

## Dinghy FC13

Jean-François Masset - May 2019

[jfcmasset@outlook.fr](mailto:jfcmasset@outlook.fr)

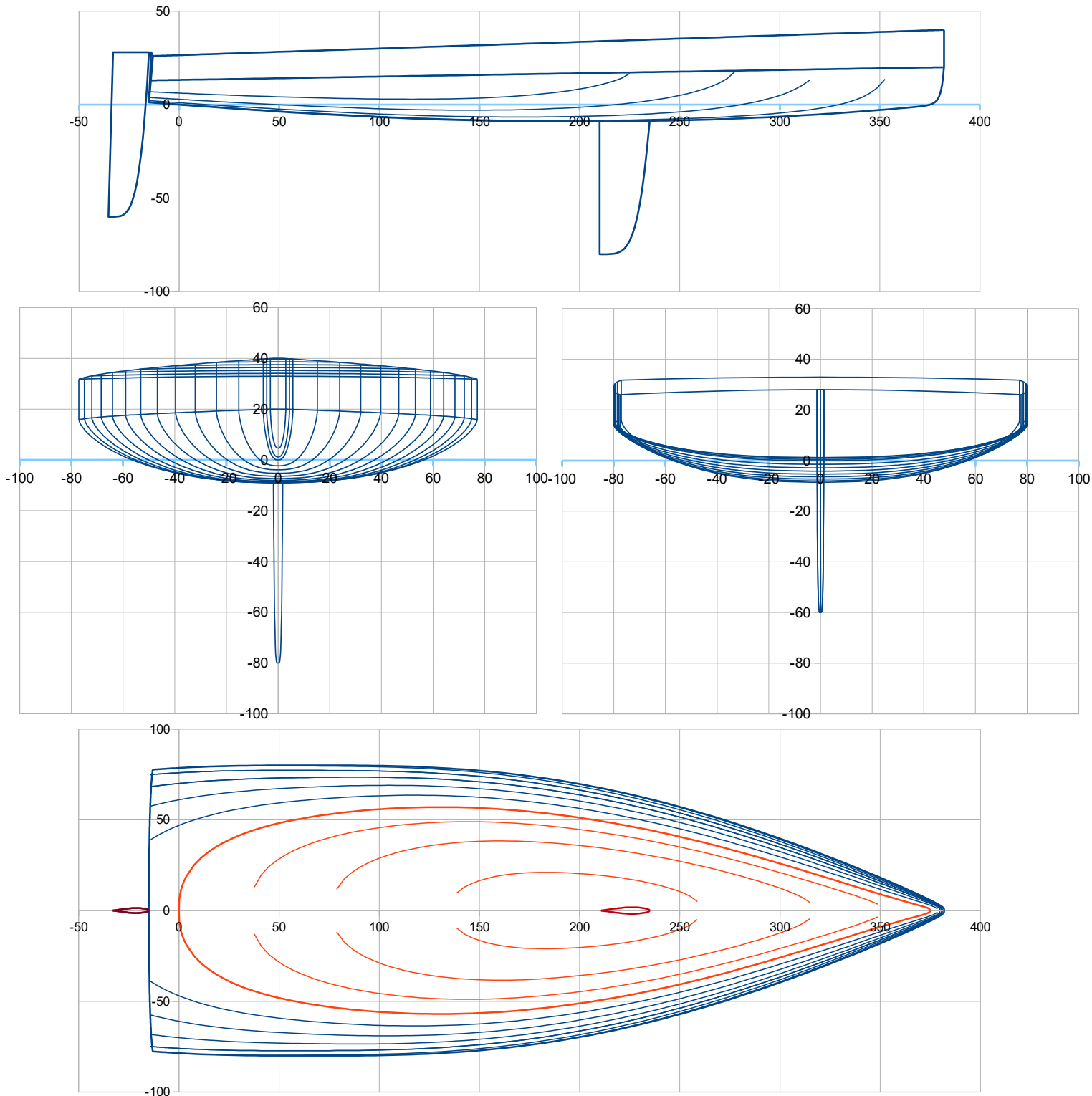
FC13 is a free interpretation inspired by Finot-Conq design Phileas 3,60 :

[http://www.finot.com/bateaux/batproduction/phileas/phileas360/phileas360\\_pres.htm](http://www.finot.com/bateaux/batproduction/phileas/phileas360/phileas360_pres.htm)

