

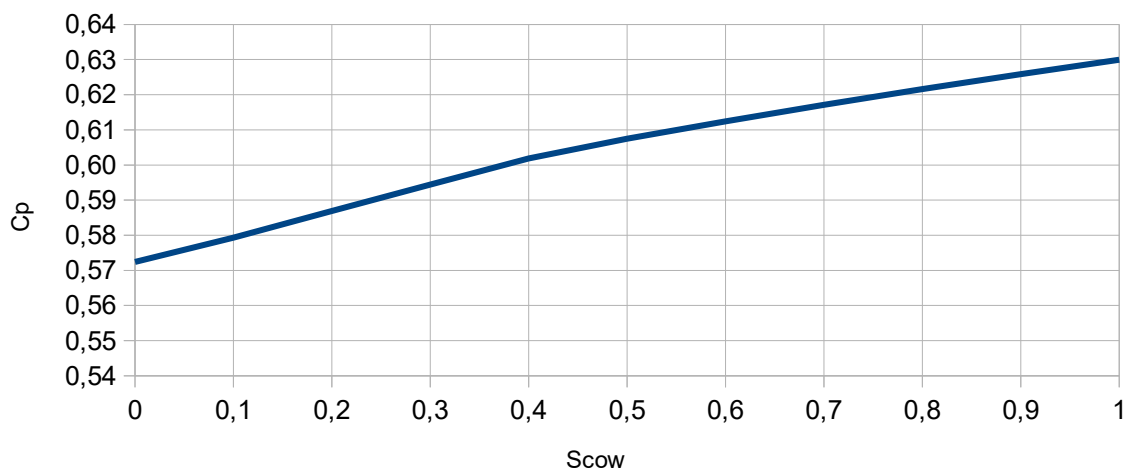
Scow Bow investigation (Rev. 1 with a focus on the Cp evolution)*Jean-françois Masset December 2019*contact : jfcmasset@outlook.fr

With introducing a « Scow » coefficient (0 to 1) within Gene-Hull, one can put a dose of scow bow influence in the hull front lines. Other parameters slightly adjusted are the waterline length, the bow line and the hull draft in order to have an adequate roundness of the bow within the same displacement and same LCB location for the comparison. The first initial hull of reference for this investigation is without scow effect, i.e. with Scow = 0. A « mid » scow bow can be generated with Scow = 0,5, a « full » scow bow with Scow = 1,0, any intermediate hull shape being possible with a Scow value between 0 and 1.

Rev.1 , the Cp evolution is also recorded within this serie, when progressively increasing the scow coefficient from 0 to 1

