20,34*					
Boa (m)	**3,00**	**at X (% Lwl)**	**27,0**	Bsheer (m)	3,00	at X (% Lwl)	27,0	
>> ft	*9,84*							
Bwl (m)	**2,13**	**at X (% Lwl)**	**37,0**	> Bwl / Boa	0,709			
>> ft	*6,98*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,170**	**at X (%Lwl)**	**50**		**0,69**	**0,74**	**0,88**	
>> ft	*0,56*			*>> ft*	*2,26*	*2,43*	*2,89*	
Displacement at H0 (m3)	**0,92379**	**at LCB (m)**	**2,895**	**LCB (%Lwl)**	**46,70**	**ZCB (m)**	**-0,062**	
>> lbs	*2088*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,20*	
Cp	**0,557**							
Sf (m2)	**9,33**	**at LCF (m)**	**2,707**	**LCF (%Lwl)**	**43,66**	>>> LCB – LCF (%Lwl)	3,03	
>> ft2	*100,43*	*>> ft*	*8,88*					
Angle Freeboard/Half beam	27,0	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**22,5**	**at 95% Lwl**		
Sw (m2)	**9,44**	>Sw/D^(2/3)	9,95					
>> ft2	*101,59*							
Shull (m2)	**22,21**	**at X (m)**	**2,862**	**Z (m)**	**0,143**			
>> ft2	*239,09*	*>> ft*	*9,39*	*>> ft*	*0,47*			
Sdeck (m2)	**15,97**	**at X (m)**	**2,617**	**Z (m)**	**0,81**			
>> ft2	*171,87*	*>> ft*	*8,59*	*>> ft*	*2,64*			

2.2 Keel

Vol. keel(m3)	**0,05191**	**at X (m)**	**3,073**	**X (%Lwl)**	**49,57**	**Z (m)**	**-1,178**	
		>> ft	*10,08*			*>> ft*	*-3,86*	
Ballast (kg)	**502,9**	**at X (m)**	**3,068**	**X (%Lwl)**	**49,48**	**Z (m)**	**-1,255**	
>> lbs	*1109*	*>> ft*	*10,07*			*>> ft*	*-4,12*	
Draft oa (m)	**1,60**		**Sw (m2)**	**1,80**		**Sxz (m2)**	**0,77**	
>> ft	*5,25*		*>> ft2*	*19,43*		*>> ft2*	*8,31*	
CLR (m)	**3,18**	**CLR (%Lwl)**	**51,33**	*CLR = Center of Lateral Resistance*				
>> ft	*10,44*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**2**							
Volume (m3)	**0,01159**	**at X (m)**	**0,09**	**X (%Lwl)**	**1,39**	**Z (m)**	**-0,37**	
Sw (m2)	**1,21**	*>> ft*	*0,28*			**Sxz (m2)**	**0,29**	per rudder
>> ft2	*13,08*					*>> ft2*	*3,14*	

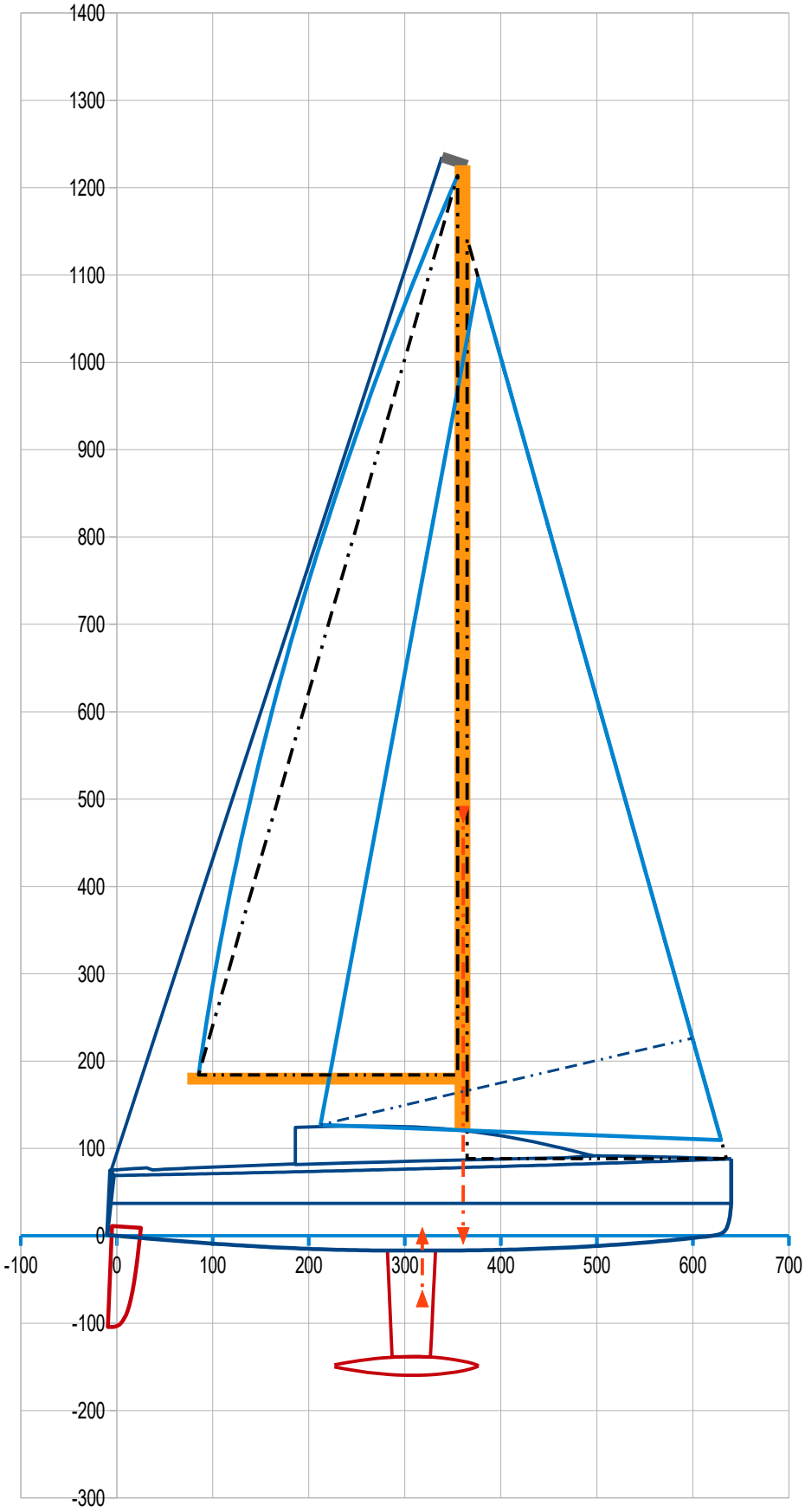
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**0,98729**	**at LCB (m)**	**2,872**	**LCB (%Lwl)**	**46,32**	**at ZCB (m)**	**-0,125**	
(kg)	**1012**	*>> ft*	*9,42*			*>> ft*	*-0,41*	
>> lbs	*2231*							
, of wich Ballast (kg)	**503**	**at Xg (m)**	**3,068**	**Xg (%Lwl)**	**49,48**	**at Zg (m)**	**-1,255**	
>> lbs	*1109*	*>> ft*	*10,07*			*>> ft*	*-4,12*	
>> % Ballast	49,7							
Sw (m2)	**12,46**	>Sw/D^(2/3)	12,56	Lwl/D^(1/3)	6,23			
>> ft2	*134,09*			***DLR***	***118***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**1012**	**at Xg (m)**	**2,882**	**Xg (%Lwl)**	**46,48**	**at Zg (m)**	**-0,295**

Mini 650 SA 37,8 m2 (Main 19,7 m2 + Jib 21,15 m2) >> SA/Sw 3,04 SA/D^(2/3) 38,17



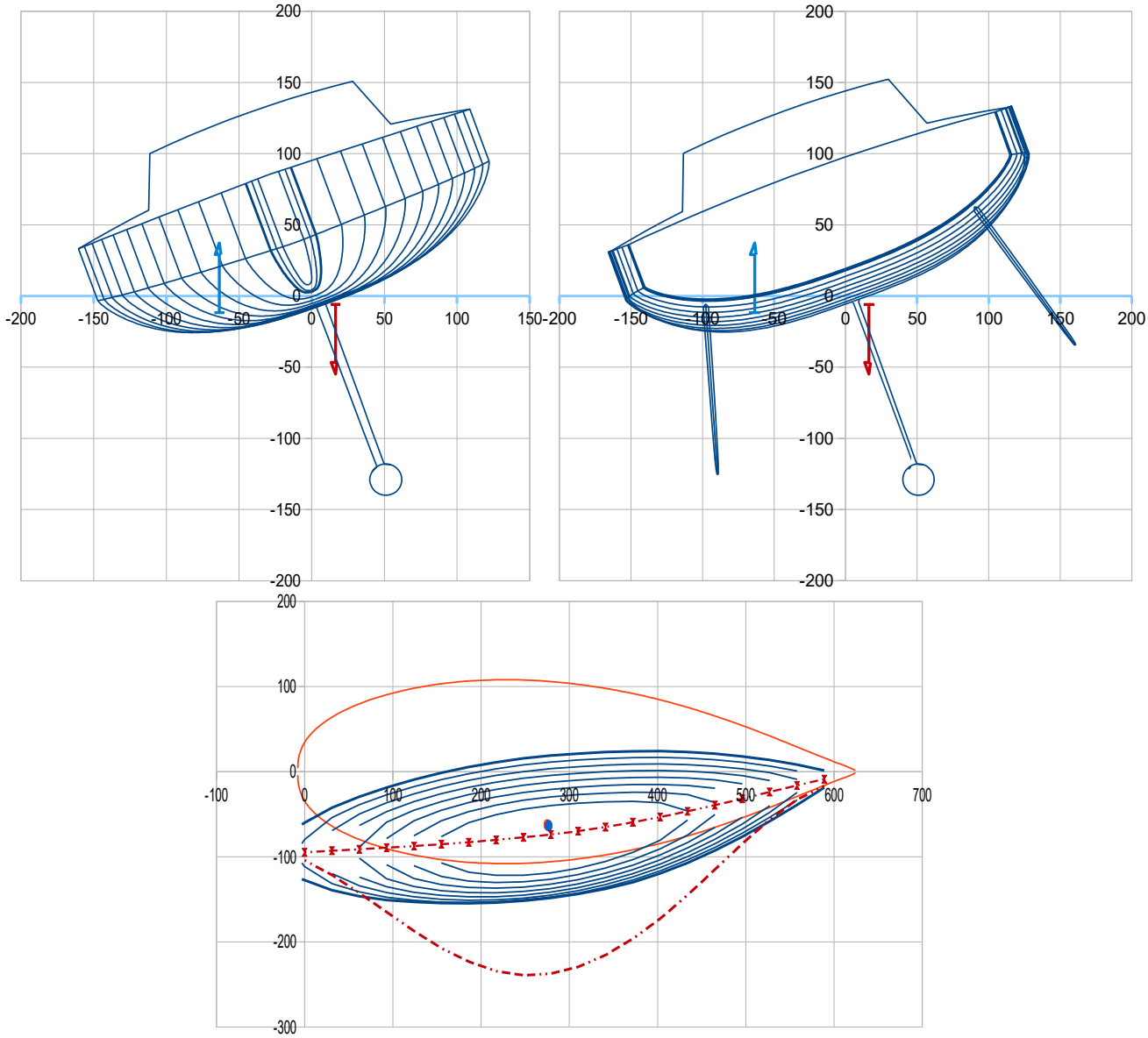
Mini 650 , with a sailor 75 kg sit windward (at Y 1,4 m) :

5.1 Mass spreadsheet with input of a load

Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*1011,73*	*2,882*	*-0,295*	*0*	*from the mass spreadsheet*
Load (kg)	**75,00**	**1,20**	**0,85**	**0,00**	Crew at center
			0,85	**1,40**	Crew sit windward
Total >>> Mass (kg)	**1086,73**	**2,766**	**-0,216**	**0,000**	**Crew at center**
Disp. (m3)	**1,06023**		**-0,216**	**0,097**	**Crew sit windward**

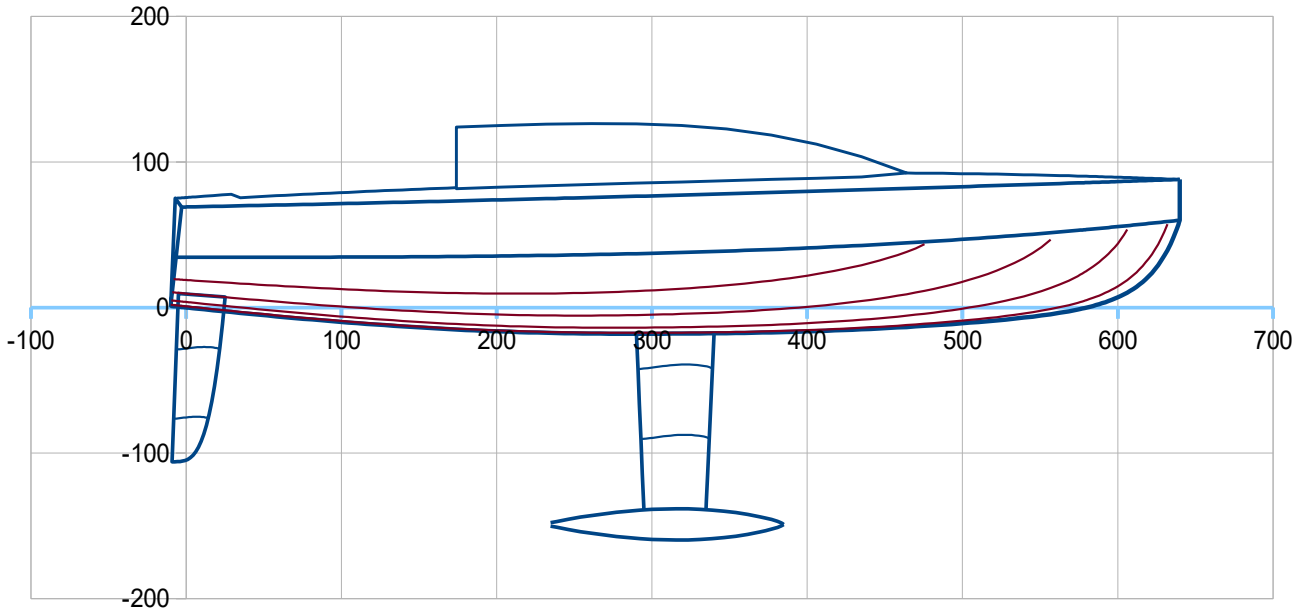
>>> at heel 20 ° : RM20° 8,53 kN.m Sw20° 10,95 m2 Bwl20° 1,68 m

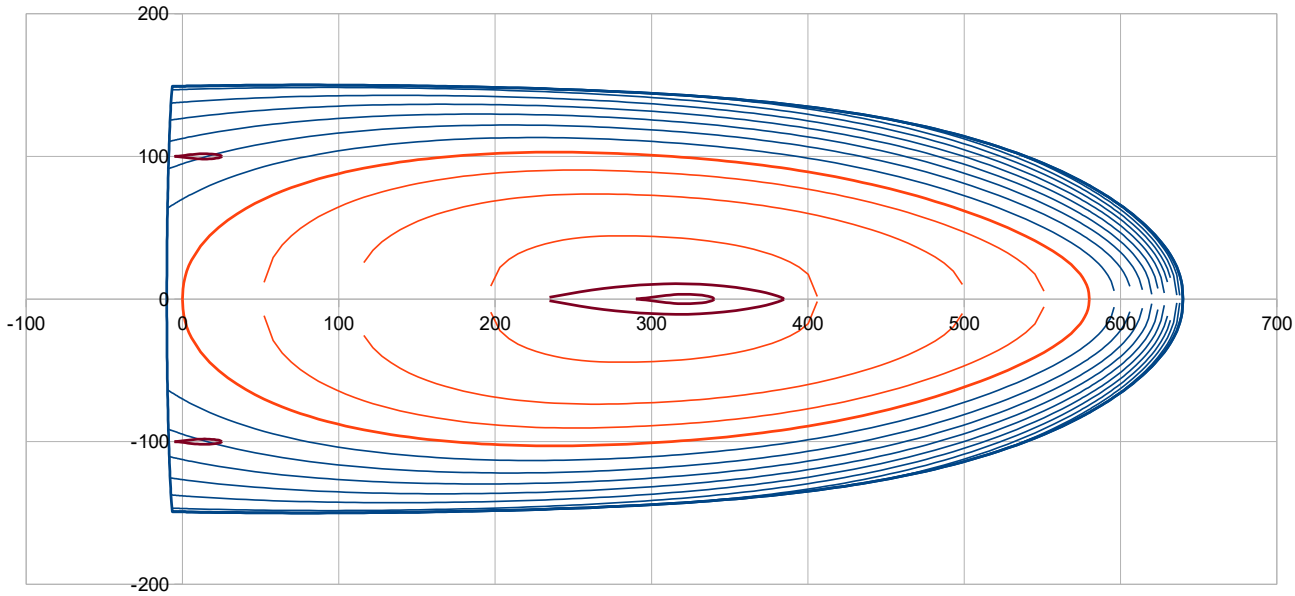
Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**1,06023**	**/ Disp. (m3)**	**1,06023**
Height (cm)	**10,8334**	**Xc heel (m)**	**2,766**	**/ Xg (m)**	**2,766**
Trim (°)	**-1,382**	Yc heel (m)	-0,635	Yg heel (m)	0,165
		Zc heel (m)	-0,117	**> GZ (m)**	**0,800**
		Sw heel(m2)	**10,95**	**RM (kN.m)**	**8,528**
		Bwl heel (m)	**1,68**	**FB mini (cm)**	**30,8**
		LCB – LCF (%Lwl)	**0,27**	**Obliquity (°)**	**8,3**

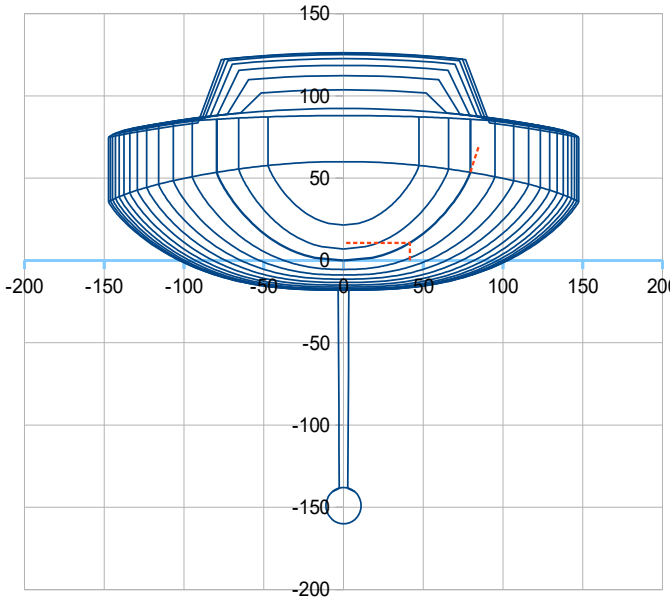


Mini 650, with a scow bow

Loa 6,50 m ; Lwl 5,80 m ; B 3,00 m ; Draft 1,60 m ; Displacement : 1037 kg ; Ballast : 502 kg
>> LCB hull 49,77 %Lwl ; Cp hull : 0,606 ; Sw : 12,47 m2 ; DLR : 148 ; Ballast ratio : 48,4 %



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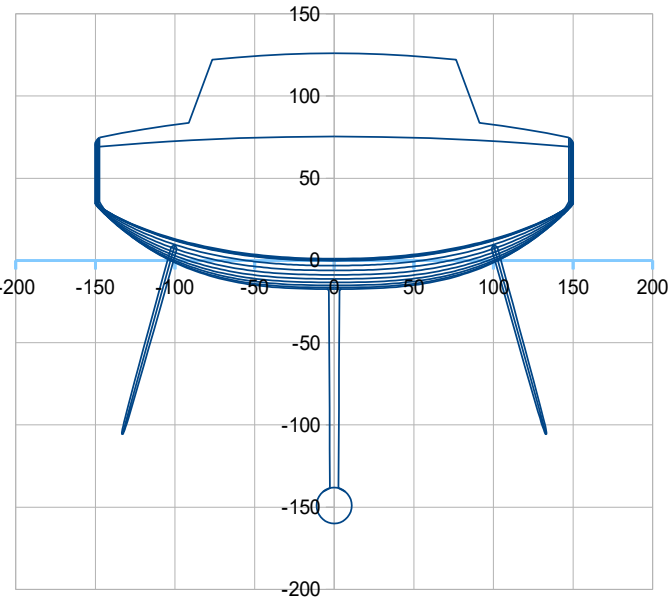
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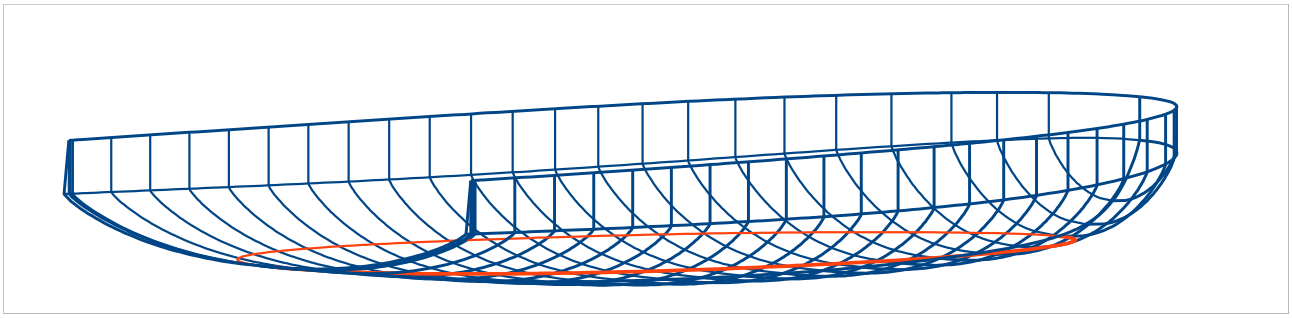