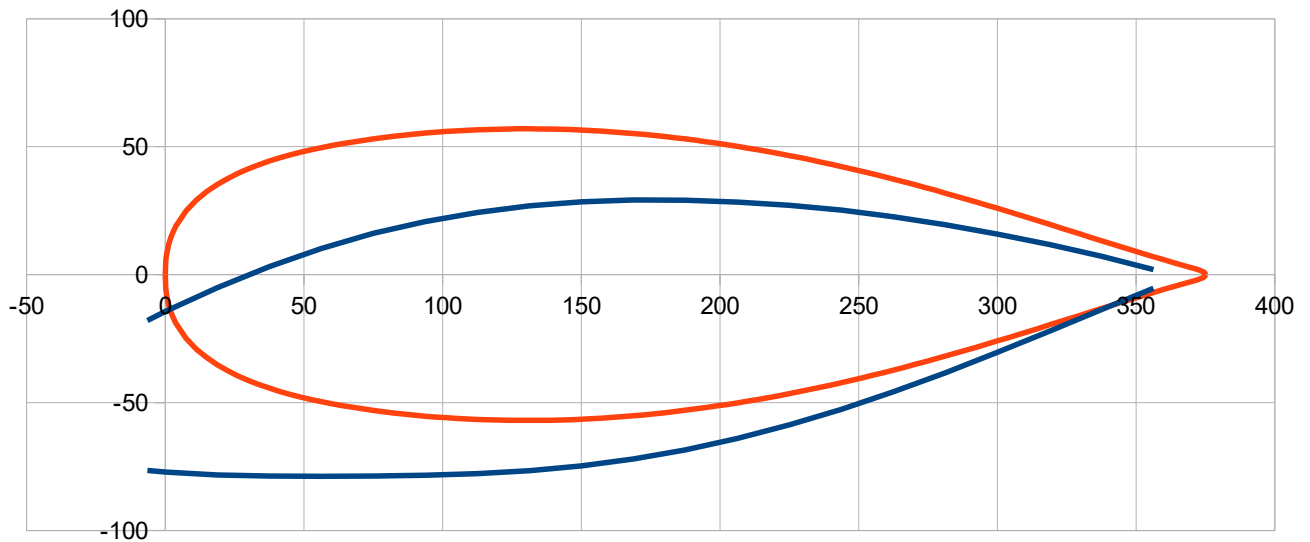
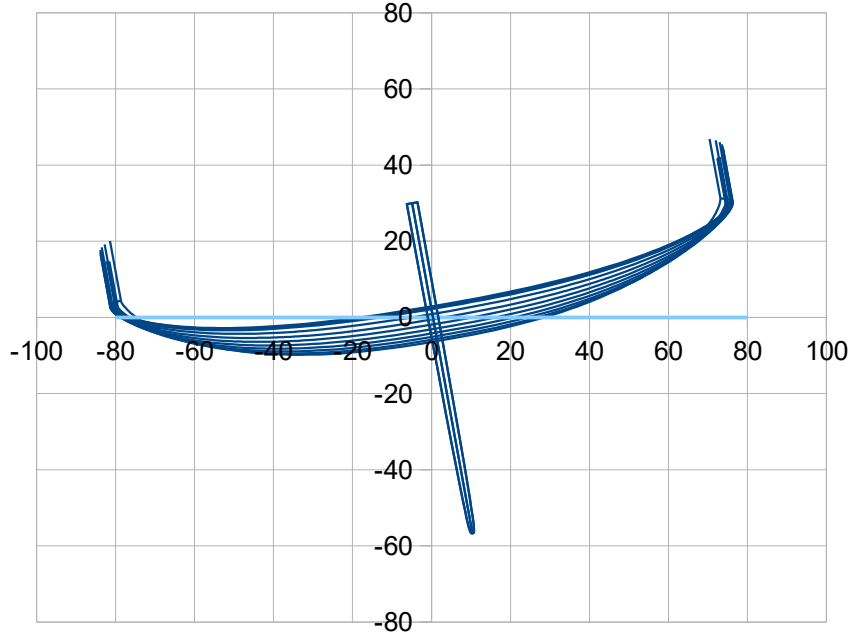
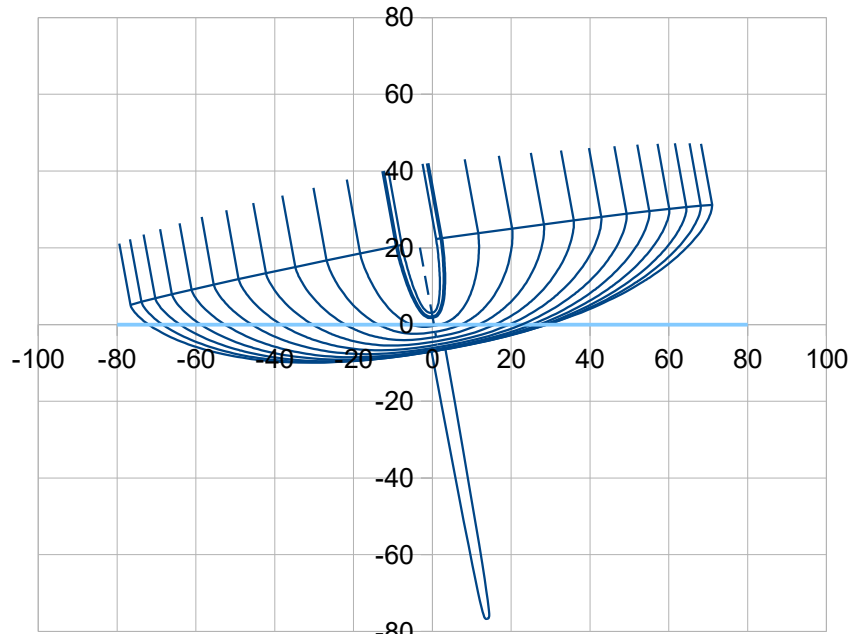
Lhull : 3,97 m (13 ft) ; Bhull : 1,60 m (at sheer line) ; Light weight assumed 59 kg (with a 8 m<sup>2</sup> sail)