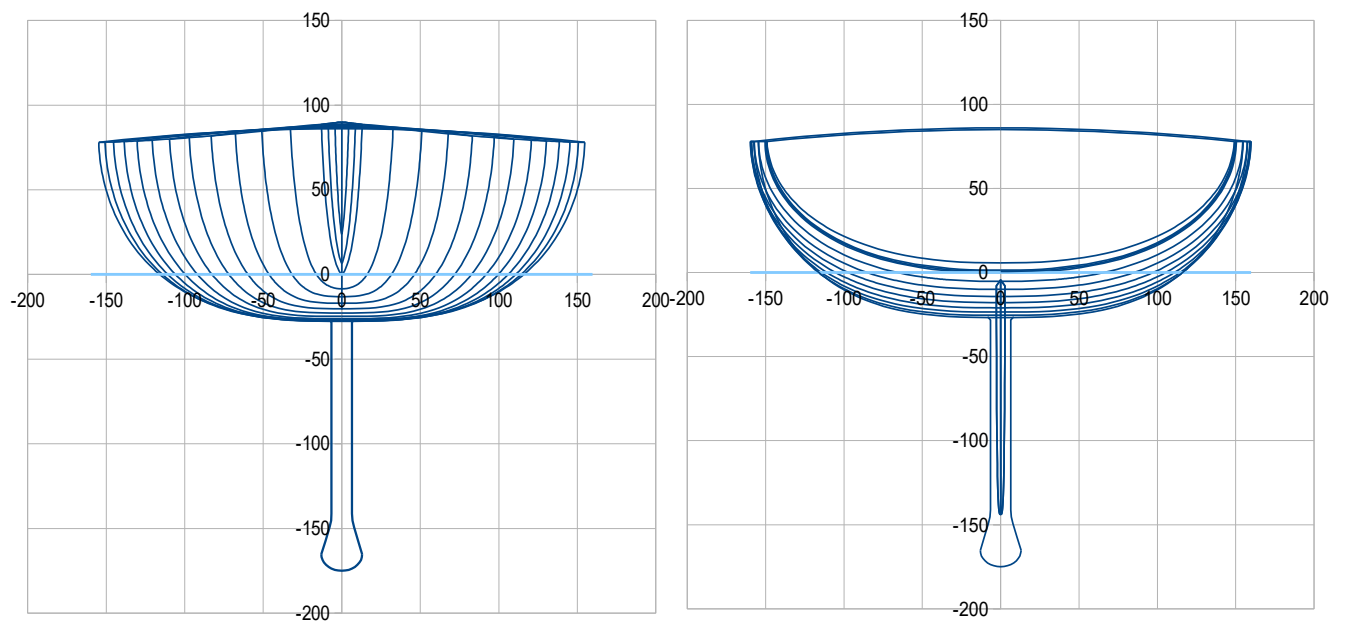
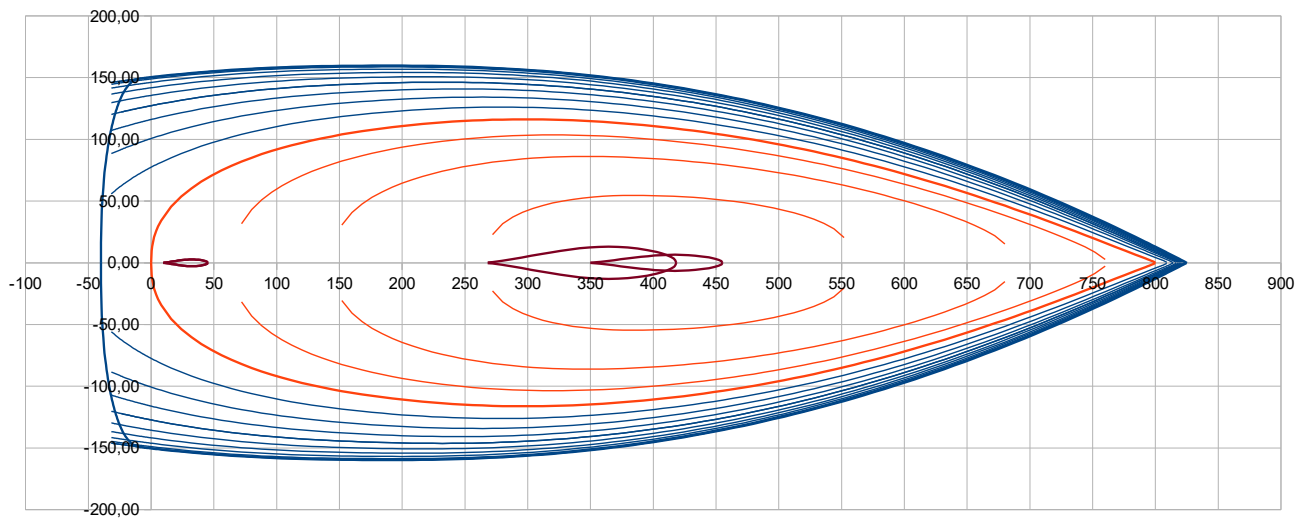