Mini 650 with a scow bow - Hydrostatics data

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

2.1 Hull

Loa (m)	**6,50**	**Lwl (m)**	**5,80**	> Hull speed (Knots)	5,87	at Froude 0,4		
>> ft	*21,33*		*19,03*					
Boa (m)	**3,00**	**at X (% Lwl)**	**13,0**	Bsheer (m)	3,00	at X (% Lwl)	13,0	
>> ft	*9,84*							
Bwl (m)	**2,06**	**at X (% Lwl)**	**41,0**	> Bwl / Boa	0,686			
>> ft	*6,76*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,180**	**at X (%Lwl)**	**50**		**0,69**	**0,74**	**0,88**	
>> ft	*0,59*			*>> ft*	*2,26*	*2,43*	*2,89*	
Displacement at H0 (m3)	**0,94844**	**at LCB (m)**	**2,887**	**LCB (%Lwl)**	**49,77**	**ZCB (m)**	**-0,065**	
>> lbs	*2143*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,21*	
Cp	**0,606**							
Sf (m2)	**9,38**	**at LCF (m)**	**2,760**	**LCF (%Lwl)**	**47,59**	>>> LCB – LCF (%Lwl)	2,19	
>> ft2	*101,02*	*>> ft*	*9,06*					
Angle Freeboard/Half beam	26,9	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**32,1**	**at 95% Lwl**		
Sw (m2)	**9,46**	>Sw/D^(2/3)	9,80					
>> ft2	*101,79*							
Shull (m2)	**23,17**	**at X (m)**	**2,898**	**Z (m)**	**0,141**			
>> ft2	*249,35*	*>> ft*	*9,51*	*>> ft*	*0,46*			
Sdeck (m2)	**17,69**	**at X (m)**	**2,799**	**Z (m)**	**0,81**			
>> ft2	*190,44*	*>> ft*	*9,18*	*>> ft*	*2,64*			

2.2 Keel

Vol. keel(m3)	**0,05174**	**at X (m)**	**3,154**	**X (%Lwl)**	**54,37**	**Z (m)**	**-1,181**	
		>> ft	*10,35*			*>> ft*	*-3,88*	
Ballast (kg)	**501,6**	**at X (m)**	**3,148**	**X (%Lwl)**	**54,28**	**Z (m)**	**-1,258**	
>> lbs	*1106*	*>> ft*	*10,33*			*>> ft*	*-4,13*	
Draft oa (m)	**1,60**		**Sw (m2)**	**1,80**		**Sxz (m2)**	**0,77**	
>> ft	*5,25*		*>> ft2*	*19,33*		*>> ft2*	*8,28*	
CLR (m)	**3,26**	**CLR (%Lwl)**	**56,25**	*CLR = Center of Lateral Resistance*				
>> ft	*10,70*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**2**							
Volume (m3)	**0,01156**	**at X (m)**	**0,09**	**X (%Lwl)**	**1,48**	**Z (m)**	**-0,39**	
Sw (m2)	**1,21**	*>> ft*	*0,28*			**Sxz (m2)**	**0,29**	per rudder
>> ft2	*13,07*					*>> ft2*	*3,14*	

2.4 Hull + Keel + Rudder(s)

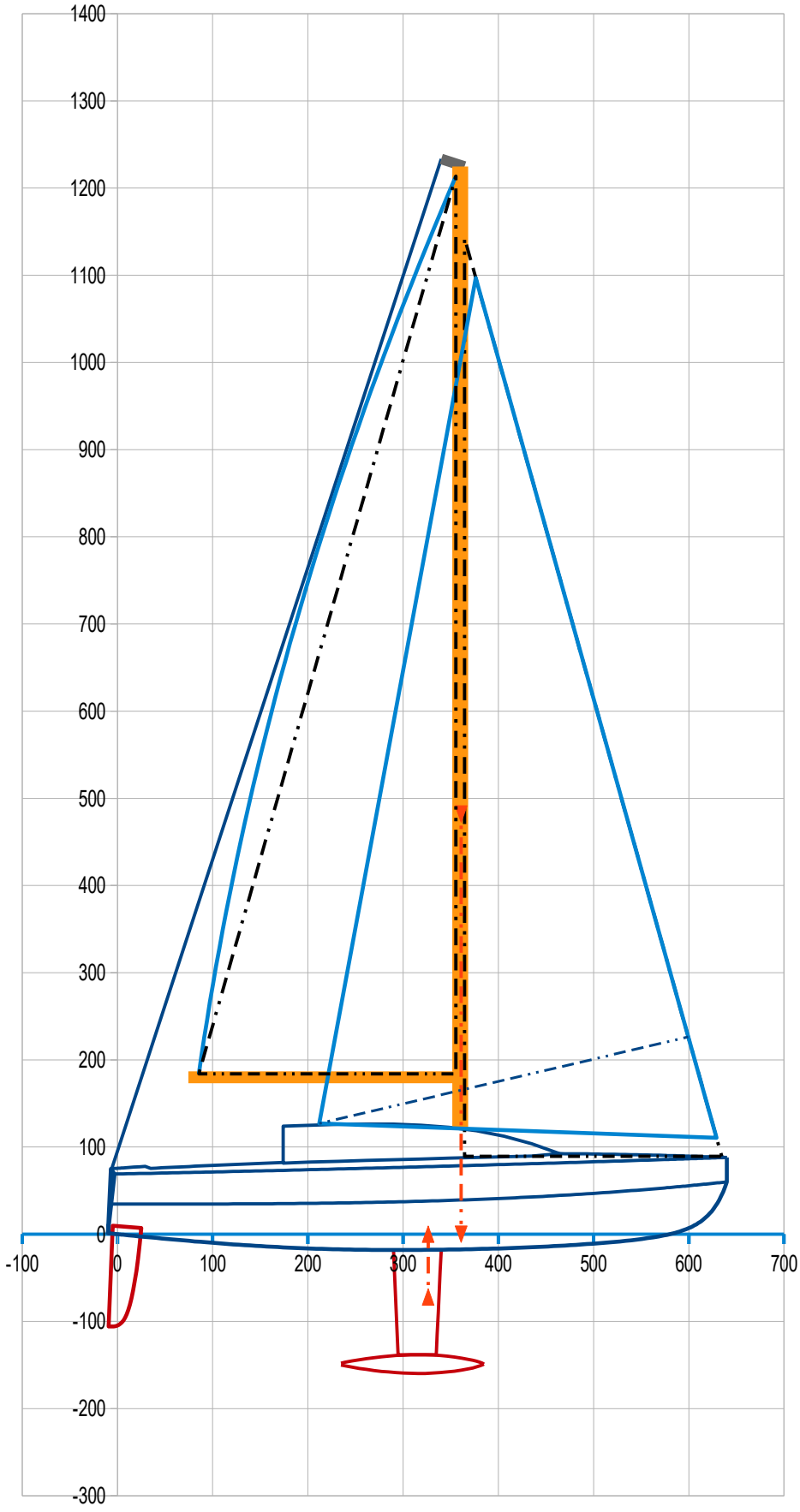
Displacement at H0 (m3)	**1,01174**	**at LCB (m)**	**2,869**	**LCB (%Lwl)**	**49,46**	**at ZCB (m)**	**-0,125**	
(kg)	**1037**	*>> ft*	*9,41*			*>> ft*	*-0,41*	
>> lbs	*2286*							
, of wich Ballast (kg)	**502**	**at Xg (m)**	**3,148**	**Xg (%Lwl)**	**54,28**	**at Zg (m)**	**-1,258**	
>> lbs	*1106*	*>> ft*	*10,33*			*>> ft*	*-4,13*	
>> % Ballast	48,4							
Sw (m2)	**12,47**	>Sw/D^(2/3)	12,37	Lwl/D^(1/3)	5,78			
>> ft2	*134,19*			***DLR***	***148***	*M(lbs/2240)/(Lwl(ft)/100)^3*		

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**1037**	**at Xg (m)**	**2,936**	**Xg (%Lwl)**	**50,63**	**at Zg (m)**	**-0,273**

Mini 650 with a mid-scow bow

SA 37,8 m2 (Main 16,7 m2 + Jib 21,14 m2) >> SA/Sw 3,03 SA/D^(2/3) 37,54



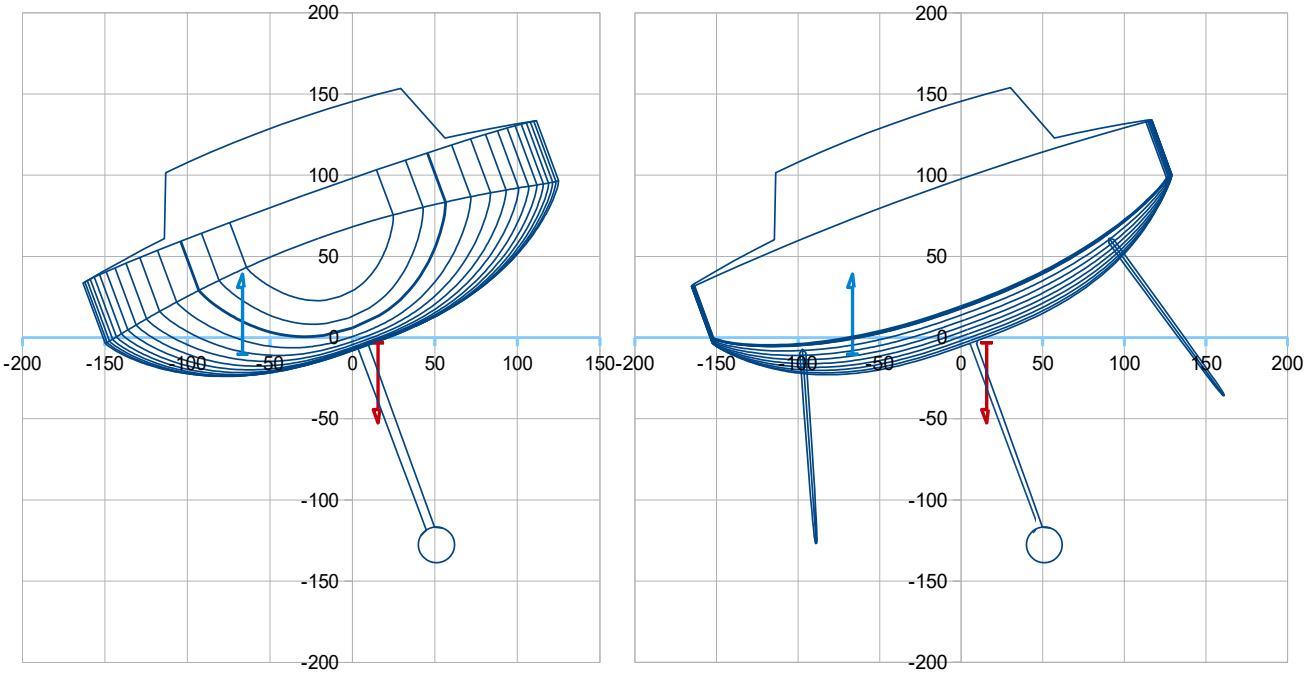
Mini 650 with a scow bow, with a sailor 75 kg sit windward (at Y 1,4 m) :

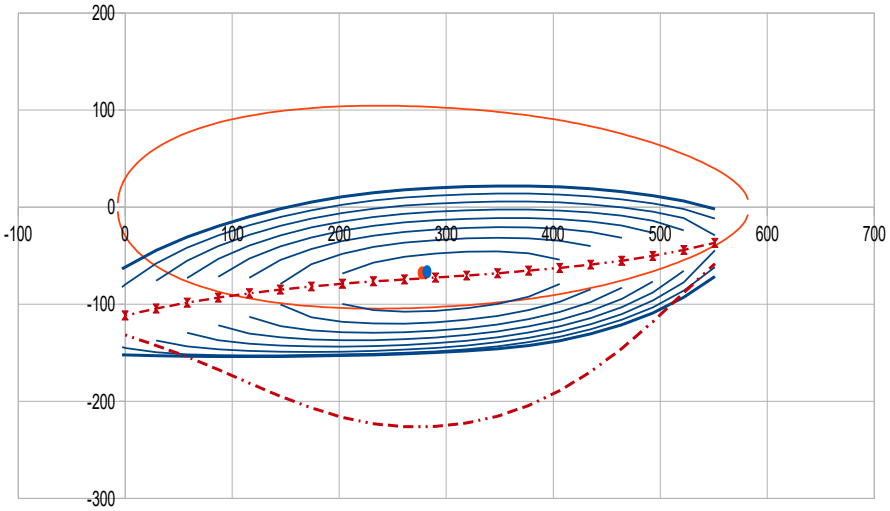
5.1 Mass spreadsheet with input of a load

Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*1037,29*	*2,936*	*-0,273*	*0*	*from the mass spreadsheet*
Load (kg)	**75,00**	**1,20**	**0,85**	**0,00**	Crew at center
			0,85	**1,40**	Crew sit windward
Total >>> Mass (kg)	**1112,29**	**2,819**	**-0,197**	**0,000**	**Crew at center**
Disp. (m3)	**1,08516**		**-0,197**	**0,094**	**Crew sit windward**

>>> at heel 20 ° : RM20° 8,972 kN.m Sw20° 11,34 m2 Bwl20° 1,70 m

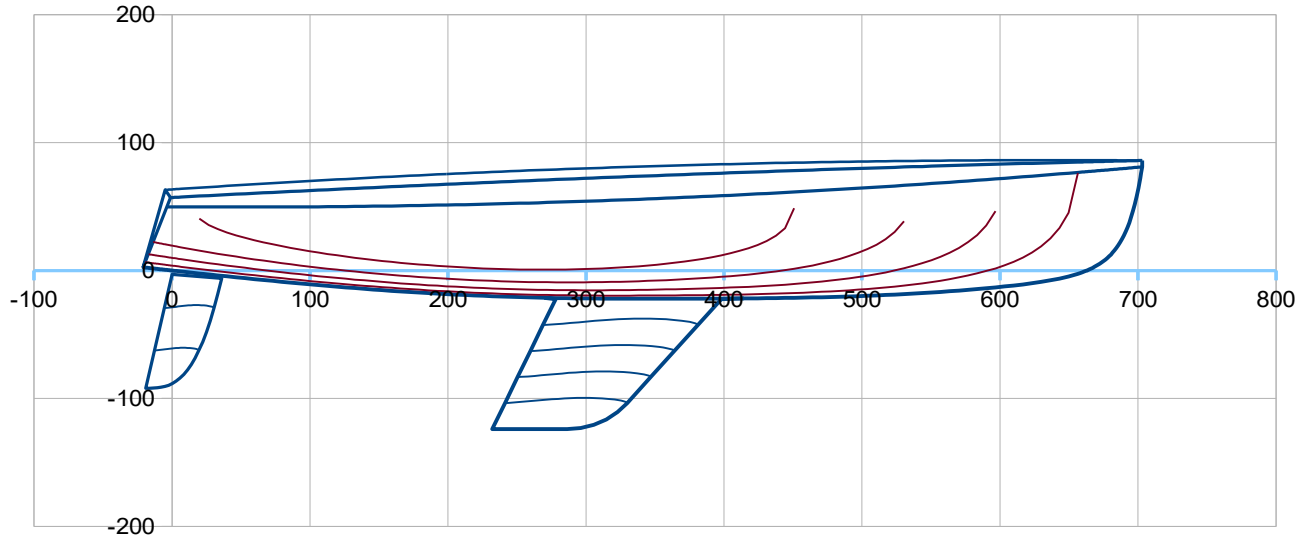
Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**1,08516**	**/ Disp. (m3)**	**1,08516**
Height (cm)	**11,8964**	**Xc heel (m)**	**2,819**	**/ Xg (m)**	**2,819**
Trim (°)	**-1,173**	Yc heel (m)	-0,666	Yg heel (m)	0,156
		Zc heel (m)	-0,102	**> GZ (m)**	**0,822**
		Sw heel(m2)	**11,34**	**RM (kN.m)**	**8,972**
		Bwl heel (m)	**1,70**	**FB mini (cm)**	**31,4**
		LCB – LCF (%Lwl)	**0,78**	**Obliquity (°)**	**6,0**

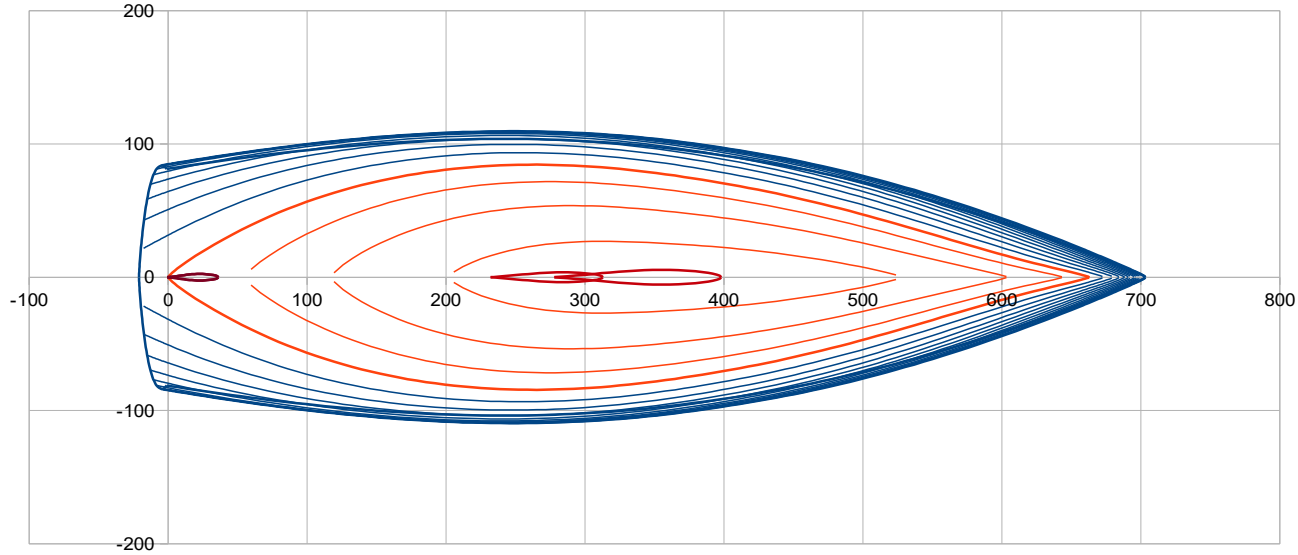


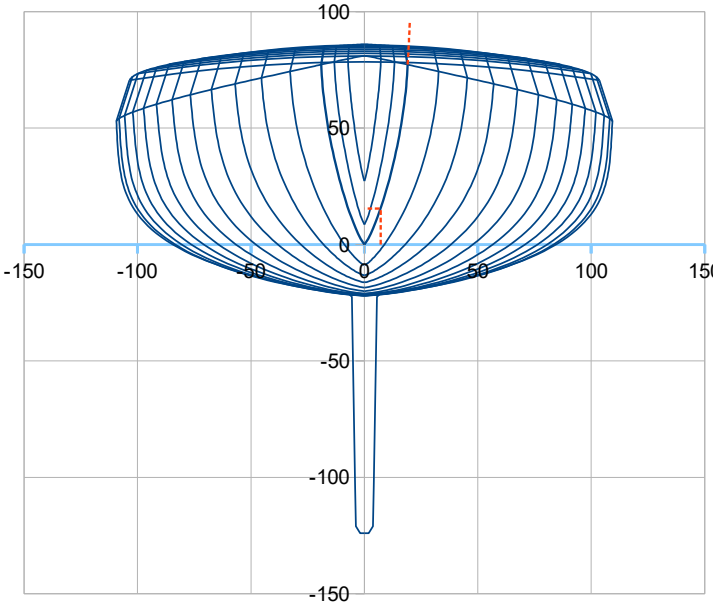


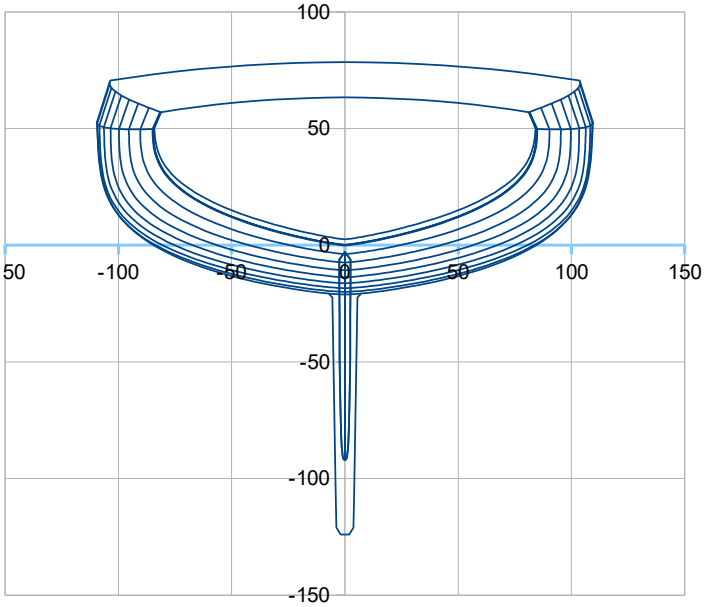
MO24, inspired by the Moore 24

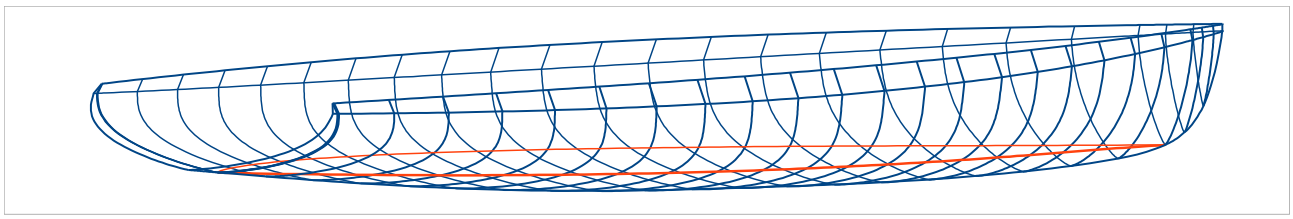
Loa 7,24 m ; Lwl 6,63 m ; B 2,19 m ; Draft 1,24 m ; Displacement : 931 kg ; Ballast : 454 kg
>> LCB hull 48,12 %Lwl ; Cp hull : 0,536 ; Sw : 10,29 m2 ; DLR : 89 ; Ballast ratio : 48,8 %