With the design « payload » 95 kg (a heavy helmsman case) :

>>> Lwl : 3,75 m ; **Bwl : 1,14 m** >>> Bwl / Bhull = 0,712



With 10° heel angle :

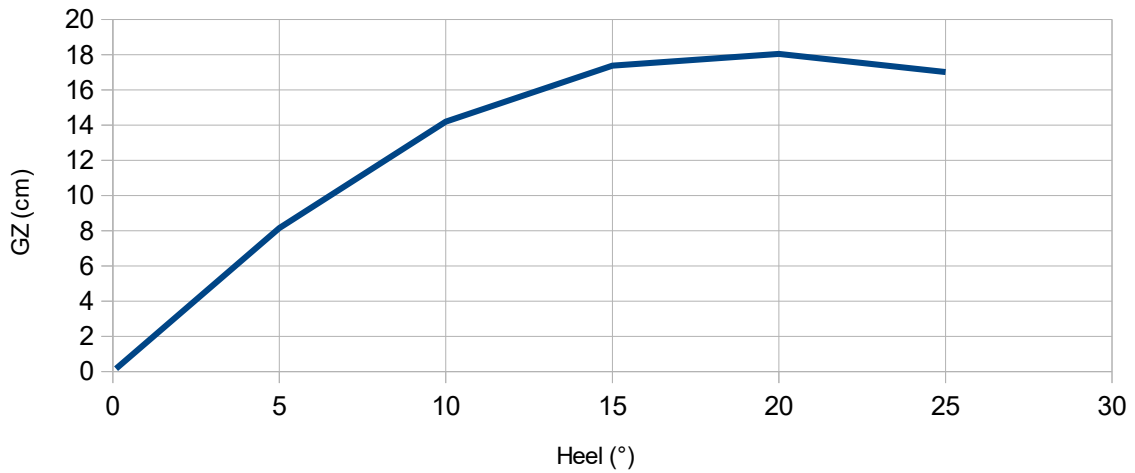


**Stability issue when considering the « payload » in the center :**

e.g. the (heavy) helmsman (95 kg) squatted in the boat center under the boom, with his center of gravity at Z +65 cm. It is typically the tack or gybe configuration. Here for the stability comparison it is assumed that the helmsman is (temporarily) fixed like a statue in the center of the boat. and we look at the righting arm GZ evolution for heel up to 25°, due to external action (waves, dynamics of a manoeuver) and/or due to a transversal offset of the payload.

**GZ versus Heel**

Payload 95 kg at center (X 150, Y 0, Z 65)