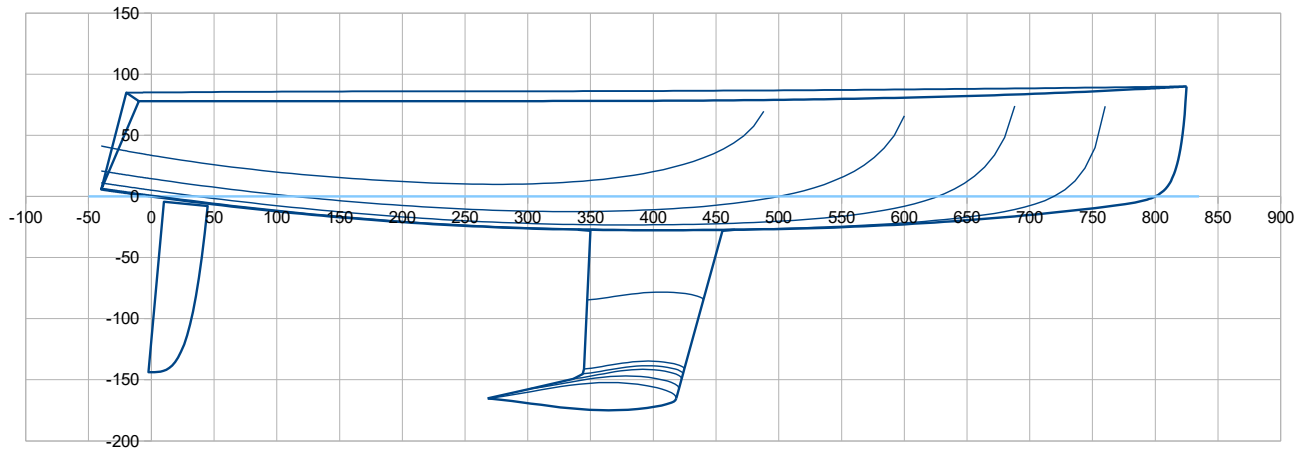
Cp versus the dose of bow scow