MO24 Hydrostatics data

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

2.1 Hull

Loa (m)	**7,24**	**Lwl (m)**	**6,63**	> Hull speed (Knots)	6,27	at Froude 0,4		
>> ft	*23,75*		*21,75*					
Boa (m)	**2,19**	**at X (% Lwl)**	**37,0**	Bsheer (m)	2,08	at X (% Lwl)	36,0	
>> ft	*7,19*							
Bwl (m)	**1,69**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,771			
>> ft	*5,54*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,220**	**at X (%Lwl)**	**52**		**0,57**	**0,69**	**0,86**	
>> ft	*0,72*			*>> ft*	*1,87*	*2,26*	*2,82*	
Displacement at H0 (m3)	**0,83791**	**at LCB (m)**	**3,191**	**LCB (%Lwl)**	**48,12**	**ZCB (m)**	**-0,075**	
>> lbs	*1893*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,25*	
Cp	**0,536**							
Sf (m2)	**7,23**	**at LCF (m)**	**2,994**	**LCF (%Lwl)**	**45,16**	>>> LCB – LCF (%Lwl)	2,96	
>> ft2	*77,84*	*>> ft*	*9,82*					
Angle Freeboard/Half beam	32,8	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**14,5**	**at 95% Lwl**		
Sw (m2)	**7,61**	>Sw/D^(2/3)	8,56					
>> ft2	*81,91*							
Shull (m2)	**19,83**	**at X (m)**	**3,236**	**Z (m)**	**0,156**			
>> ft2	*213,42*	*>> ft*	*10,62*	*>> ft*	*0,51*			
Sdeck (m2)	**11,06**	**at X (m)**	**2,925**	**Z (m)**	**0,73**			
>> ft2	*119,02*	*>> ft*	*9,60*	*>> ft*	*2,40*			

2.2 Keel

Vol. keel(m3)	**0,06224**	**at X (m)**	**3,182**	**X (%Lwl)**	**47,99**	**Z (m)**	**-0,659**	
		>> ft	*10,44*			*>> ft*	*-2,16*	
Ballast (kg)	**454,3**	**at X (m)**	**3,182**	**X (%Lwl)**	**47,99**	**Z (m)**	**-0,659**	
>> lbs	*1002*	*>> ft*	*10,44*			*>> ft*	*-2,16*	
Draft oa (m)	**1,24**		**Sw (m2)**	**2,10**		**Sxz (m2)**	**1,03**	
>> ft	*4,07*		*>> ft2*	*22,57*		*>> ft2*	*11,06*	
CLR (m)	**3,35**	**CLR (%Lwl)**	**50,56**	*CLR = Center of Lateral Resistance*				
>> ft	*11,00*	method: keel profile extended to the waterline, CLR at Z 45% draft and					32,50	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,00766**	**at X (m)**	**0,12**	**X (%Lwl)**	**1,75**	**Z (m)**	**-0,41**	
Sw (m2)	**0,58**	*>> ft*	*0,38*			**Sxz (m2)**	**0,28**	per rudder
>> ft2	*6,28*					*>> ft2*	*3,02*	

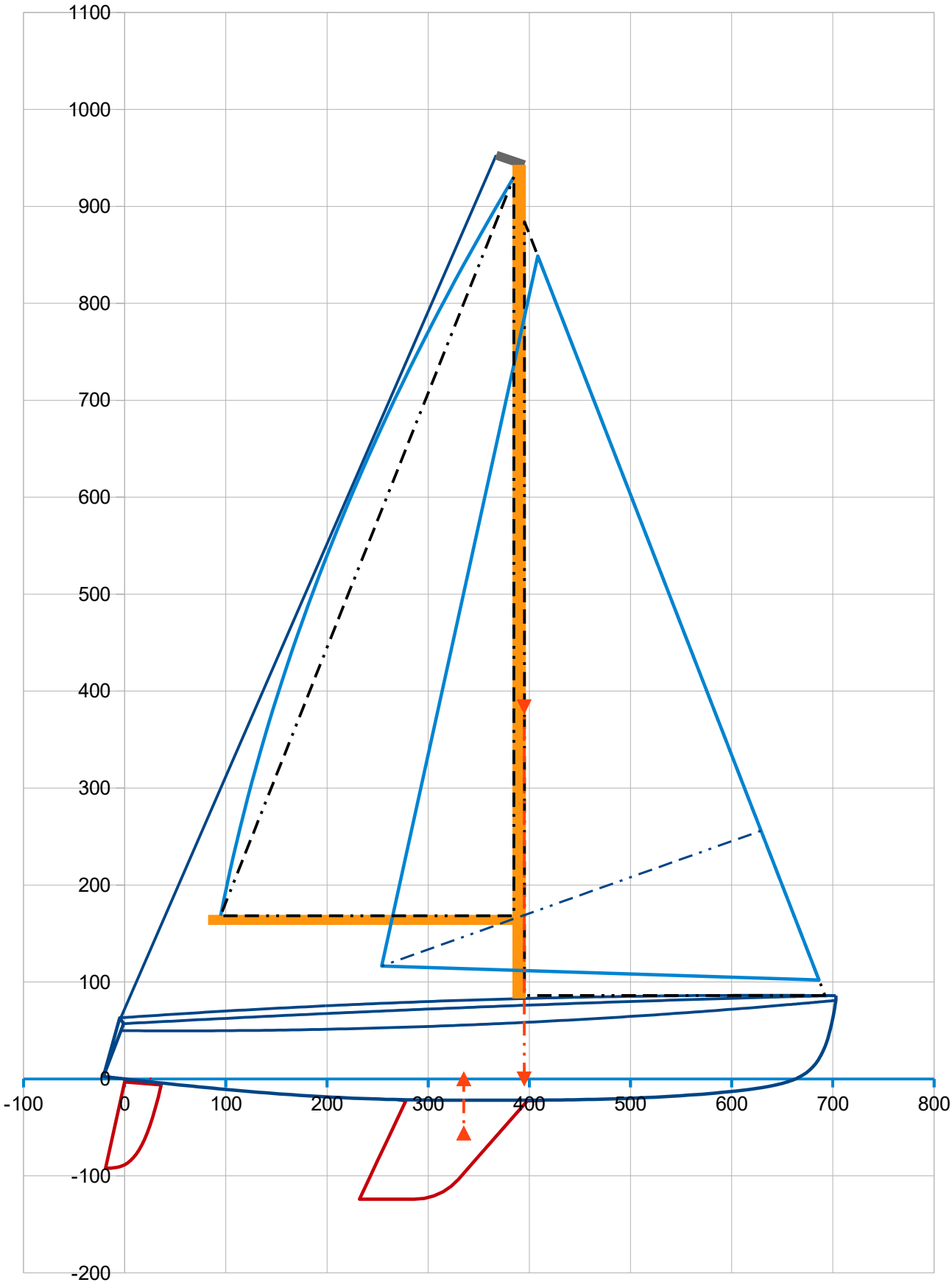
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**0,90781**	**at LCB (m)**	**3,164**	**LCB (%Lwl)**	**47,72**	**at ZCB (m)**	**-0,118**
(kg)	**931**	*>> ft*	*10,38*			*>> ft*	*-0,39*
>> lbs	*2051*						
, of wich Ballast (kg)	**454**	**at Xg (m)**	**3,182**	**Xg (%Lwl)**	**47,99**	**at Zg (m)**	**-0,659**
>> lbs	*1002*	*>> ft*	*10,44*			*>> ft*	*-2,16*
>> % Ballast	48,8						
Sw (m2)	**10,29**	>Sw/D^(2/3)	10,98	Lwl/D^(1/3)	6,85		
>> ft2	*110,77*			***DLR***	***89***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**931**	**at Xg (m)**	**3,146**	**Xg (%Lwl)**	**47,46**	**at Zg (m)**	**-0,025**

MO24 : SA 29,7 m2 (Main 13,3 m2 + Jib 16,4 m2) >> SA/Sw 2,88 SA/D^(2/3) 31,64



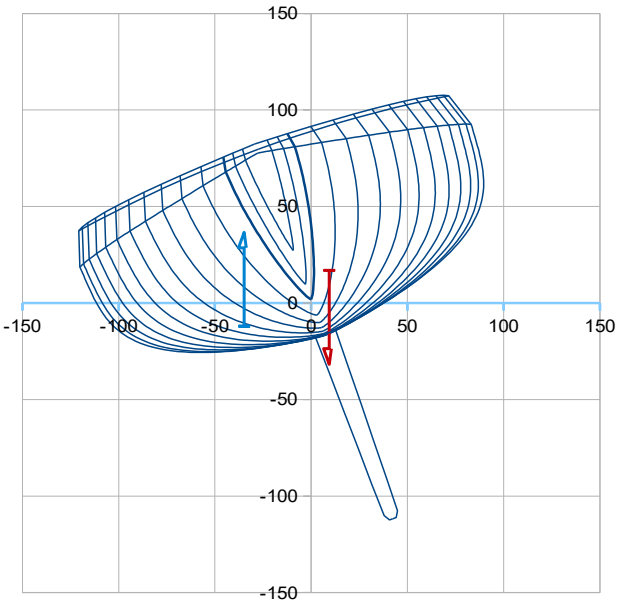
MO24 , with crew 140 kg sit windward (at Y 1,0 m) :

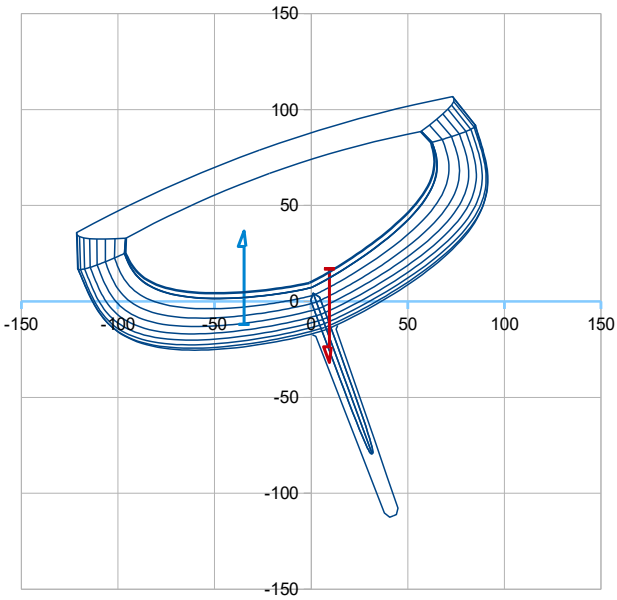
5.1 Mass spreadsheet with input of a load

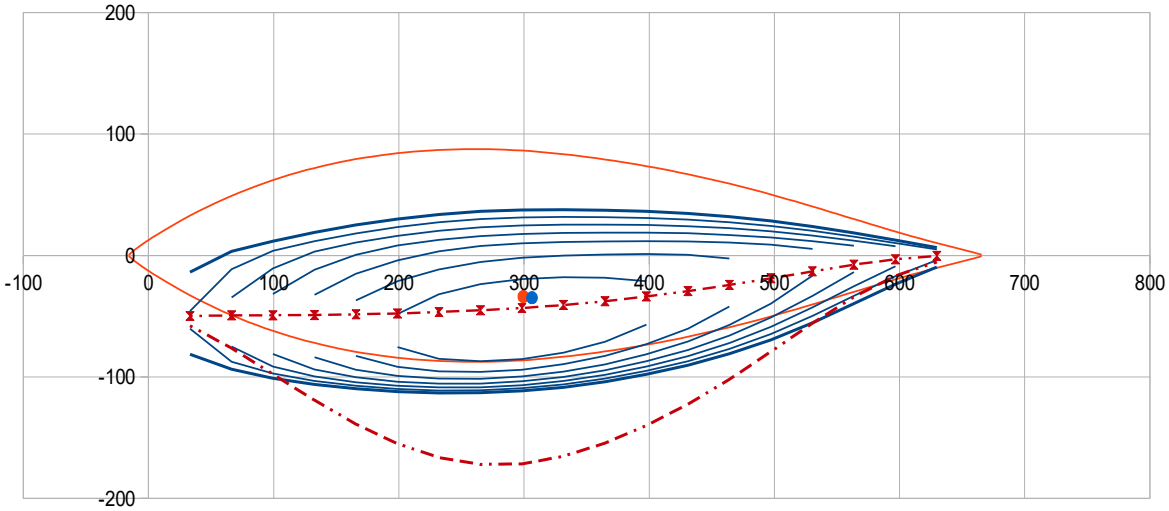
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*930,59*	*3,146*	*-0,025*	*0*	*from the mass spreadsheet*
Load (kg)	**140,00**	**2,50**	**0,80**	**0,00**	Crew at center
			0,80	**1,00**	Crew sit windward
Total >>> Mass (kg)	**1070,59**	**3,062**	**0,083**	**0,000**	**Crew at center**
Disp. (m3)	**1,04447**		**0,083**	**0,131**	**Crew sit windward**

>>> at heel 20 ° : RM20° 4,646 kN.m Sw20° 10,14 m2 Bwl20° 1,50 m

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**1,04447**	**/ Disp. (m3)**	**1,04447**
Height (cm)	**4,6177**	**Xc heel (m)**	**3,062**	**/ Xg (m)**	**3,062**
Trim (°)	**-0,46**	Yc heel (m)	-0,348	Yg heel (m)	0,095
		Zc heel (m)	-0,120	**> GZ (m)**	**0,442**
		Sw heel(m2)	**10,14**	**RM (kN.m)**	**4,646**
		Bwl heel (m)	**1,50**	**FB mini (cm)**	**32,5**
		LCB – LCF (%Lwl)	**1,04**	**Obliquity (°)**	**4,3**

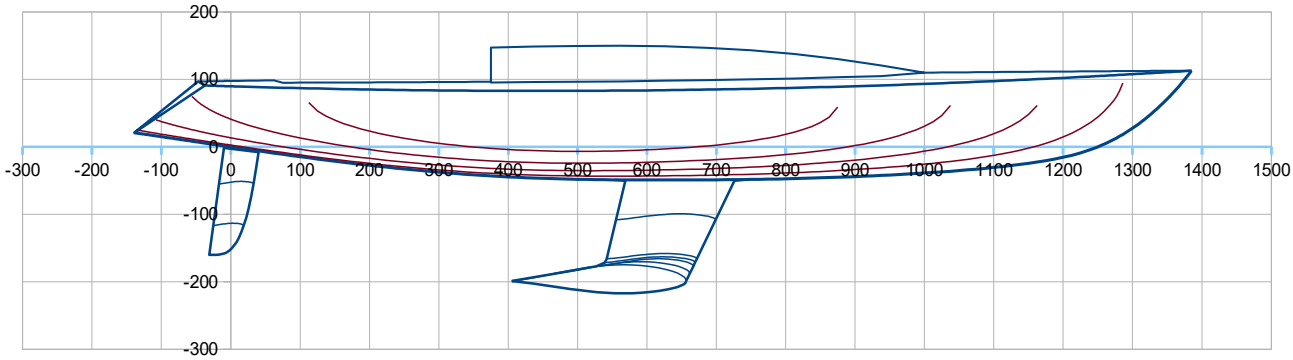


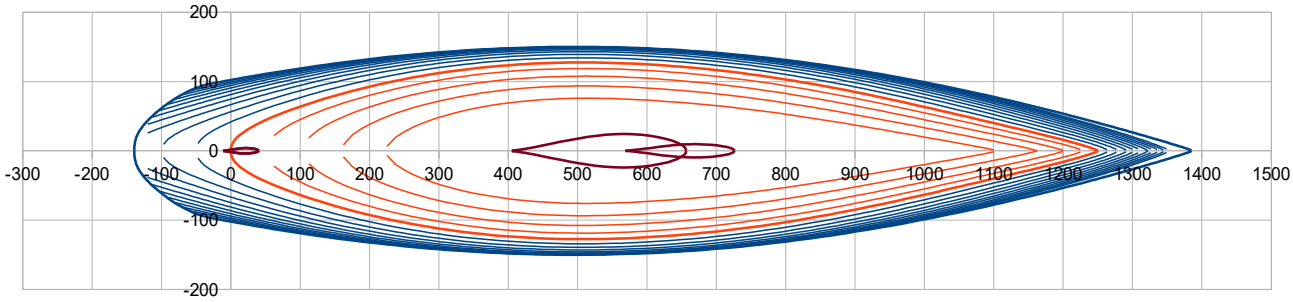


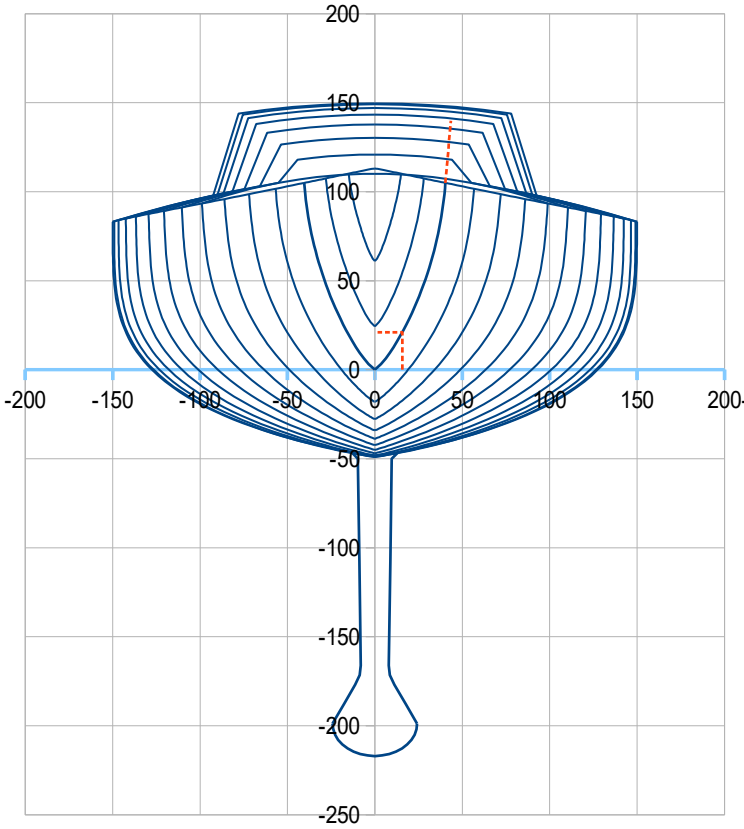


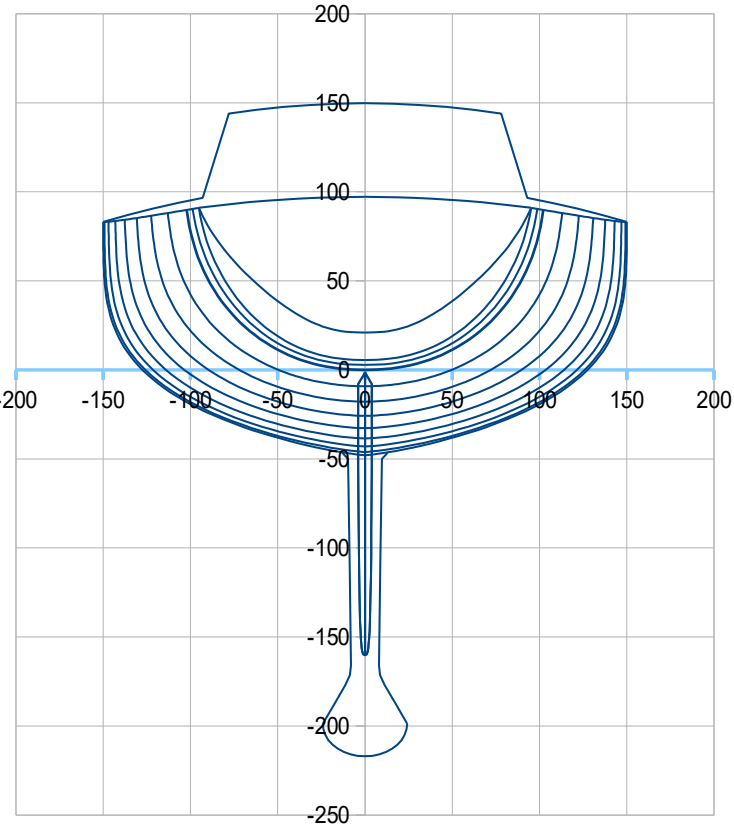
ULDB 50, inspired by Knud Reimers Swede 55