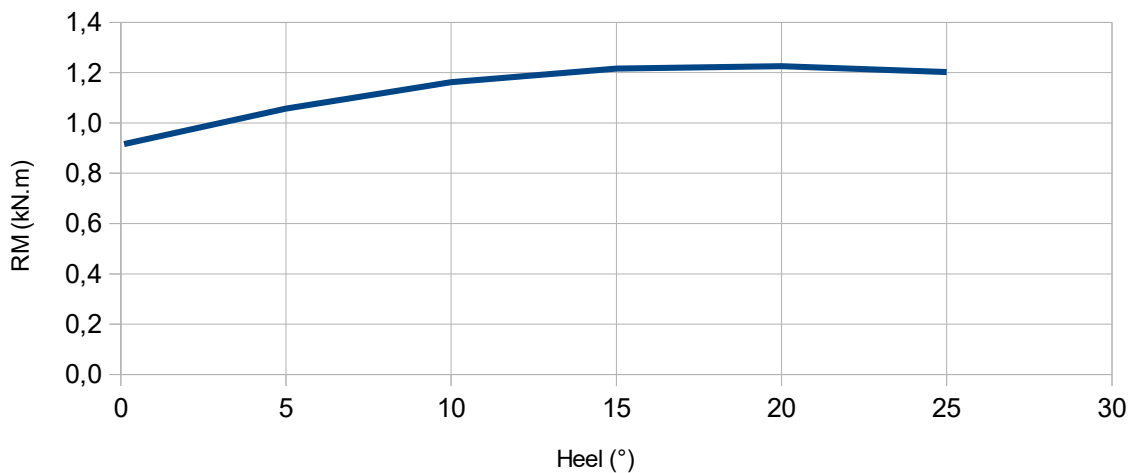


**Righting moment when the « payload » is hiking at windward :**

e.g. the helmsman is hiking with its center of gravity estimated at about Y = B/2 + 15 cm and Z = 35 cm (and X still at 150 cm).

**RM versus Heel**

Payload 95kg in hiking position (X 150, Y 98, Z 35)



Hydrostatics when upright with payload 95 kg :

### 2.1 Hull

Loa (m)	3,97	Lwl (m)	3,75	>Hull speed	4,7	(at Fn 0,4)		
>> ft	13,02		12,30					
B (m)	1,60	at X (% Lwl)	18,0					
>> ft	5,25							
Bwl (m)	1,14	at X (% Lwl)	35,0	> Bwl / B	0,712			
>> ft	3,74							
Tc (m)	0,09	at X (%Lwl)	50					
>> ft	0,30							
Displacement at H0 (m3)	0,14561	at Xc (m)	1,744	Xc (%Lwl)	46,51			
>> lbs	329	w. seawater	1025	kg/m3				
Disp at h (cm)	-0,363067944	at Xc (m)	1,755	Xc (%Lwl)	46,79			
Disp at h (cm)	0,363067944	at Xc (m)	1,733	Xc (%Lwl)	46,21			
Cp (%)	55,42							
Sf (m2)	3,00	at Xf (m)	1,590	Xf (%Lwl)	42,40	>>> Xc – Xf (%Lwl)		4,11
>> ft2	32,27	>> ft	5,22					
Angle immersed sheer li (°)	22,4	at section C4 (40% Lwl)						
Sw (m2)	3,02	>Sw/D^(2/3)	10,92					
>> ft2	32,54							
Shull (m2)	6,75	at X (m)	1,632	Z (m)	0,048			
>> ft2	72,64	>> ft	5,35	>> ft	0,16			
Sdeck (m2)	4,80	at X (m)	1,456					
>> ft2	51,71	>> ft	4,78					

### 2.2 Daggerboard

Volume (m3)	0,00283	at X (m)	2,226	X (%Lwl)	59,36	Z (m)	-0,37
Draft oa (m)	0,80			Sw (m2)	0,30	Sxz (m2)	0,15
>> ft	2,62			>> ft2	3,25	>> ft2	1,56
CLR (m)	2,288	CLR (%Lwl)	61,00	method : keel profile extended to the waterline, 25% c at 45% draft oa			
>> ft	7,50						

### 2.3 Rudder(s)

Number	1						
Volume (m3)	0,00142	at X (m)	-0,246	X (%Lwl)	-6,56	Z (m)	-0,083
Sw (m2)	0,18	>> ft	-0,81			Sxz (m2)	0,09
>> ft2	1,92					>> ft2	0,93
							per rudder

### 2.4 Hull + Daggerboard + Rudder(s)

Displacement at H0 (m3)	0,14986	at Xc (m)	1,734	Xc (%Lwl)	46,25	Zc (m)	-0,038
Disp. (kg)	153,6	>> ft	0,53			>> ft	-0,13
>> lbs	339						
Sw (m2)	3,50	>Sw/D^(2/3)	12,42	Lwl/D^(1/3)	7,06		
>> ft2	37,71			DLR	81		M(lbs/2240)/(Lwl(ft)/100)^3

### 2.5 Data from the mass spreadsheet

Boat with payload	M(kg)	153,6	at Xg (m)	1,572	Xc (%Lwl)	41,91	at Zg (m)	0,581
Light boat		58,6		1,688				0,470