Scow = 0 no scow effect ; Scow =1 "full " scow bow



Initial hull without scow bow :

Scow = 0 ; Loa : 8,65 m ; Lwl 8,00 m ; B 3,20 m ; LCB : 3,78 m ; D 2400 kg ; **Cp 0,572**



Hydrostatics data :

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

2.1 Hull

Loa (m)	8,65	Lwl (m)	8,00					
>> ft	28,38		26,25					
B (m)	3,20	at X (% Lwl)	24,0					
>> ft	10,48							
Bwl (m)	2,32	at X (% Lwl)	37,0	> Bwl/B	0,728			
>> ft	7,63			Freeboards (m) >				
Tc (m)	0,2765	at X (%Lwl)	50,0			Aft	Midship	Fore
>> ft	0,91					0,78	0,78	0,90
Displacement at H0 (m3)	2,19322	at Xc (m)	3,784	Xc (%Lwl)	47,30	2,56	2,56	2,95
>> lbs	4956	w. seawater	1025	kg/m3		>> ft		
Disp at H(cm)	-3	at Xc (m)	3,834	Xc (%Lwl)	47,92	Zc (m)		-0,10
Disp at H(cm)	3	at Xc (m)	3,735	Xc (%Lwl)	46,69	Zc (m)		-0,09
Cp (%)	57,24							-0,11
Sf (m2)	13,27	at Xf (m)	3,498	Xf (%Lwl)	43,72	>>> Xc – Xf (%Lwl)		3,58
>> ft2	142,84	>> ft	11,48					
Angle immersed sheer li (°)	26,8	at section C4 (40% Lwl)						
Sw (m2)	13,84	>Sm/D^(2/3)	8,20					
>> ft2	148,94							
Shull (m2)	30,34	at X (m)	358,03	Z (m)	0,11			
>> ft2	326,59	>> ft	1174,63	>> ft	0,37			
Sdeck (m2)	20,13	at X (m)	324,91					
>> ft2	216,70	>> ft	1065,99					

2.2 Keel

Vol. keel (m3)	0,08787	at X (m)	4,017	X (%Lwl)	50,21	Z (m)	-0,81	
Mass keel(kg)	641,44212	>> ft	13,18			>> ft	-2,65	
>> lbs	1414							
Vol. Bulb(m3)	0,04714	at X (m)	3,681	X (%Lwl)	46,01	Z (m)	-1,61	
Mass bulb(kg)	344,11	>> ft	12,08			>> ft	-5,27	
>> lbs	759							
Draft oa (m)	1,75	Sw (m2)	3,51			Sxz (m2)	1,32	
>> ft	5,74	>> ft2	37,79			>> ft2	14,25	
LCR (m)	4,18	LCR (%Lwl)	52,25	method : keel profile extended to the waterline, 25% c at 45% draft oa				
>> ft2	44,99							