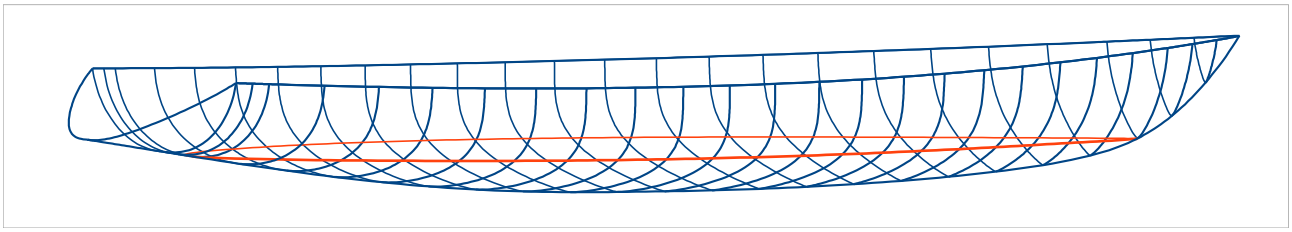
Loa 15,24 m ; Lwl 12,50 m ; B 3,00 m ; Draft 2,17 m ; Displacement : 6057kg ; Ballast : 2908 kg
>> LCB hull 46,87 %Lwl ; Cp hull : 0,553 ; Sw : 32,13 m2 ; DLR : 86 ; Ballast ratio : 48,0 %











ULDB 50 Hydrostatics data

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

2.1 Hull

Loa (m)	**15,24**	**Lwl (m)**	**12,50**	> Hull speed (Knots)	8,61	at Froude 0,4			
>> ft	*50,00*		*41,01*						
Boa (m)	**3,00**	**at X (% Lwl)**	**40,0**	Bsheer (m)	3,00	at X (% Lwl)	40,0		
>> ft	*9,84*								
Bwl (m)	**2,55**	**at X (% Lwl)**	**41,0**	> Bwl / Boa	0,850				
>> ft	*8,37*			**Freeboards (m) >**		**Aft**	**Midship**	**Fore**	
Tc (m)	**0,490**	**at X (%Lwl)**	**51,5**			**0,91**	**0,83**	**1,13**	
>> ft	*1,61*				*>> ft*	*2,99*	*2,72*	*3,71*	
Displacement at H0 (m3)	**5,48010**	**at LCB (m)**	**5,859**	**LCB (%Lwl)**	**46,87**	**ZCB (m)**	**-0,163**		
>> lbs	*12383*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,53*		
Cp	**0,553**								
Sf (m2)	**21,59**	**at LCF (m)**	**5,667**	**LCF (%Lwl)**	**45,33**	>>> LCB – LCF (%Lwl)	1,54		
>> ft2	*232,40*	*>> ft*	*18,59*						
Angle Freeboard/Half beam	29,0	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**14,0**	**at 95% Lwl**			
Sw (m2)	**23,59**	>Sw/D^(2/3)	7,59						
>> ft2	*253,91*								
Shull (m2)	**52,56**	**at X (m)**	**5,932**	**Z (m)**	**0,106**				
>> ft2	*565,73*	*>> ft*	*19,46*	*>> ft*	*0,35*				
Sdeck (m2)	**35,18**	**at X (m)**	**5,724**	**Z (m)**	**0,99**				
>> ft2	*378,65*	*>> ft*	*18,78*	*>> ft*	*3,23*				

2.2 Keel

Vol. keel(m3)	**0,39834**	**at X (m)**	**6,042**	**X (%Lwl)**	**48,34**	**Z (m)**	**-1,511**	
		>> ft	*19,82*			*>> ft*	*-4,96*	
Ballast (kg)	**2907,9**	**at X (m)**	**6,042**	**X (%Lwl)**	**48,34**	**Z (m)**	**-1,511**	
>> lbs	*6411*	*>> ft*	*19,82*			*>> ft*	*-4,96*	
Draft oa (m)	**2,17**		**Sw (m2)**	**7,08**		**Sxz (m2)**	**2,29**	
>> ft	*7,12*		*>> ft2*	*76,21*		*>> ft2*	*24,66*	
CLR (m)	**6,67**	**CLR (%Lwl)**	**53,38**	*CLR = Center of Lateral Resistance*				
>> ft	*21,89*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,03102**	**at X (m)**	**0,08**	**X (%Lwl)**	**0,65**	**Z (m)**	**-0,72**	
Sw (m2)	**1,46**	*>> ft*	*0,27*			**Sxz (m2)**	**0,70**	per rudder
>> ft2	*15,72*					*>> ft2*	*7,56*	

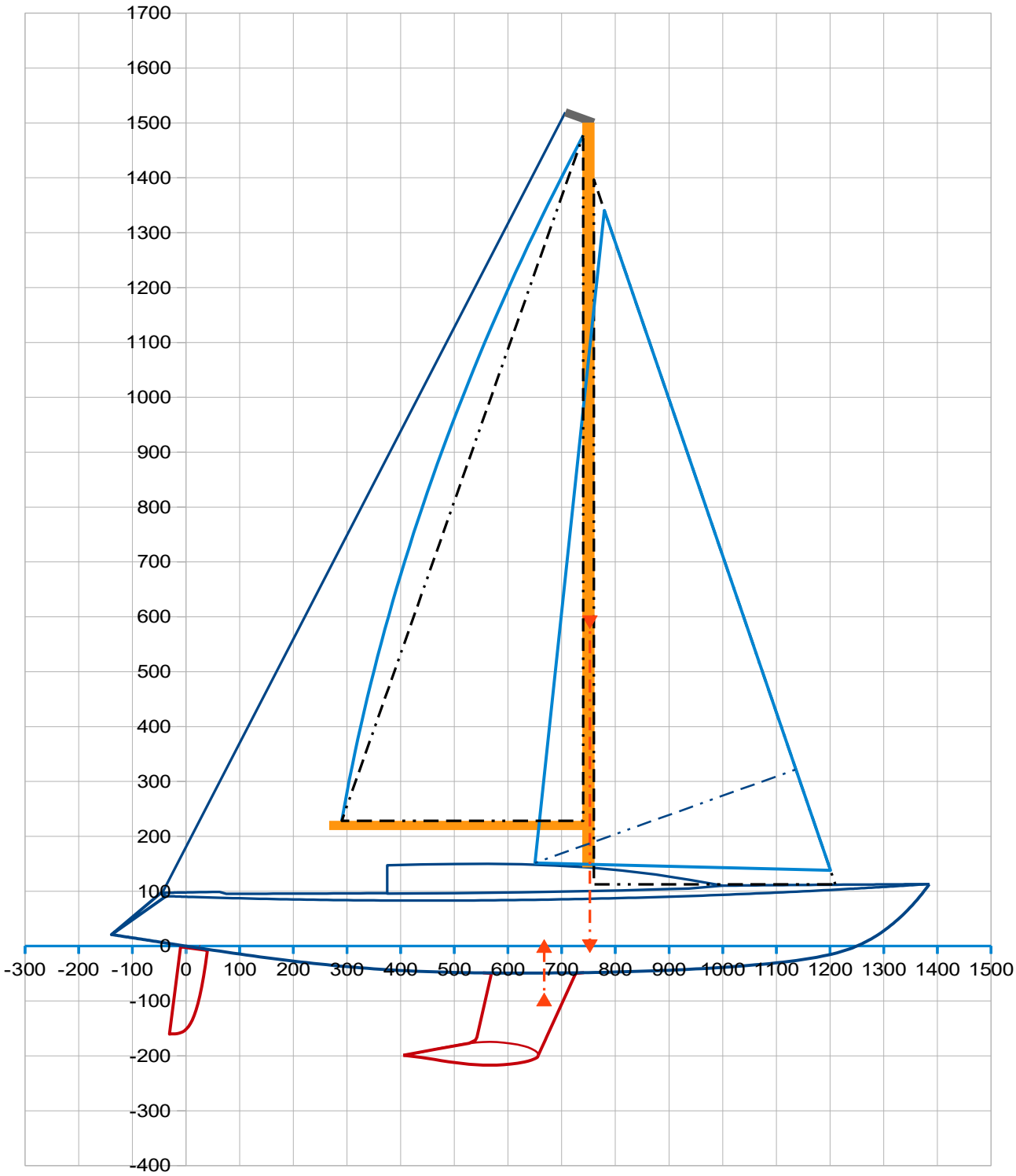
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**5,90946**	**at LCB (m)**	**5,841**	**LCB (%Lwl)**	**46,73**	**at ZCB (m)**	**-0,257**
(kg)	**6057**	*>> ft*	*19,16*			*>> ft*	*-0,84*
>> lbs	*13354*						
, of wich Ballast (kg)	**2908**	**at Xg (m)**	**6,042**	**Xg (%Lwl)**	**48,34**	**at Zg (m)**	**-1,511**
>> lbs	*6411*	*>> ft*	*19,82*			*>> ft*	*-4,96*
>> % Ballast	48,0						
Sw (m2)	**32,13**	>Sw/D^(2/3)	9,83	Lwl/D^(1/3)	6,91		
>> ft2	*345,83*			***DLR***	***86***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

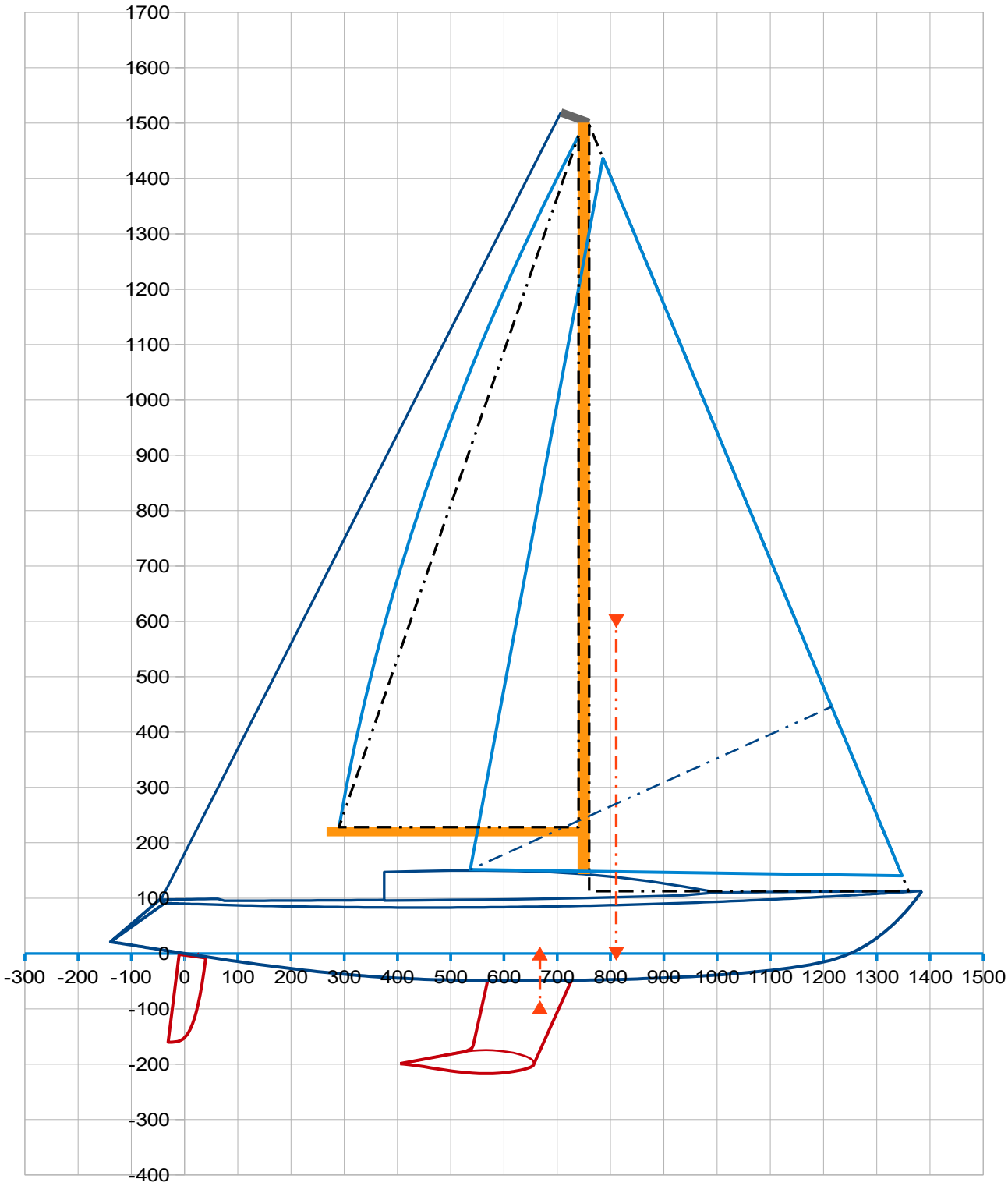
2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**6057**	**at Xg (m)**	**5,892**	**Xg (%Lwl)**	**47,14**	**at Zg (m)**	**-0,408**

ULDB 50 SA with Jib 67,2 m2 (Main 33,7 m2 + Jib 33,5 m2) >> SA/Sw 2,09 SA/D^(2/3) 20,56



ULDB 50 SA with Code 0 87,1 m2 (Main 33,7 m2 + Code 0 53,4 m2) >> SA/Sw 2,71 SA/D^(2/3) 26,66



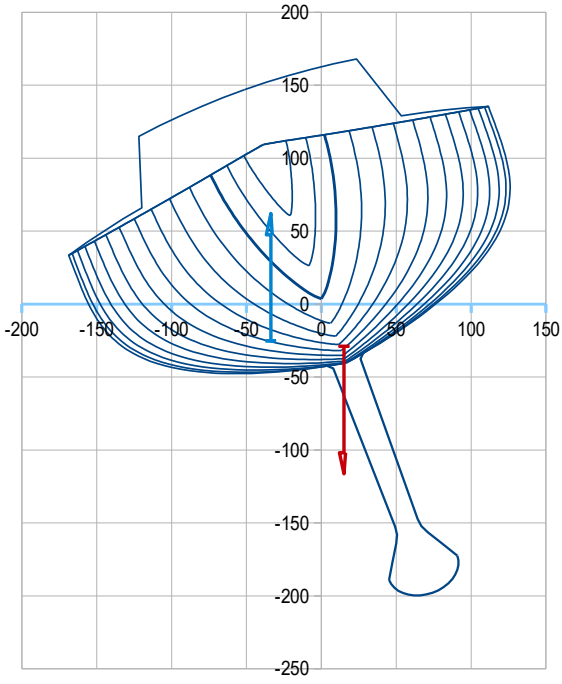
ULDB50 , with crew 140 kg sit windward (at Y 1,0 m) :

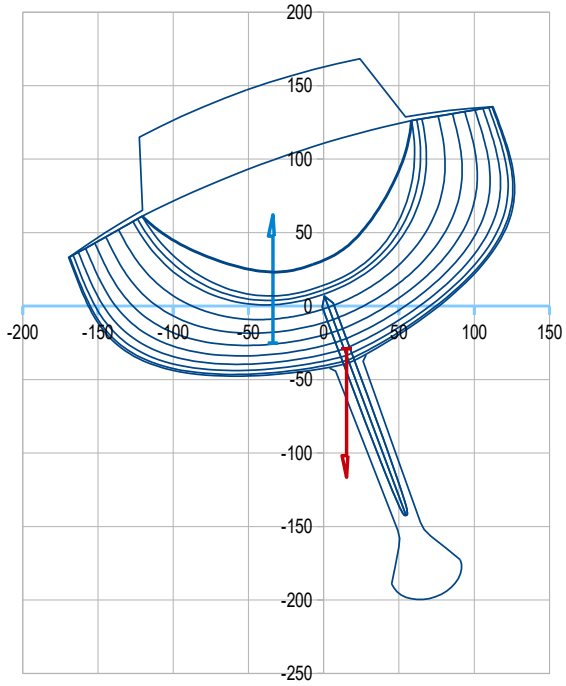
5.1 Mass spreadsheet with input of a load

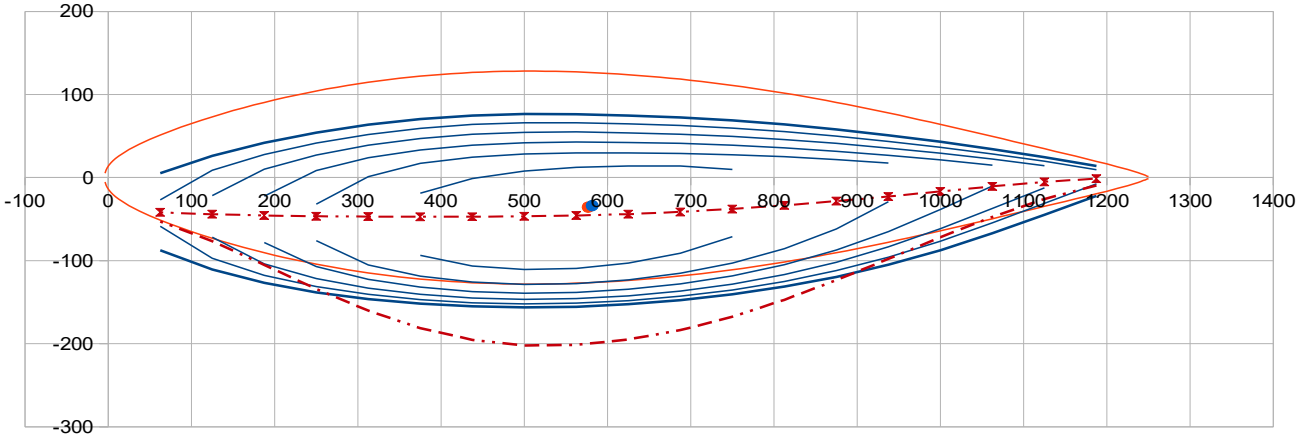
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*6056,79*	*5,892*	*-0,408*	*0*	*from the mass spreadsheet*
Load (kg)	**140,00**	**2,50**	**0,80**	**0,00**	Crew at center
			0,80	**1,00**	Crew sit windward
Total >>> Mass (kg)	**6196,79**	**5,815**	**-0,380**	**0,000**	**Crew at center**
Disp. (m3)	**6,04565**		**-0,380**	**0,023**	**Crew sit windward**

>>> at heel 20 ° : RM20° 29,733 kN.m Sw20° 31,27 m2 Bwl20° 2,33 m

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**6,04566**	**/ Disp. (m3)**	**6,04565**
Height (cm)	**5,9816**	**Xc heel (m)**	**5,815**	**/ Xg (m)**	**5,815**
Trim (°)	**-0,203**	Yc heel (m)	-0,338	Yg heel (m)	0,151
		Zc heel (m)	-0,253	**> GZ (m)**	**0,489**
		Sw heel(m2)	**31,27**	**RM (kN.m)**	**29,733**
		Bwl heel (m)	**2,33**	**FB mini (cm)**	**33,1**
		LCB – LCF (%Lwl)	**0,39**	**Obliquity (°)**	**1,8**