2.3 Rudder(s)

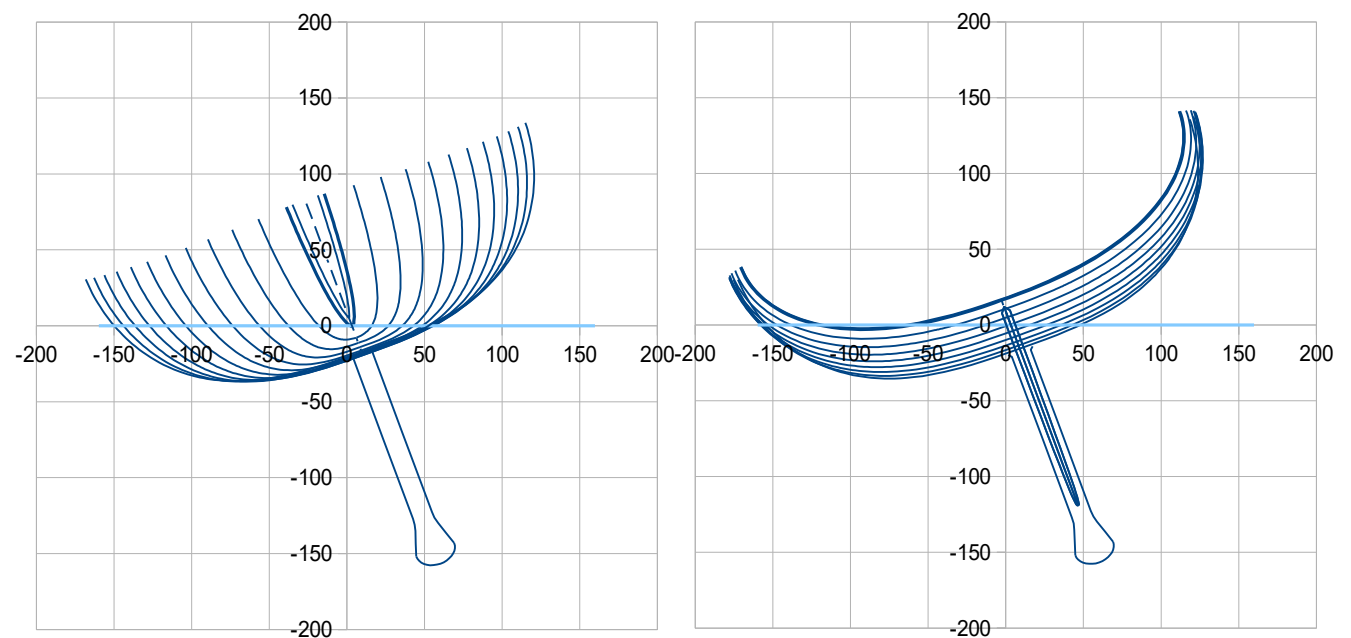
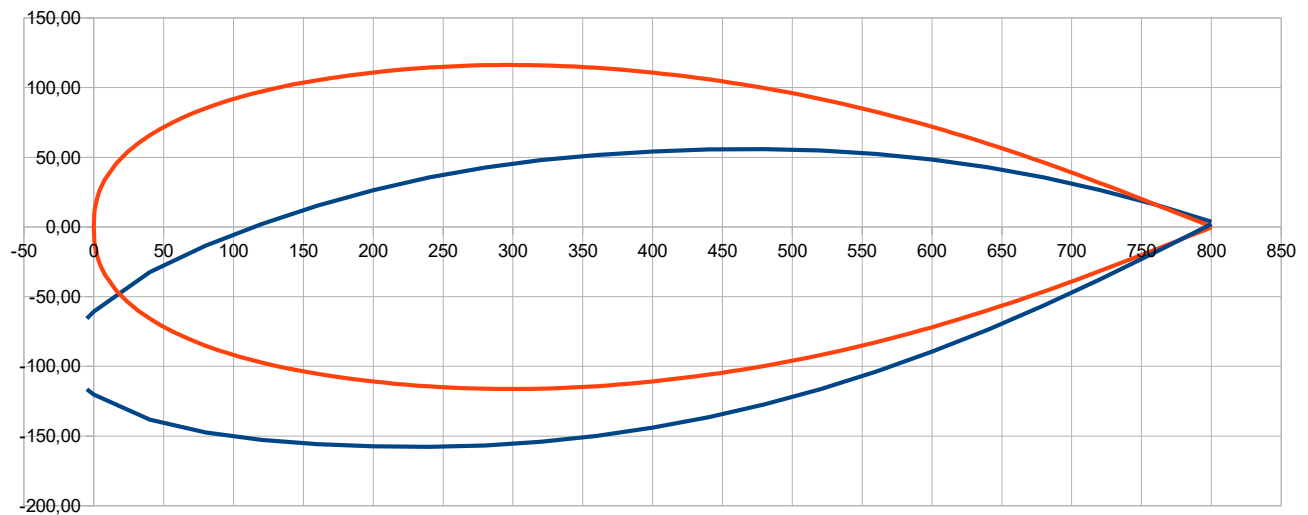
Number	1							
Volume (m3)	0,01293	at X (m)	0,235	X (%Lwl)	2,94	Z (m)	-0,64	
Sw (m2)	0,88	>> ft	0,77			Sxz (m2)	0,42	per rudder
>> ft2	9,49					>> ft2	4,56	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	2,34115	at Xc (m)	3,771	Xc (%Lwl)	47,14	Zc (m)	-0,16	
(kg)	2400	>> ft	12,37			>> ft	-0,53	
>> lbs	5290							
Ballast (kg)	986	at Xg (m)	3,899	Xg (%Lwl)	48,74	Zg (m)	-1,09	
>> lbs	2173	>> ft	12,79			>> ft	-3,57	
>> % Ballast	41,1							
Sw (m2)	18,23	>Sw/D^(2/3)	10,34	Lwl/D^(1/3)	6,02			
>> ft2	196,21			DLR	131	M(lbs/2240)/(Lwl(ft)/100)^3		