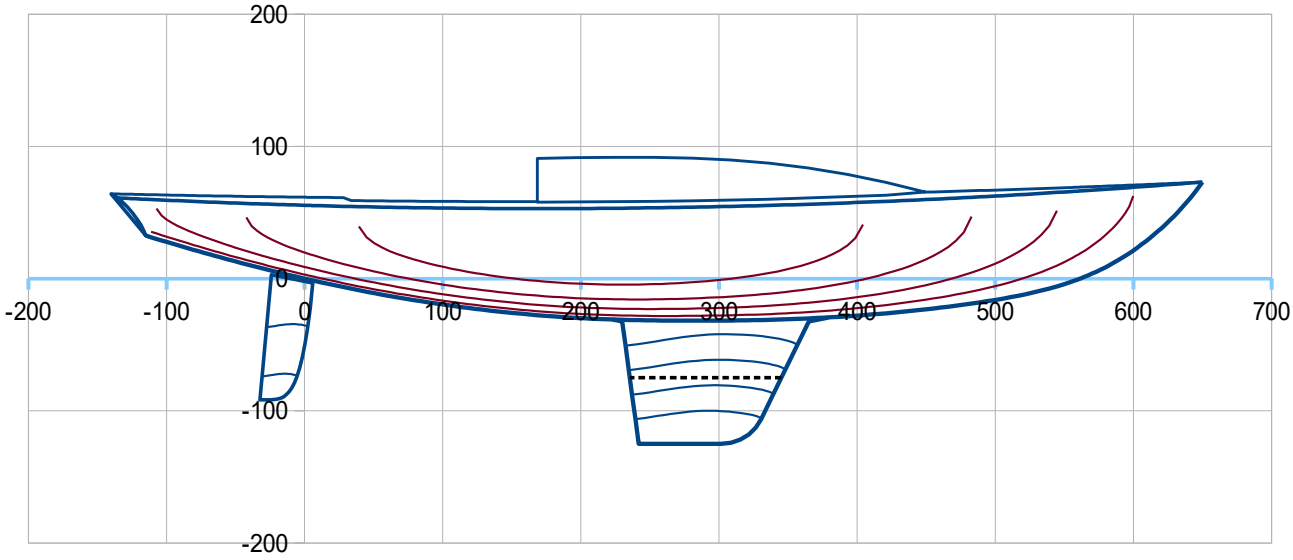


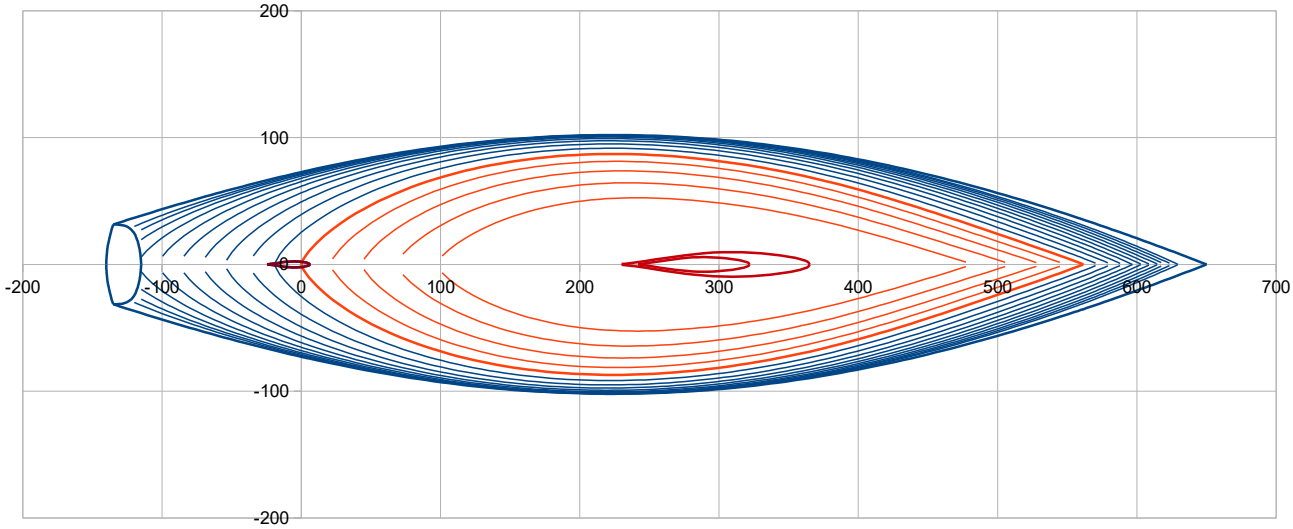


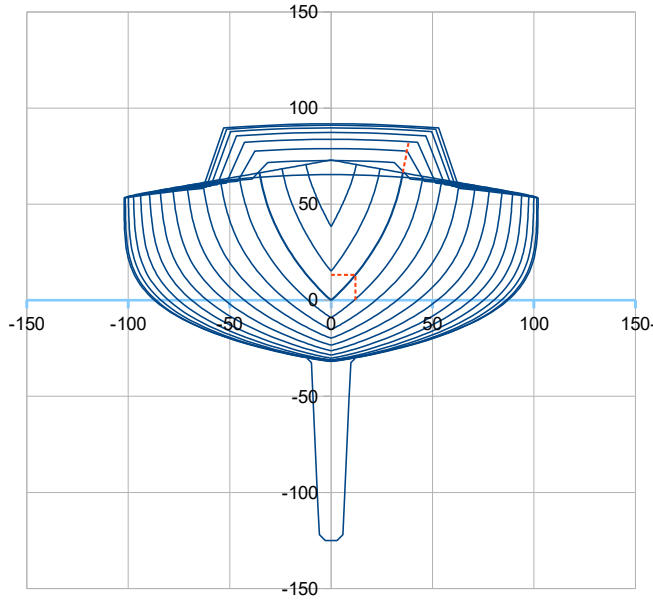


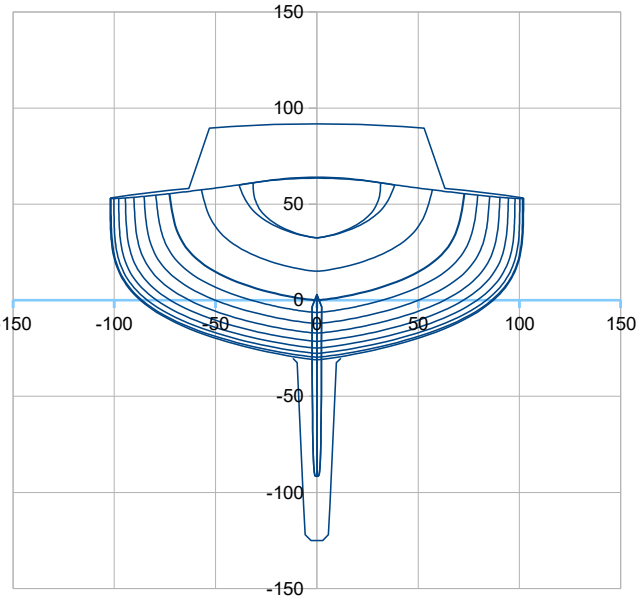
DH17 inspired by Dark Harbour 17,5 / B.B. Crowninshield

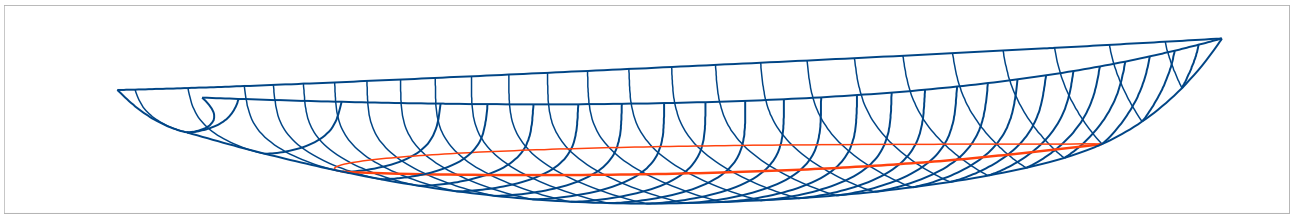
Loa 7,90 m ; Lwl 5,62 m ; B 2,04 m ; Draft 1,25 m ; Displacement : 1214kg ; Ballast : 500 kg
>> LCB hull 46,70 %Lwl ; Cp hull : 0,544 ; Sw : 9,75 m2 ; DLR : 191 ; Ballast ratio : 41,2 %











DH17 Hydrostatics data

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

2.1 Hull

Loa (m)	**7,90**	**Lwl (m)**	**5,62**	> Hull speed (Knots)	5,77	at Froude 0,4		
>> ft	*25,92*		*18,42*					
Boa (m)	**2,04**	**at X (% Lwl)**	**40,0**	Bsheer (m)	2,04	at X (% Lwl)	40,0	
>> ft	*6,69*							
Bwl (m)	**1,74**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,854			
>> ft	*5,72*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,318**	**at X (%Lwl)**	**50**		**0,60**	**0,53**	**0,73**	
>> ft	*1,04*			*>> ft*	*1,97*	*1,74*	*2,40*	
Displacement at H0 (m3)	**1,07178**	**at LCB (m)**	**2,622**	**LCB (%Lwl)**	**46,70**	**ZCB (m)**	**-0,105**	
>> lbs	*2422*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,34*	
Cp	**0,544**							
Sf (m2)	**6,60**	**at LCF (m)**	**2,534**	**LCF (%Lwl)**	**45,12**	>>> LCB – LCF (%Lwl)	1,57	
>> ft2	*71,08*	*>> ft*	*8,31*					
Angle Freeboard/Half beam	27,5	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**21,0**	**at 95% Lwl**		
Sw (m2)	**7,13**	>Sw/D^(2/3)	6,81					
>> ft2	*76,79*							
Shull (m2)	**17,07**	**at X (m)**	**2,458**	**Z (m)**	**0,074**			
>> ft2	*183,73*	*>> ft*	*8,06*	*>> ft*	*0,24*			
Sdeck (m2)	**12,04**	**at X (m)**	**2,353**	**Z (m)**	**0,62**			
>> ft2	*129,59*	*>> ft*	*7,72*	*>> ft*	*2,04*			

2.2 Keel

Vol. keel(m3)	**0,10580**	**at X (m)**	**2,977**	**X (%Lwl)**	**53,01**	**Z (m)**	**-0,700**	
		>> ft	*9,77*			*>> ft*	*-2,30*	
Ballast (kg)	**499,7**	**at X (m)**	**2,931**	**X (%Lwl)**	**52,20**	**Z (m)**	**-0,923**	
>> lbs	*1102*	*>> ft*	*9,62*			*>> ft*	*-3,03*	
Draft oa (m)	**1,25**		**Sw (m2)**	**2,09**		**Sxz (m2)**	**1,04**	
>> ft	*4,10*		*>> ft2*	*22,50*		*>> ft2*	*11,16*	
CLR (m)	**3,24**	**CLR (%Lwl)**	**57,65**	*CLR = Center of Lateral Resistance*				
>> ft	*10,62*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,00665**	**at X (m)**	**-0,11**	**X (%Lwl)**	**-2,04**	**Z (m)**	**-0,41**	
Sw (m2)	**0,52**	*>> ft*	*-0,38*			**Sxz (m2)**	**0,25**	per rudder
>> ft2	*5,63*					*>> ft2*	*2,71*	

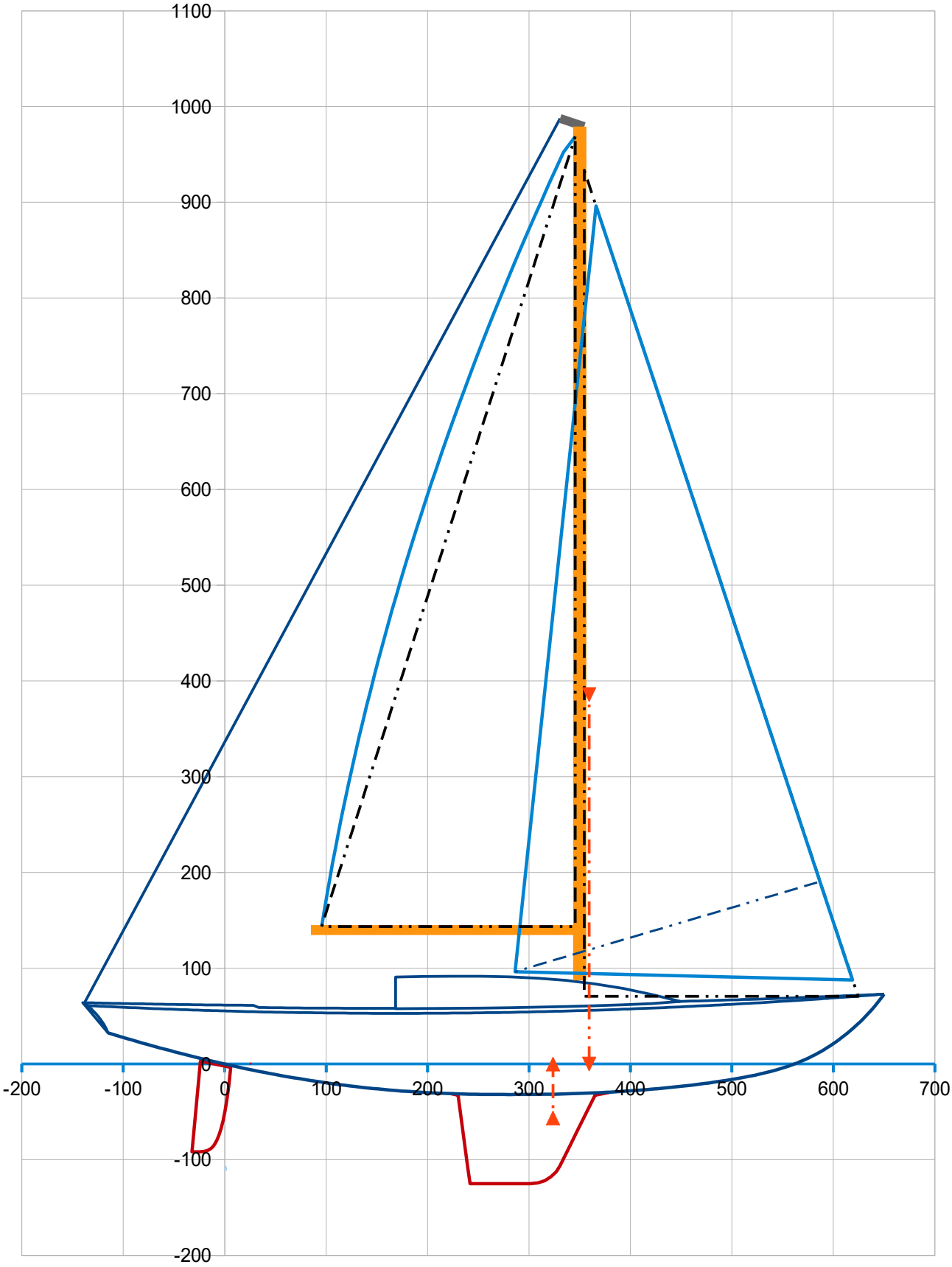
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**1,18422**	**at LCB (m)**	**2,638**	**LCB (%Lwl)**	**46,99**	**at ZCB (m)**	**-0,160**
(kg)	**1214**	*>> ft*	*8,66*			*>> ft*	*-0,52*
>> lbs	*2676*						
, of wich Ballast (kg)	**500**	**at Xg (m)**	**2,931**	**Xg (%Lwl)**	**52,20**	**at Zg (m)**	**-0,923**
>> lbs	*1102*	*>> ft*	*9,62*			*>> ft*	*-3,03*
>> % Ballast	41,2						
Sw (m2)	**9,75**	>Sw/D^(2/3)	8,71	Lwl/D^(1/3)	5,31		
>> ft2	*104,92*			***DLR***	***191***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**1214**	**at Xg (m)**	**2,652**	**Xg (%Lwl)**	**47,23**	**at Zg (m)**	**-0,136**

DH17 SA 26,1 m2 (Main 12,5 m2 + Jib 13,6 m2) >> SA/Sw 2,68 SA/D^(2/3) 23,32



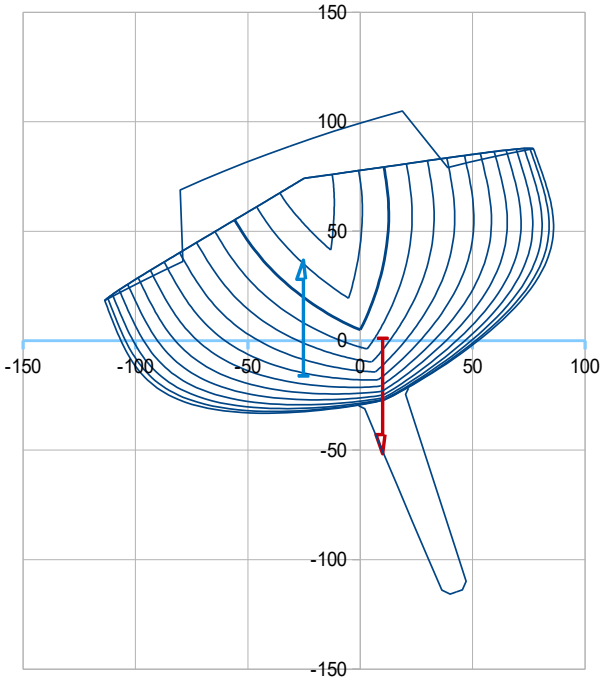
DH17 , with crew 150 kg sit windward (at Y 0,8 m) :

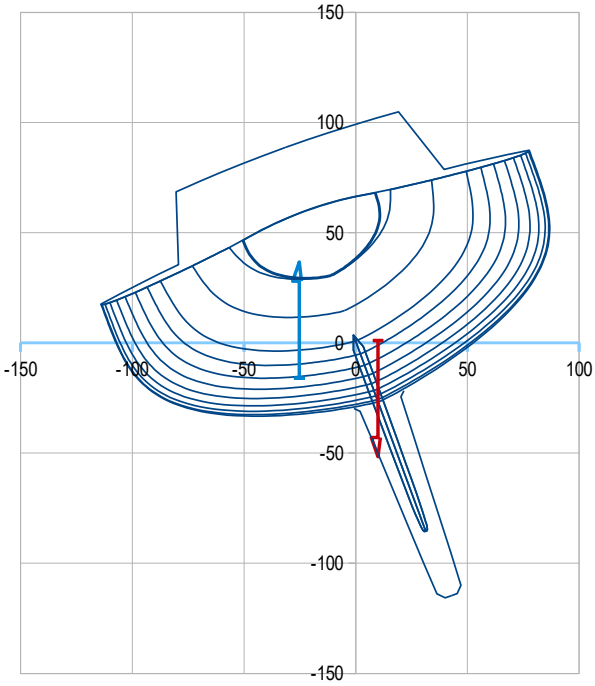
5.1 Mass spreadsheet with input of a load

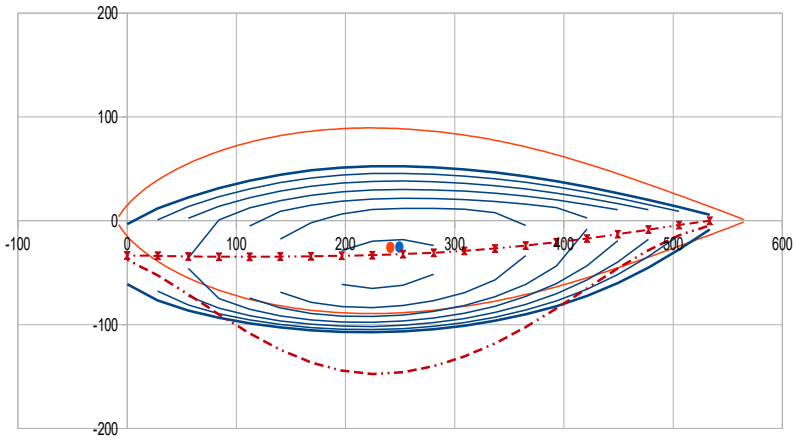
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*1213,87*	*2,652*	*-0,136*	*0*	*from the mass spreadsheet*
Load (kg)	**150,00**	**1,20**	**0,65**	**0,00**	Crew at center
			0,65	**0,80**	Crew sit windward
Total >>> Mass (kg)	**1363,87**	**2,492**	**-0,049**	**0,000**	**Crew at center**
Disp. (m3)	**1,33061**		**-0,049**	**0,088**	**Crew sit windward**

>>> at heel 20 ° : RM20° 4,711 kN.m Sw20° 9,95 m2 Bwl20° 1,60 m

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**1,33061**	**/ Disp. (m3)**	**1,33061**
Height (cm)	**2,8056**	**Xc heel (m)**	**2,492**	**/ Xg (m)**	**2,492**
Trim (°)	**0,413**	Yc heel (m)	-0,253	Yg heel (m)	0,099
		Zc heel (m)	-0,160	**> GZ (m)**	**0,352**
		Sw heel(m2)	**9,95**	**RM (kN.m)**	**4,711**
		Bwl heel (m)	**1,60**	**FB mini (cm)**	**17,4**
		LCB – LCF (%Lwl)	**1,48**	**Obliquity (°)**	**3,1**