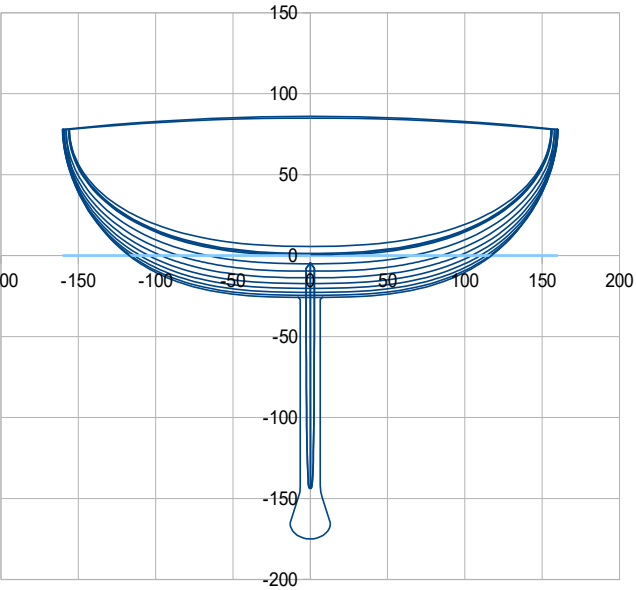
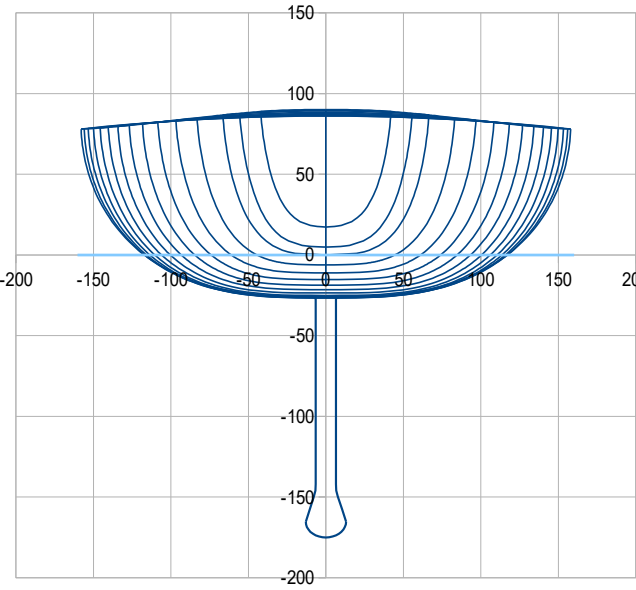
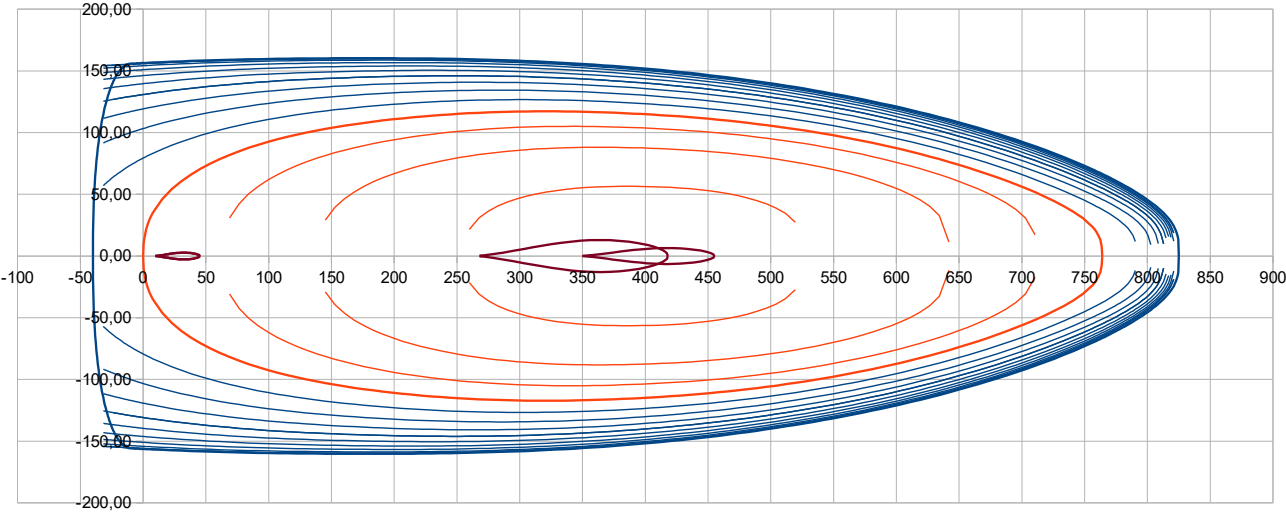
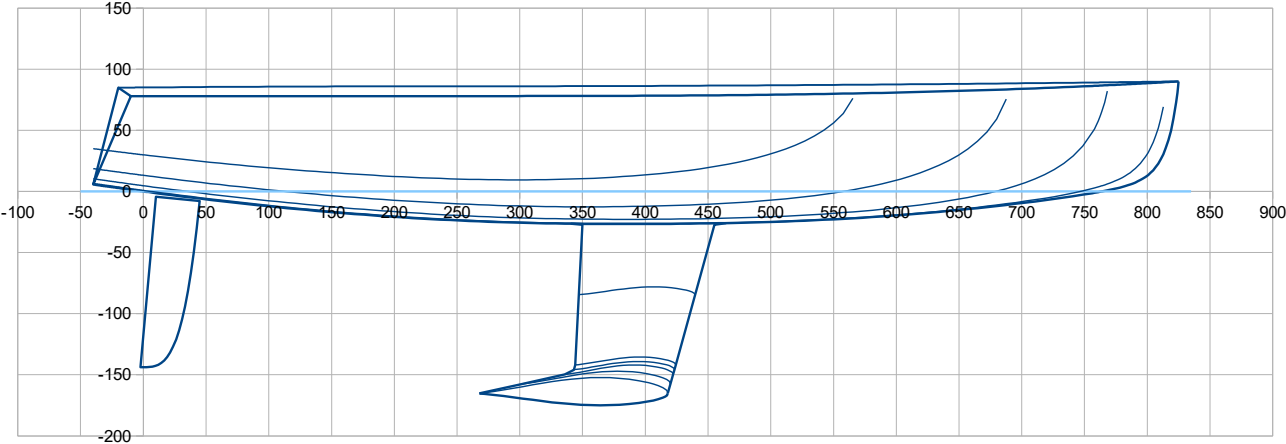
With 20° heel angle :