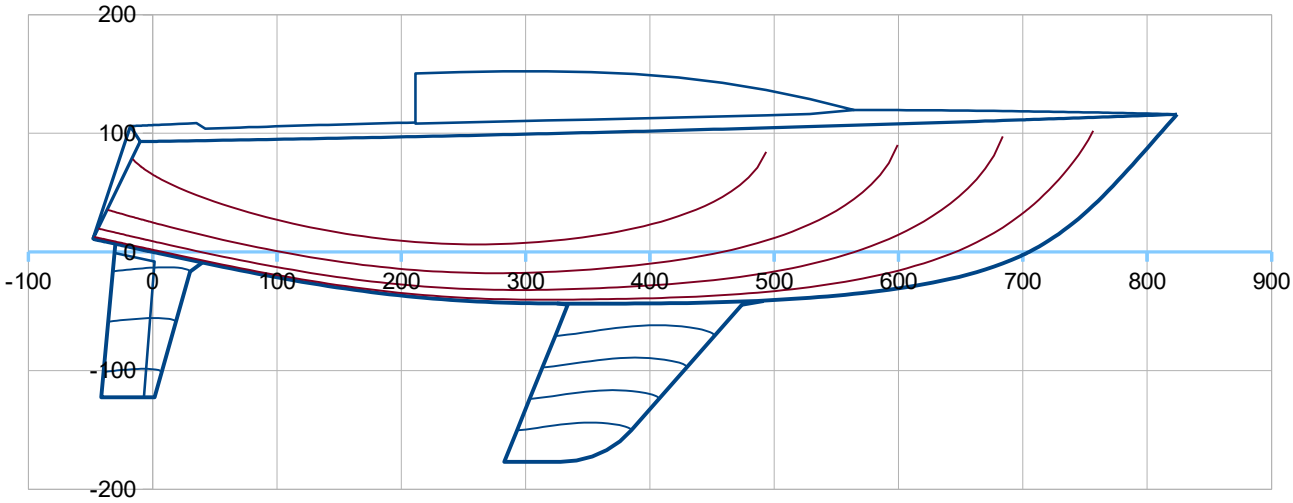


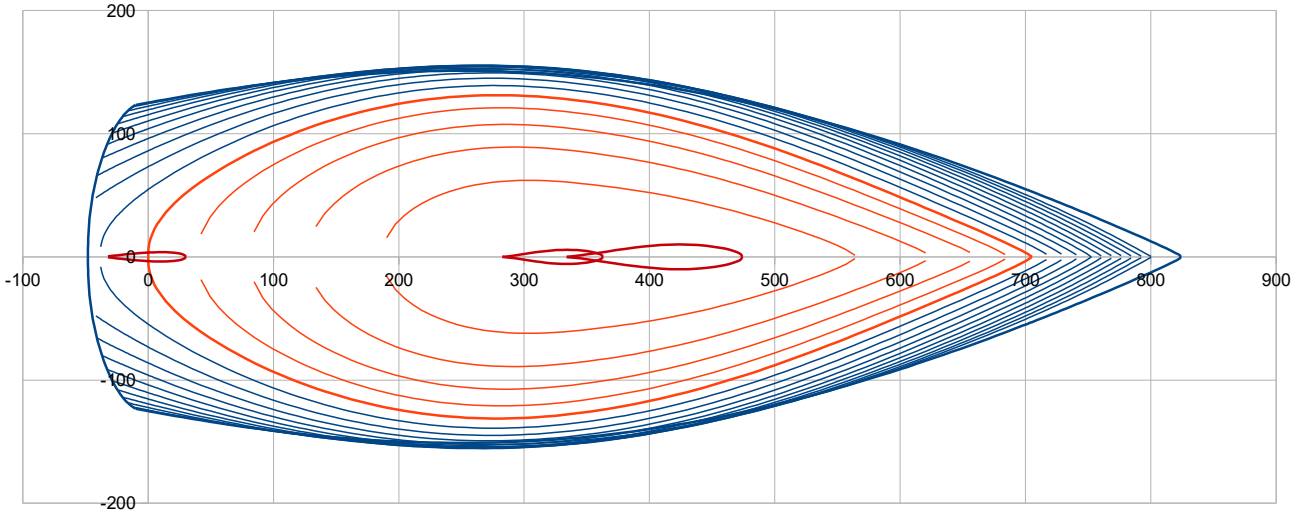


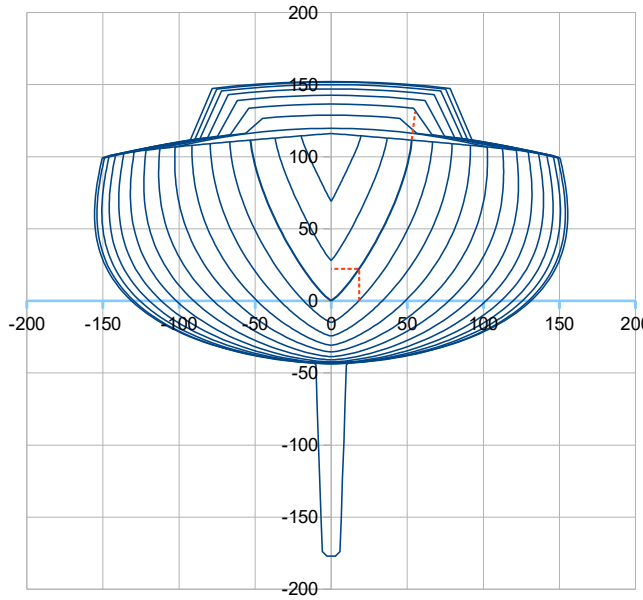


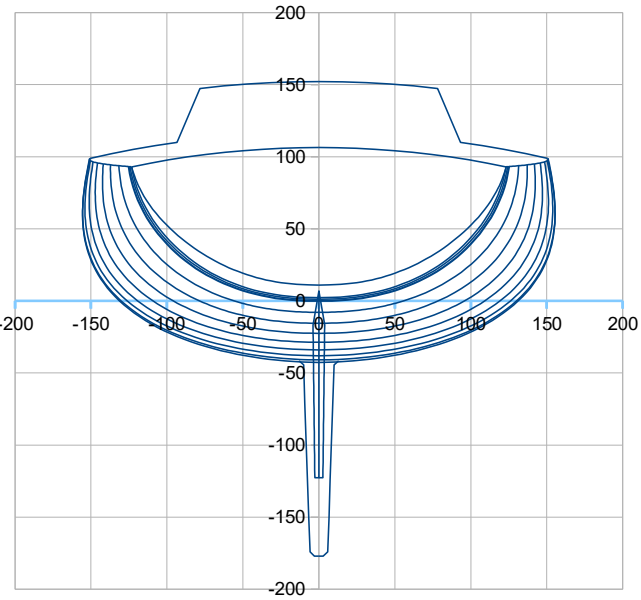
AL29 inspired by Aloa 29 / J.M. Finot

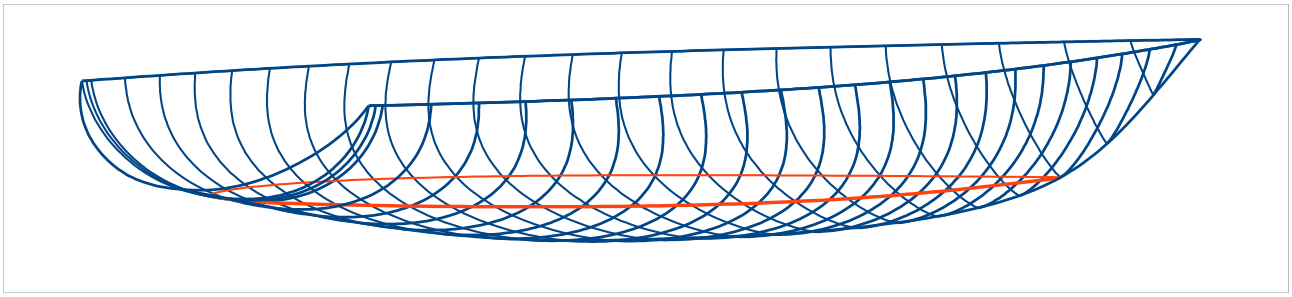
Loa 8,72 m ; Lwl 7,05 m ; B 3,11 m ; Draft 1,77 m ; Displacement : 3341kg ; Ballast : 1127 kg
>> LCB hull 46,93 %Lwl ; Cp hull : 0,55 ; Sw : 17,88 m2 ; DLR : 266 ; Ballast ratio : 33,7 %



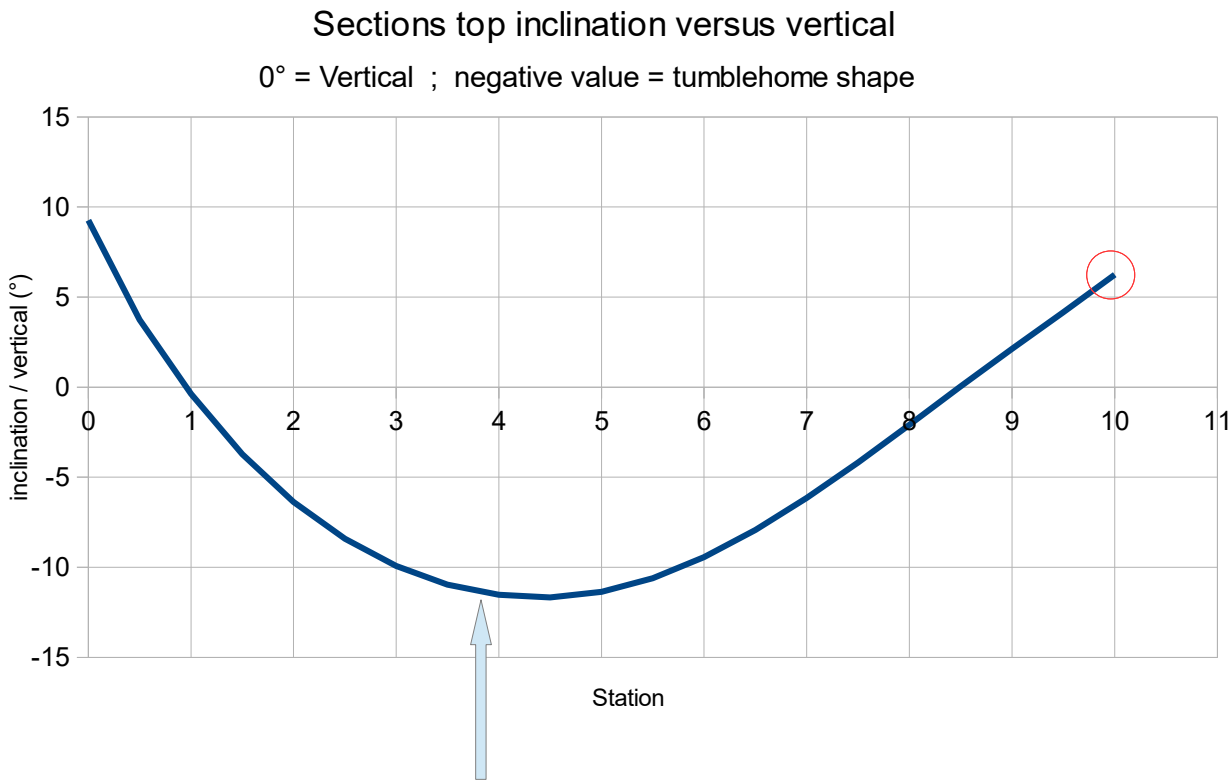








Variation of the sections top inclination showing the zone of tumblehome shape :



Tumblehome shape, giving a negative inclination angle at top section, go from station 1 to station 8,5.

At the stations C0 (aft perpendicular) and C10 (fore perpendicular), the inclination becomes positive again (6,2° at C10).

Angle C10 at Z sheer (°)
6,2
Angle C10 at Z 20% sheer
39,5

AL29 Hydrostatics data

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

2.1 Hull

Loa (m)	**8,72**	**Lwl (m)**	**7,05**	> Hull speed (Knots)	6,47	at Froude 0,4		
>> ft	*28,61*		*23,13*					
Boa (m)	**3,11**	**at X (% Lwl)**	**35,0**	Bsheer (m)	3,02	at X (% Lwl)	35,0	
>> ft	*10,20*							
Bwl (m)	**2,62**	**at X (% Lwl)**	**40,0**	> Bwl / Boa	0,844			
>> ft	*8,61*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,436**	**at X (%Lwl)**	**50**		**0,93**	**0,98**	**1,16**	
>> ft	*1,43*			*>> ft*	*3,05*	*3,22*	*3,81*	
Displacement at H0 (m3)	**3,07694**	**at LCB (m)**	**3,309**	**LCB (%Lwl)**	**46,93**	**ZCB (m)**	**-0,155**	
>> lbs	*6953*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,51*	
Cp	**0,550**							
Sf (m2)	**12,55**	**at LCF (m)**	**3,151**	**LCF (%Lwl)**	**44,69**	>>> LCB – LCF (%Lwl)	2,25	
>> ft2	*135,06*	*>> ft*	*10,34*					
Angle Freeboard/Half beam	33,3	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**24,3**	**at 95% Lwl**		
Sw (m2)	**13,54**	>Sw/D^(2/3)	6,40					
>> ft2	*145,72*							
Shull (m2)	**32,12**	**at X (m)**	**3,461**	**Z (m)**	**0,167**			
>> ft2	*345,72*	*>> ft*	*11,35*	*>> ft*	*0,55*			
Sdeck (m2)	**20,15**	**at X (m)**	**3,286**	**Z (m)**	**1,07**			
>> ft2	*216,92*	*>> ft*	*10,78*	*>> ft*	*3,52*			

2.2 Keel

Vol. keel(m3)	**0,15445**	**at X (m)**	**3,808**	**X (%Lwl)**	**54,01**	**Z (m)**	**-0,975**	
		>> ft	*12,49*			*>> ft*	*-3,20*	
Ballast (kg)	**1127,5**	**at X (m)**	**3,808**	**X (%Lwl)**	**54,01**	**Z (m)**	**-0,975**	
>> lbs	*2486*	*>> ft*	*12,49*			*>> ft*	*-3,20*	
Draft oa (m)	**1,77**		**Sw (m2)**	**3,04**		**Sxz (m2)**	**1,51**	
>> ft	*5,81*		*>> ft2*	*32,70*		*>> ft2*	*16,21*	
CLR (m)	**4,04**	**CLR (%Lwl)**	**57,32**	*CLR = Center of Lateral Resistance*				
>> ft	*13,26*	method: keel profile extended to the waterline, CLR at Z 45% draft and					32,50	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,02822**	**at X (m)**	**-0,06**	**X (%Lwl)**	**-0,81**	**Z (m)**	**-0,58**	
Sw (m2)	**1,31**	*>> ft*	*-0,19*			**Sxz (m2)**	**0,63**	per rudder
>> ft2	*14,09*					*>> ft2*	*6,77*	

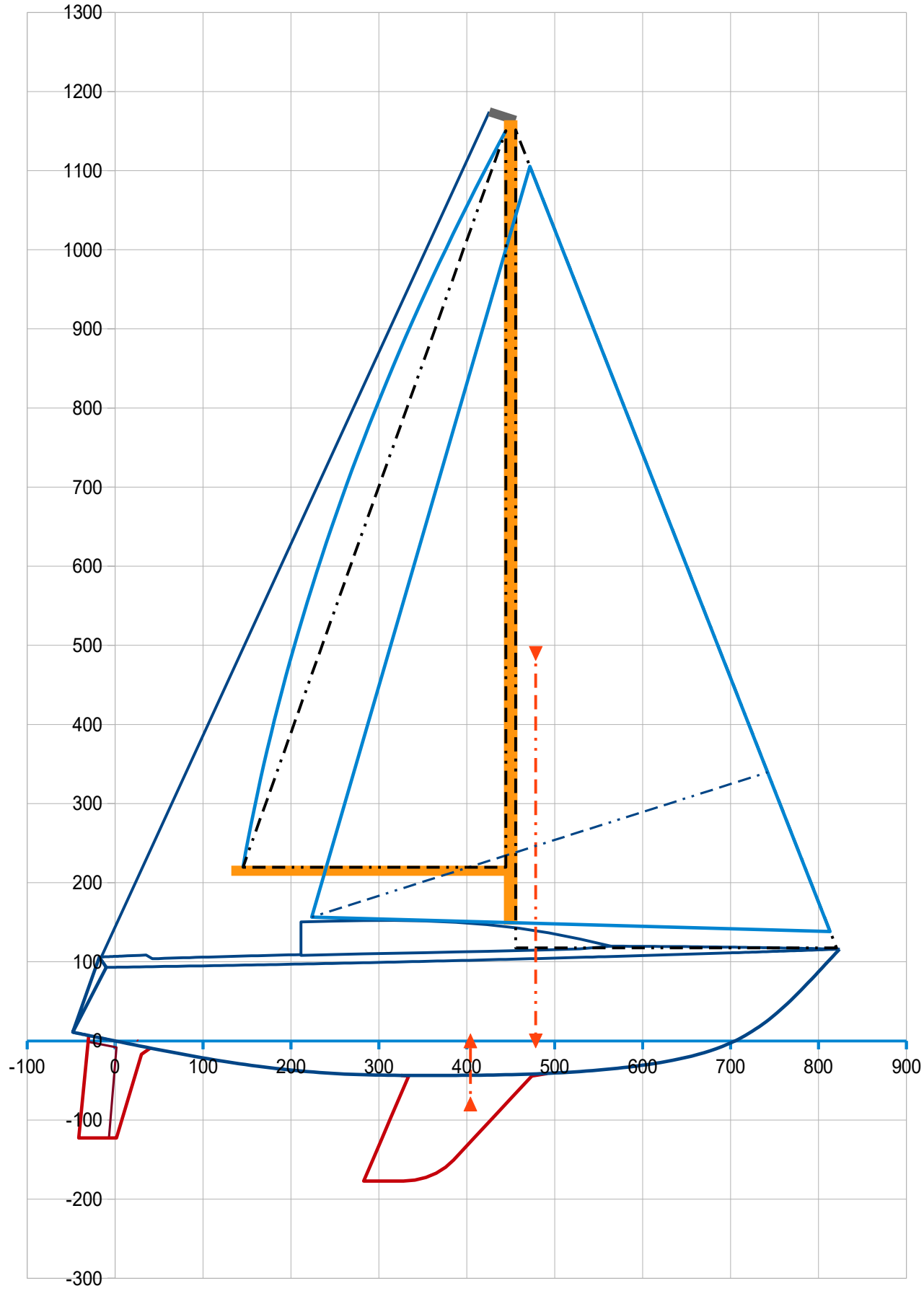
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**3,25961**	**at LCB (m)**	**3,303**	**LCB (%Lwl)**	**46,86**	**at ZCB (m)**	**-0,198**
(kg)	**3341**	*>> ft*	*10,84*			*>> ft*	*-0,65*
>> lbs	*7366*						
, of wich Ballast (kg)	**1127**	**at Xg (m)**	**3,808**	**Xg (%Lwl)**	**54,01**	**at Zg (m)**	**-0,975**
>> lbs	*2486*	*>> ft*	*12,49*			*>> ft*	*-3,20*
>> % Ballast	33,7						
Sw (m2)	**17,88**	>Sw/D^(2/3)	8,14	Lwl/D^(1/3)	4,75		
>> ft2	*192,51*			***DLR***	***266***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**3341**	**at Xg (m)**	**3,497**	**Xg (%Lwl)**	**49,60**	**at Zg (m)**	**0,100**

AL29 SA 46,0 m2 (Main 16,7 m2 + Genoa 29,3 m2) >> SA/Sw 2,57 SA/D^(2/3) 20,94



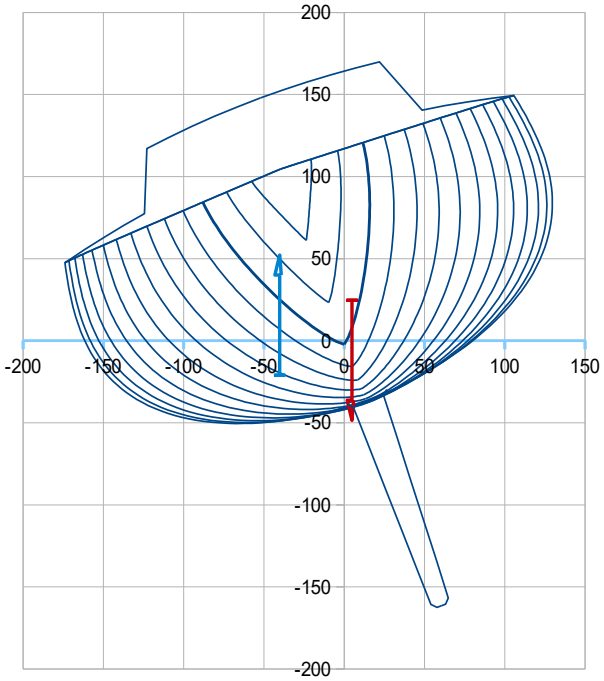
AL29 , with crew 300 kg sit windward (at Y 1,4 m) :

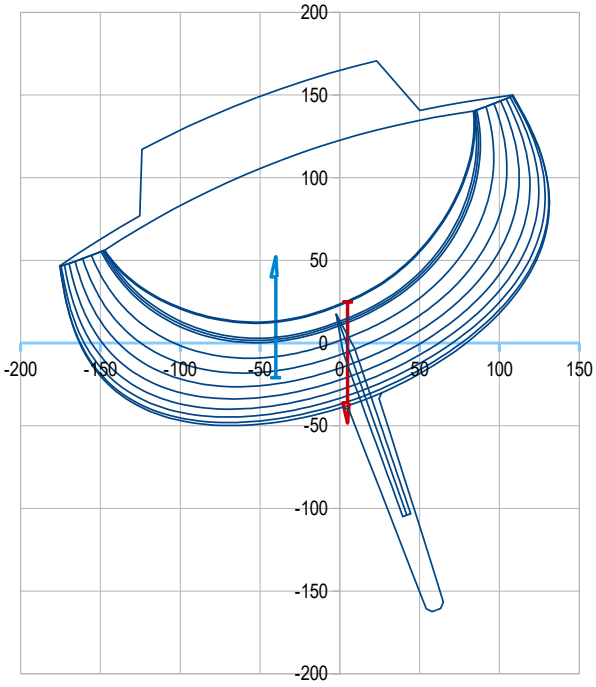
5.1 Mass spreadsheet with input of a load

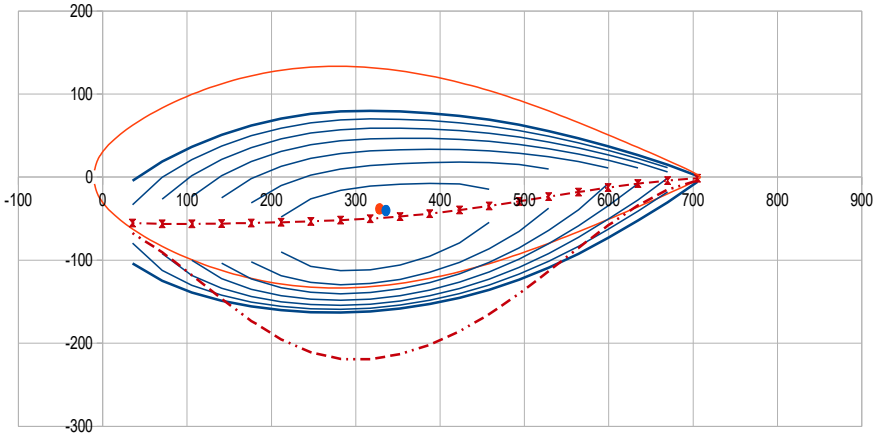
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*3340,92*	*3,497*	*0,100*	*0*	*from the mass spreadsheet*
Load (kg)	**300,00**	**1,80**	**1,00**	**0,00**	Crew at center
			1,00	**1,40**	Crew sit windward
Total >>> Mass (kg)	**3640,92**	**3,357**	**0,174**	**0,000**	**Crew at center**
Disp. (m3)	**3,55212**		**0,174**	**0,115**	**Crew sit windward**

>>> at heel 20 ° : RM20° 16,101 kN.m Sw20° 17,79 m2 Bwl20° 2,43 m

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**3,55212**	**/ Disp. (m3)**	**3,55212**
Height (cm)	**4,5749**	**Xc heel (m)**	**3,357**	**/ Xg (m)**	**3,357**
Trim (°)	**-1,04**	Yc heel (m)	-0,402	Yg heel (m)	0,049
		Zc heel (m)	-0,210	**> GZ (m)**	**0,451**
		Sw heel(m2)	**17,79**	**RM (kN.m)**	**16,101**
		Bwl heel (m)	**2,43**	**FB mini (cm)**	**46,5**
		LCB – LCF (%Lwl)	**1,06**	**Obliquity (°)**	**4,1**

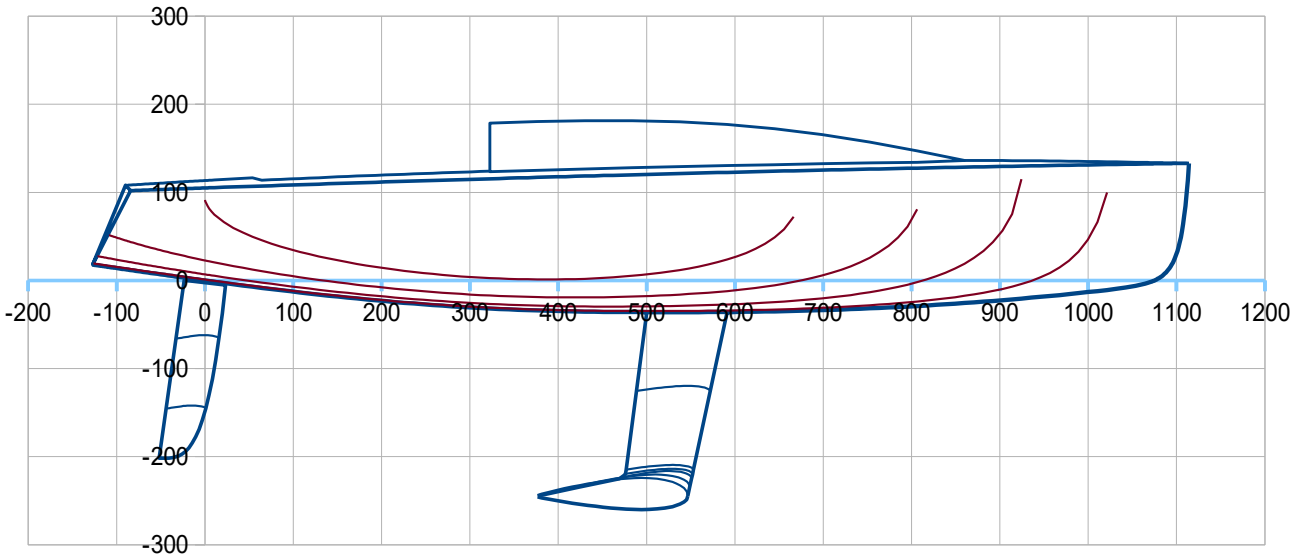


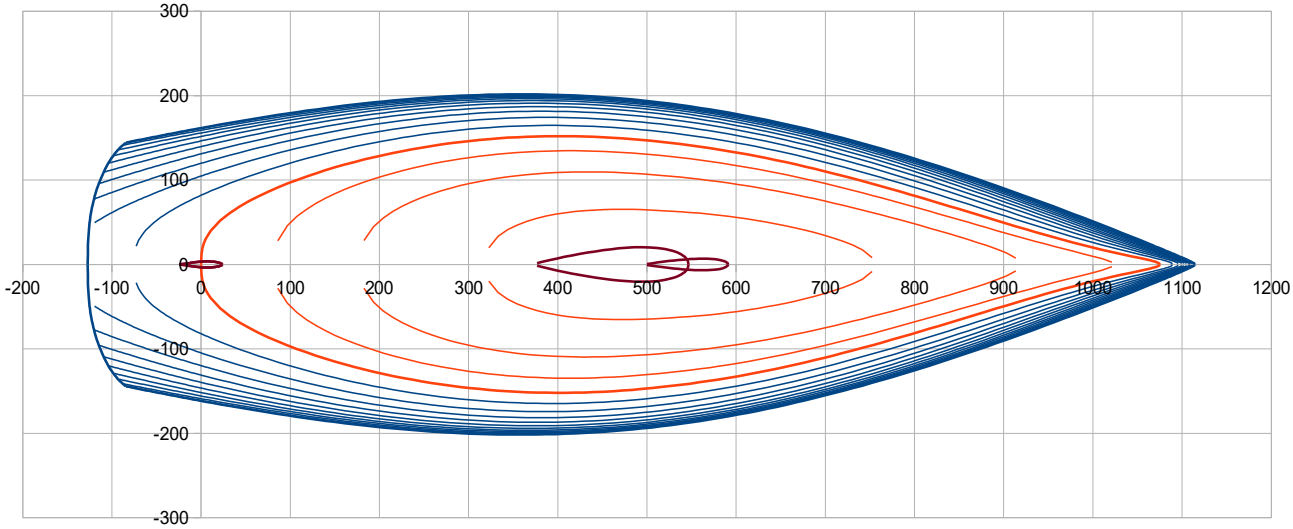


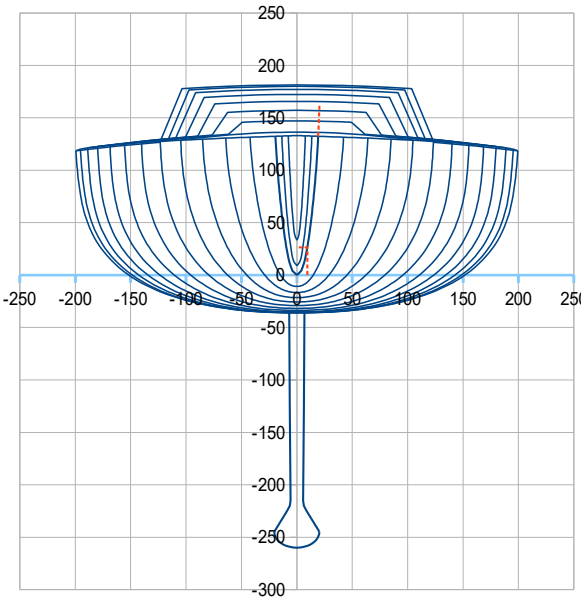


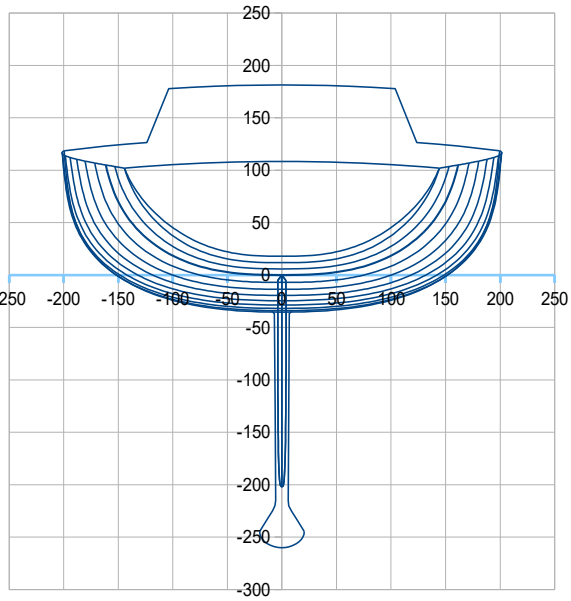
Fa40 inspired by Farr 40 One Design / Bruce Farr

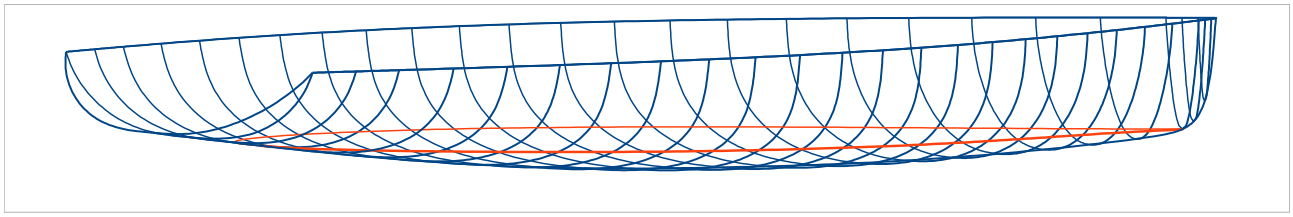
Loa 12,41 m ; Lwl 10,75 m ; B 4,03 m ; Draft 2,60 m ; Displacement : 4963 kg ; Ballast : 2250 kg
>> LCB hull 45,35 %Lwl ; Cp hull : 0,541 ; Sw : 29,79 m2 ; DLR : 111 ; Ballast ratio : 45,3 %











Fa40 Hydrostatics data

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

2.1 Hull

Loa (m)	**12,41**	**Lwl (m)**	**10,75**	> Hull speed (Knots)	7,98	at Froude 0,4		
>> ft	*40,72*		*35,27*					
Boa (m)	**4,03**	**at X (% Lwl)**	**33,0**	Bsheer (m)	4,03	at X (% Lwl)	33,0	
>> ft	*13,22*							
Bwl (m)	**3,04**	**at X (% Lwl)**	**37,0**	> Bwl / Boa	0,754			
>> ft	*9,98*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,360**	**at X (%Lwl)**	**50**		**1,02**	**1,17**	**1,33**	
>> ft	*1,18*			*>> ft*	*3,35*	*3,84*	*4,36*	
Displacement at H0 (m3)	**4,56388**	**at LCB (m)**	**4,875**	**LCB (%Lwl)**	**45,35**	**ZCB (m)**	**-0,131**	
>> lbs	*10313*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,43*	
Cp	**0,541**							
Sf (m2)	**21,78**	**at LCF (m)**	**4,600**	**LCF (%Lwl)**	**42,79**	>>> LCB – LCF (%Lwl)	2,55	
>> ft2	*234,41*	*>> ft*	*15,09*					
Angle Freeboard/Half beam	30,7	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**13,5**	**at 95% Lwl**		
Sw (m2)	**22,70**	>Sw/D^(2/3)	8,25					
>> ft2	*244,30*							
Shull (m2)	**57,35**	**at X (m)**	**4,697**	**Z (m)**	**0,223**			
>> ft2	*617,28*	*>> ft*	*15,41*	*>> ft*	*0,73*			
Sdeck (m2)	**38,57**	**at X (m)**	**4,247**	**Z (m)**	**1,21**			
>> ft2	*415,18*	*>> ft*	*13,93*	*>> ft*	*3,98*			

2.2 Keel

Vol. keel(m3)	**0,23878**	**at X (m)**	**5,150**	**X (%Lwl)**	**47,90**	**Z (m)**	**-1,739**	
		>> ft	*16,90*			*>> ft*	*-5,71*	
Ballast (kg)	**2249,9**	**at X (m)**	**5,104**	**X (%Lwl)**	**47,48**	**Z (m)**	**-1,853**	
>> lbs	*4960*	*>> ft*	*16,74*			*>> ft*	*-6,08*	
Draft oa (m)	**2,60**		**Sw (m2)**	**5,23**		**Sxz (m2)**	**1,85**	
>> ft	*8,53*		*>> ft2*	*56,24*		*>> ft2*	*19,90*	
CLR (m)	**5,53**	**CLR (%Lwl)**	**51,43**	*CLR = Center of Lateral Resistance*				
>> ft	*18,14*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,03920**	**at X (m)**	**-0,09**	**X (%Lwl)**	**-0,88**	**Z (m)**	**-0,91**	
Sw (m2)	**1,86**	*>> ft*	*-0,31*			**Sxz (m2)**	**0,89**	per rudder
>> ft2	*19,99*					*>> ft2*	*9,61*	

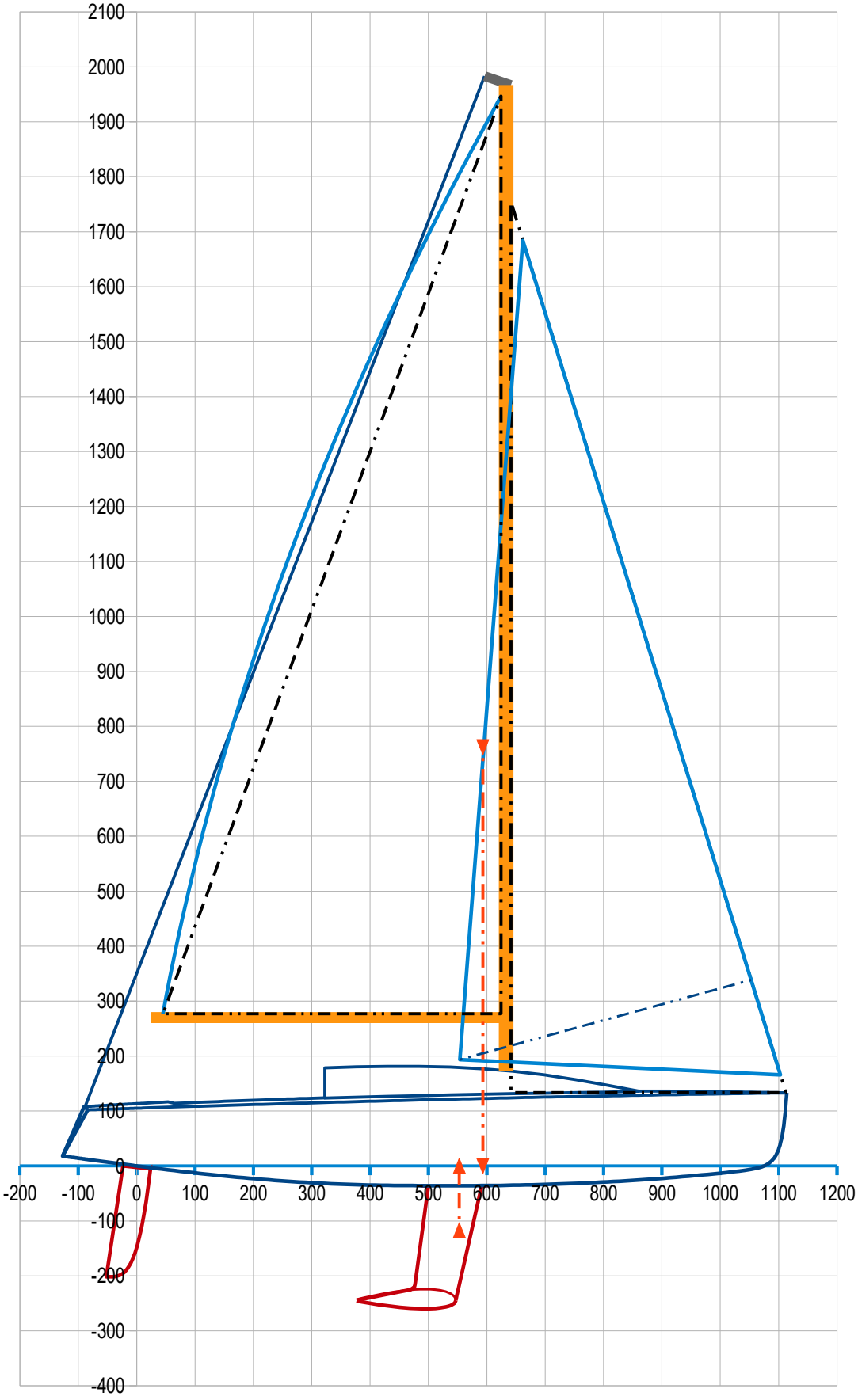
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**4,84186**	**at LCB (m)**	**4,848**	**LCB (%Lwl)**	**45,10**	**at ZCB (m)**	**-0,217**
(kg)	**4963**	*>> ft*	*15,91*			*>> ft*	*-0,71*
>> lbs	*10941*						
, of wich Ballast (kg)	**2250**	**at Xg (m)**	**5,104**	**Xg (%Lwl)**	**47,48**	**at Zg (m)**	**-1,853**
>> lbs	*4960*	*>> ft*	*16,74*			*>> ft*	*-6,08*
>> % Ballast	45,3						
Sw (m2)	**29,78**	>Sw/D^(2/3)	10,40	Lwl/D^(1/3)	6,35		
>> ft2	*320,53*			***DLR***	***111***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**4963**	**at Xg (m)**	**4,865**	**Xg (%Lwl)**	**45,25**	**at Zg (m)**	**-0,303**

Fa40 SA 100,0 m2 (Main 58,1 m2 + Jib 41,9 m2) >> SA/Sw 3,36 SA/D^(2/3) 34,94



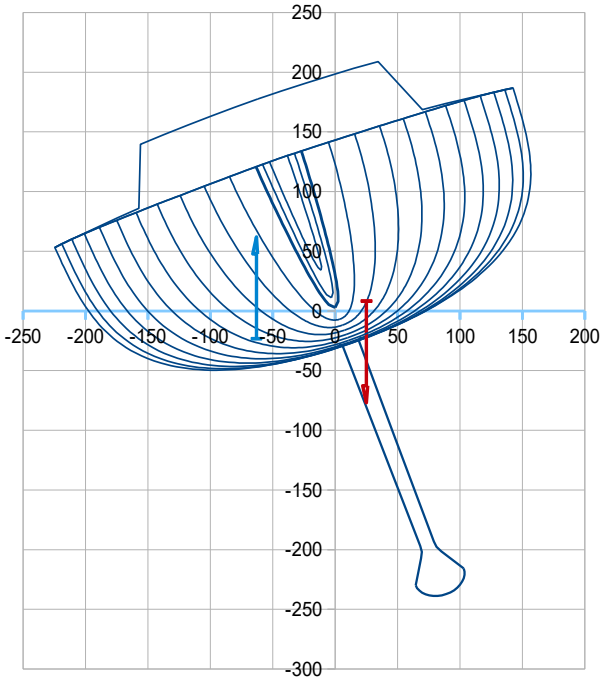
Fa40 , with crew 760 kg sit windward (at Y 1,8 m) :

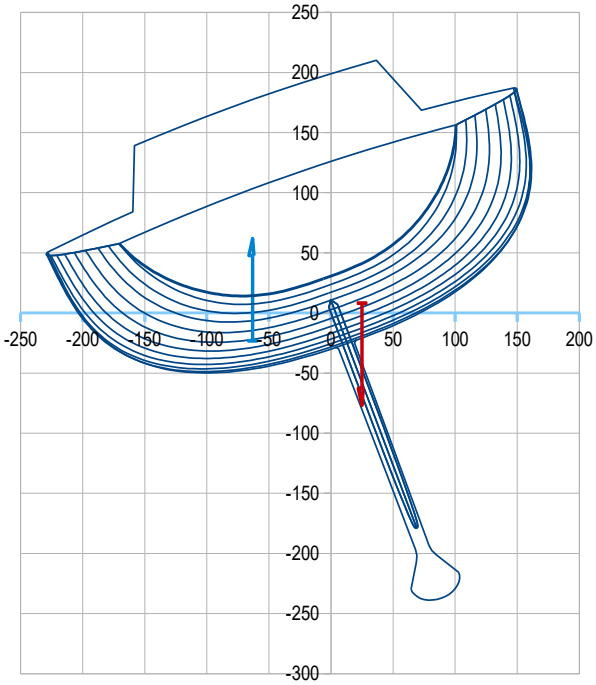
5.1 Mass spreadsheet with input of a load

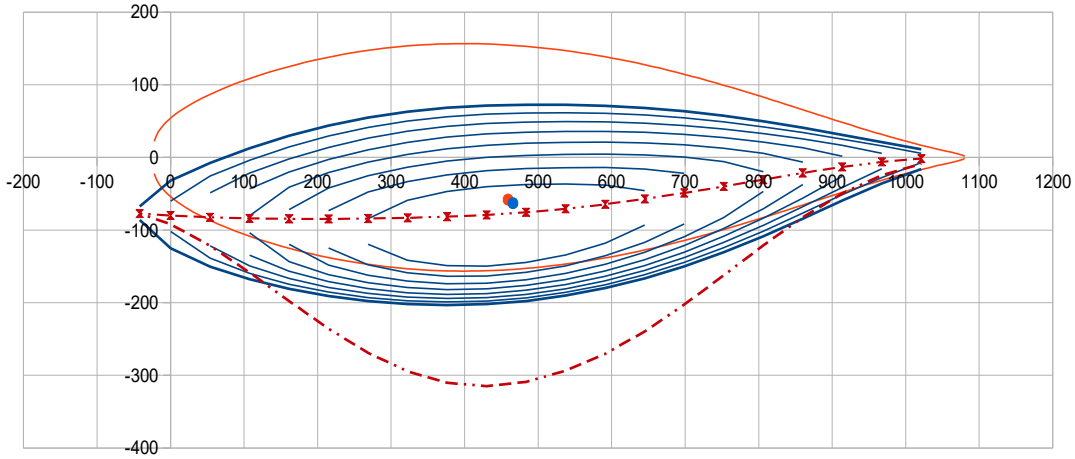
Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*4963,16*	*4,865*	*-0,303*	*0*	*from the mass spreadsheet*
Load (kg)	**760,00**	**3,30**	**1,40**	**0,00**	Crew at center
			1,40	**1,80**	Crew sit windward
Total >>> Mass (kg)	**5723,16**	**4,657**	**-0,077**	**0,000**	**Crew at center**
Disp. (m3)	**5,58357**		**-0,077**	**0,239**	**Crew sit windward**

>>> at heel 20 ° : RM20° 49,508 kN.m Sw20° 29,27 m2 Bwl20° 2,73 m

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**5,58358**	**/ Disp. (m3)**	**5,58357**
Height (cm)	**7,0967**	**Xc heel (m)**	**4,657**	**/ Xg (m)**	**4,657**
Trim (°)	**-0,413**	Yc heel (m)	-0,631	Yg heel (m)	0,251
		Zc heel (m)	-0,232	**> GZ (m)**	**0,882**
		Sw heel(m2)	**29,27**	**RM (kN.m)**	**49,508**
		Bwl heel (m)	**2,73**	**FB mini (cm)**	**47,7**
		LCB – LCF (%Lwl)	**0,63**	**Obliquity (°)**	**4,7**

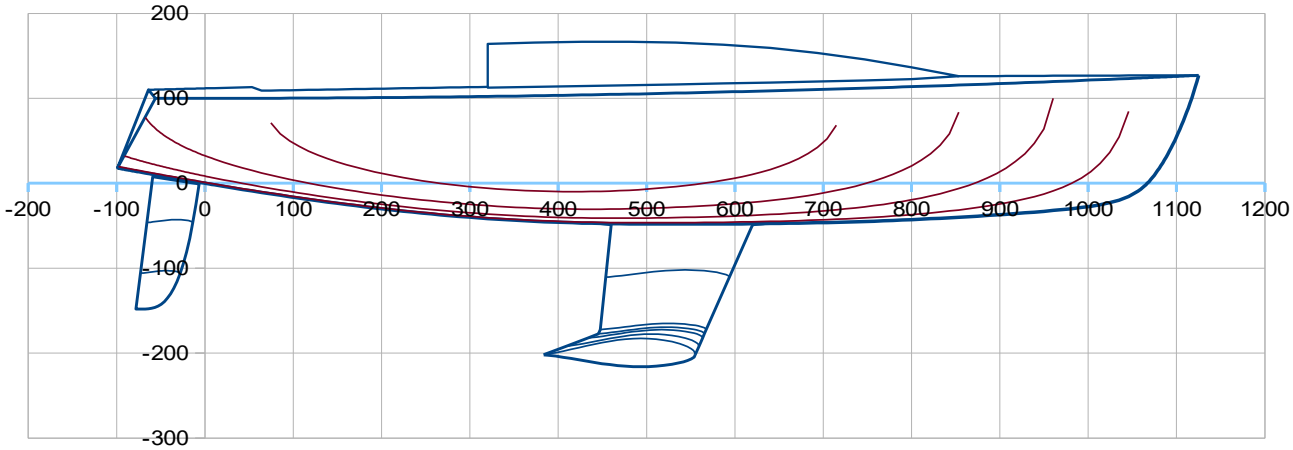


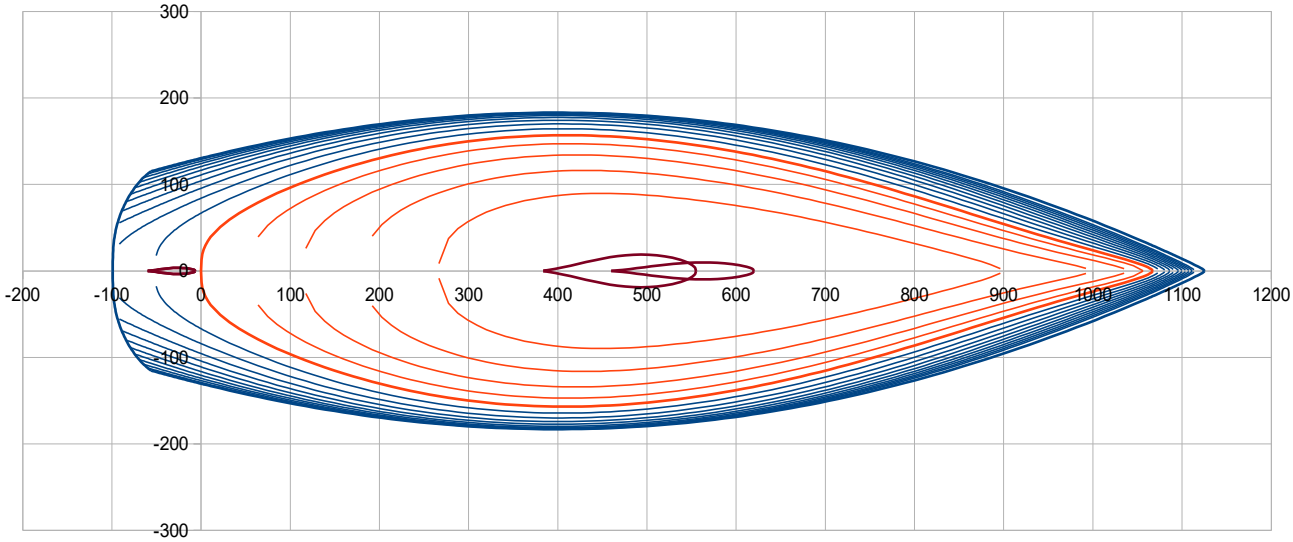


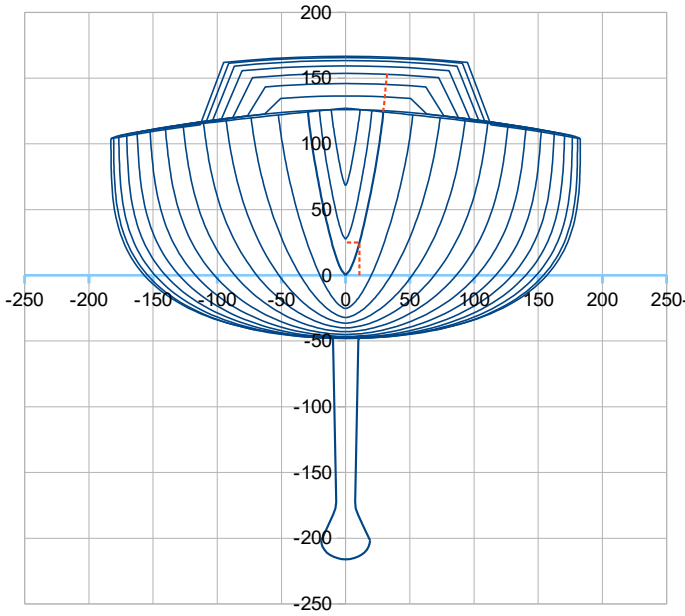


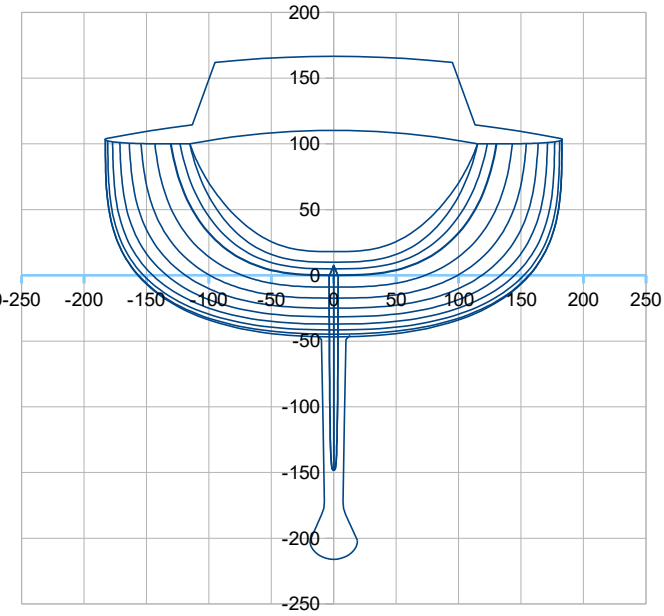
J120 inspired by J/120 / Rod Johnstone

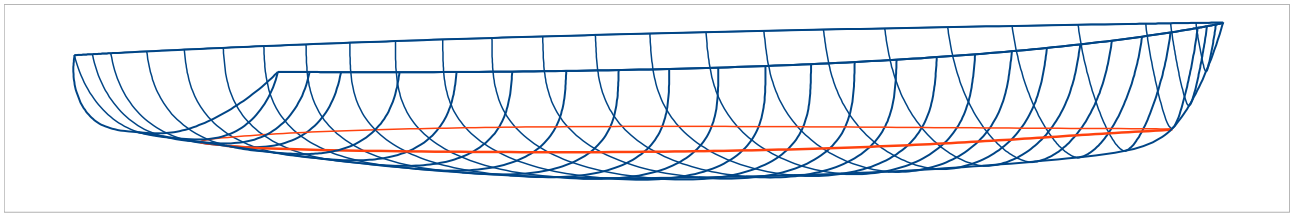
Loa 12,24 m ; Lwl 10,67 m ; B 3,66 m ; Draft 2,16 m ; Displacement : 6894 kg ; Ballast : 2722 kg
>> LCB hull 46,53 %Lwl ; Cp hull : 0,550 ; Sw : 31,72 m2 ; DLR : 158 ; Ballast ratio : 39,5 %











J120 Hydrostatics data

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

2.1 Hull

Loa (m)	**12,24**	**Lwl (m)**	**10,67**	> Hull speed (Knots)	7,95	at Froude 0,4		
>> ft	*40,16*		*35,01*					
Boa (m)	**3,66**	**at X (% Lwl)**	**37,0**	Bsheer (m)	3,66	at X (% Lwl)	37,0	
>> ft	*12,01*							
Bwl (m)	**3,14**	**at X (% Lwl)**	**38,0**	> Bwl / Boa	0,858			
>> ft	*10,30*			**Freeboards (m) >**	**Aft**	**Midship**	**Fore**	
Tc (m)	**0,480**	**at X (%Lwl)**	**50**		**1,00**	**1,03**	**1,27**	
>> ft	*1,57*			*>> ft*	*3,28*	*3,38*	*4,17*	
Displacement at H0 (m3)	**6,39790**	**at LCB (m)**	**4,964**	**LCB (%Lwl)**	**46,53**	**ZCB (m)**	**-0,176**	
>> lbs	*14457*	*w. seawater*	*1025*	*kg/m3*		*>> ft*	*-0,58*	
Cp	**0,550**							
Sf (m2)	**22,52**	**at LCF (m)**	**4,659**	**LCF (%Lwl)**	**43,66**	>>> LCB – LCF (%Lwl)	2,87	
>> ft2	*242,42*	*>> ft*	*15,28*					
Angle Freeboard/Half beam	29,6	(°), at section C4 (40% Lwl)		**Half entry angle (°)**	**15,9**	**at 95% Lwl**		
Sw (m2)	**24,35**	>Sw/D^(2/3)	7,07					
>> ft2	*262,13*							
Shull (m2)	**53,27**	**at X (m)**	**4,903**	**Z (m)**	**0,134**			
>> ft2	*573,39*	*>> ft*	*16,09*	*>> ft*	*0,44*			
Sdeck (m2)	**35,04**	**at X (m)**	**4,570**	**Z (m)**	**1,14**			
>> ft2	*377,12*	*>> ft*	*14,99*	*>> ft*	*3,73*			

2.2 Keel

Vol. keel(m3)	**0,29975**	**at X (m)**	**5,225**	**X (%Lwl)**	**48,97**	**Z (m)**	**-1,353**	
		>> ft	*17,14*			*>> ft*	*-4,44*	
Ballast (kg)	**2721,8**	**at X (m)**	**5,187**	**X (%Lwl)**	**48,62**	**Z (m)**	**-1,436**	
>> lbs	*6001*	*>> ft*	*17,02*			*>> ft*	*-4,71*	
Draft oa (m)	**2,16**		**Sw (m2)**	**5,89**		**Sxz (m2)**	**2,19**	
>> ft	*7,09*		*>> ft2*	*63,42*		*>> ft2*	*23,53*	
CLR (m)	**5,63**	**CLR (%Lwl)**	**52,81**	*CLR = Center of Lateral Resistance*				
>> ft	*18,49*	method: keel profile extended to the waterline, CLR at Z 45% draft and					25,00	% chord

2.3 Rudder(s)

Number	**1**							
Volume (m3)	**0,02795**	**at X (m)**	**-0,39**	**X (%Lwl)**	**-3,66**	**Z (m)**	**-0,62**	
Sw (m2)	**1,48**	*>> ft*	*-1,28*			**Sxz (m2)**	**0,71**	per rudder
>> ft2	*15,88*					*>> ft2*	*7,63*	

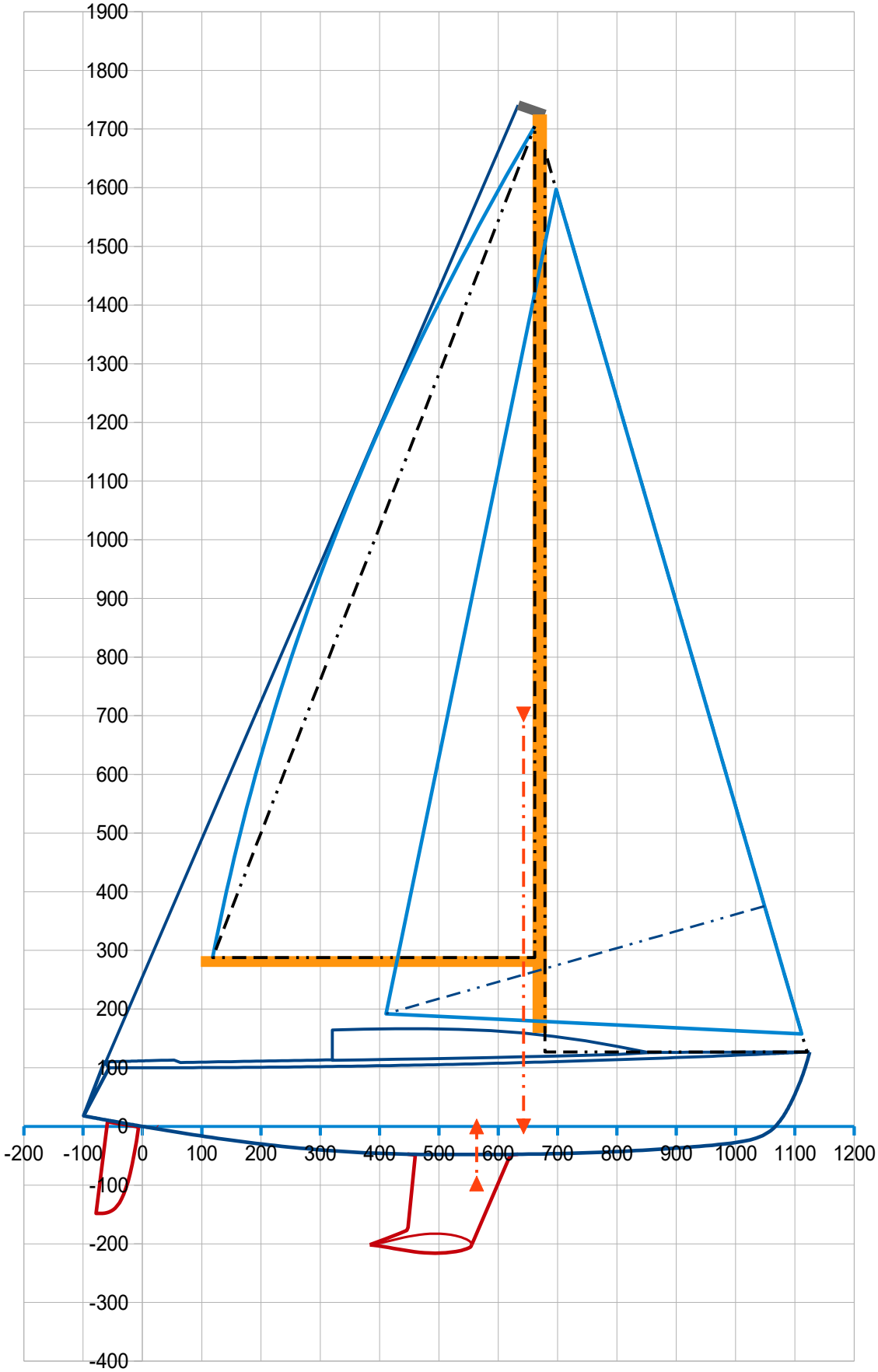
2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	**6,72561**	**at LCB (m)**	**4,954**	**LCB (%Lwl)**	**46,43**	**at ZCB (m)**	**-0,230**
(kg)	**6894**	*>> ft*	*16,25*			*>> ft*	*-0,76*
>> lbs	*15198*						
, of wich Ballast (kg)	**2722**	**at Xg (m)**	**5,187**	**Xg (%Lwl)**	**48,62**	**at Zg (m)**	**-1,436**
>> lbs	*6001*	*>> ft*	*17,02*			*>> ft*	*-4,71*
>> % Ballast	39,5						
Sw (m2)	**31,72**	>Sw/D^(2/3)	8,90	Lwl/D^(1/3)	5,65		
>> ft2	*341,42*			***DLR***	***158***	*M(lbs/2240)/(Lwl(ft)/100)^3*	

2.5 Data from the mass spreadsheet

Light boat:	**M (kg)**	**6894**	**at Xg (m)**	**4,955**	**Xg (%Lwl)**	**46,44**	**at Zg (m)**	**-0,172**

J120 SA 98,0 m2 (Main 46,3 m2 + Jib 51,7 m2) >> SA/Sw 3,09 SA/D^(2/3) 27,50



J120 , with crew 801 kg sit windward (at Y 1,65 m) :

5.1 Mass spreadsheet with input of a load

Data to enter : yellow cells	Mass (kg)	Xg (m)	Zg (m)	Yg (m)	(in the coordinates of the 2D
Displacement of ref. (kg)	*6893,63*	*4,955*	*-0,172*	*0*	*from the mass spreadsheet*
Load (kg)	**801,00**	**3,20**	**1,25**	**0,00**	Crew at center
			1,25	**1,65**	Crew sit windward
Total >>> Mass (kg)	**7694,63**	**4,772**	**-0,024**	**0,000**	**Crew at center**
Disp. (m3)	**7,50696**		**-0,024**	**0,172**	**Crew sit windward**

>>> at heel 20 ° : RM20° 50,269 kN.m Sw20° 31,69 m2 Bwl20° 2,88 m

Data to enter : yellow cells		Results			
Heel (°)	**20**	**Disp. (m3)**	**7,50695**	**/ Disp. (m3)**	**7,50696**
Height (cm)	**4,3142**	**Xc heel (m)**	**4,772**	**/ Xg (m)**	**4,772**
Trim (°)	**-0,045**	Yc heel (m)	-0,496	Yg heel (m)	0,170
		Zc heel (m)	-0,253	**> GZ (m)**	**0,666**
		Sw heel(m2)	**31,69**	**RM (kN.m)**	**50,269**
		Bwl heel (m)	**2,88**	**FB mini (cm)**	**38,6**
		LCB – LCF (%Lwl)	**1,14**	**Obliquity (°)**	**3,4**