Data to enter		Results					
Heel (°)	20,0	Disp. Heel 0°	2,34115				
Height (cm)	9,4682	> Disp. (m3)	2,34115	Mom (m4)	1,081	Mom (kN.m)	10,87
Trim (°)	-1,294	Xc heel (m)	3,771	/ Xc 0°	3,771	> Xc 0° - Xc heel° (% Lwl)	0,00
		Yc heel (m)	-0,46	/ Yc 0°	0,00	Obliquity (°)	6,68
		Zc heel (m)	-0,17	/ Zc 0°	-0,16		
		Sw heel (m2)	17,13	/ Sw 0°	18,23		



With a « mid » scow bow :

Scow = 0,50 : Loa : 8,65 m ; Lwl 7,64 m ; B 3,20 m ; LCB : 3,78 m ; D 2400 kg ; **Cp 0,608**



Hydrostatics data :

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

2.1 Hull

Loa (m)	8,65	Lwl (m)	7,64					
>> ft	28,38		25,07					
B (m)	3,20	at X (% Lwl)	24,0					
>> ft	10,51							
Bwl (m)	2,34	at X (% Lwl)	42,0	> Bwl/B	0,732			
>> ft	7,69			Freeboards (m) >				
Tc (m)	0,2663	at X (%Lwl)	50,0			Aft	Midship	Fore
>> ft	0,87					0,78	0,78	0,90
Displacement at H0 (m3)	2,19328	at Xc (m)	3,784	Xc (%Lwl)	49,53	>> ft	Zc (m)	-0,10
>> lbs	4956	w. seawater	1025	kg/m3			>> ft	-0,32
Disp at H(cm)	-3	at Xc (m)	3,812	Xc (%Lwl)	49,89		Zc (m)	-0,09
Disp at H(cm)	3	at Xc (m)	3,757	Xc (%Lwl)	49,18		Zc (m)	-0,11
Cp (%)	60,75							
Sf (m2)	14,18	at Xf (m)	3,636	Xf (%Lwl)	47,59	>>> Xc – Xf (%Lwl)		1,94
>> ft2	152,64	>> ft	11,93					
Angle immersed sheer li (°)	26,3	at section C4 (40% Lwl)						
Sw (m2)	14,51	>Sm/D^(2/3)	8,59					
>> ft2	156,15							
Shull (m2)	31,52	at X (m)	364,72	Z (m)	0,11			
>> ft2	339,26	>> ft	1196,59	>> ft	0,36			
Sdeck (m2)	22,19	at X (m)	350,84					
>> ft2	238,80	>> ft	1151,03					

2.2 Keel

Vol. keel (m3)	0,08927	at X (m)	4,014	X (%Lwl)	52,54	Z (m)	-0,81	
Mass keel(kg)	651,66464	>> ft	13,17			>> ft	-2,65	
>> lbs	1437							
Vol. Bulb(m3)	0,04612	at X (m)	3,677	X (%Lwl)	48,13	Z (m)	-1,61	
Mass bulb(kg)	336,66	>> ft	12,06			>> ft	-5,28	
>> lbs	742							
Draft oa (m)	1,75	Sw (m2)	3,53			Sxz (m2)	1,34	
>> ft	5,74	>> ft2	37,97			>> ft2	14,39	
LCR (m)	4,18	LCR (%Lwl)	54,68	method : keel profile extended to the waterline, 25% c at 45% draft oa				
>> ft2	44,96							

2.3 Rudder(s)

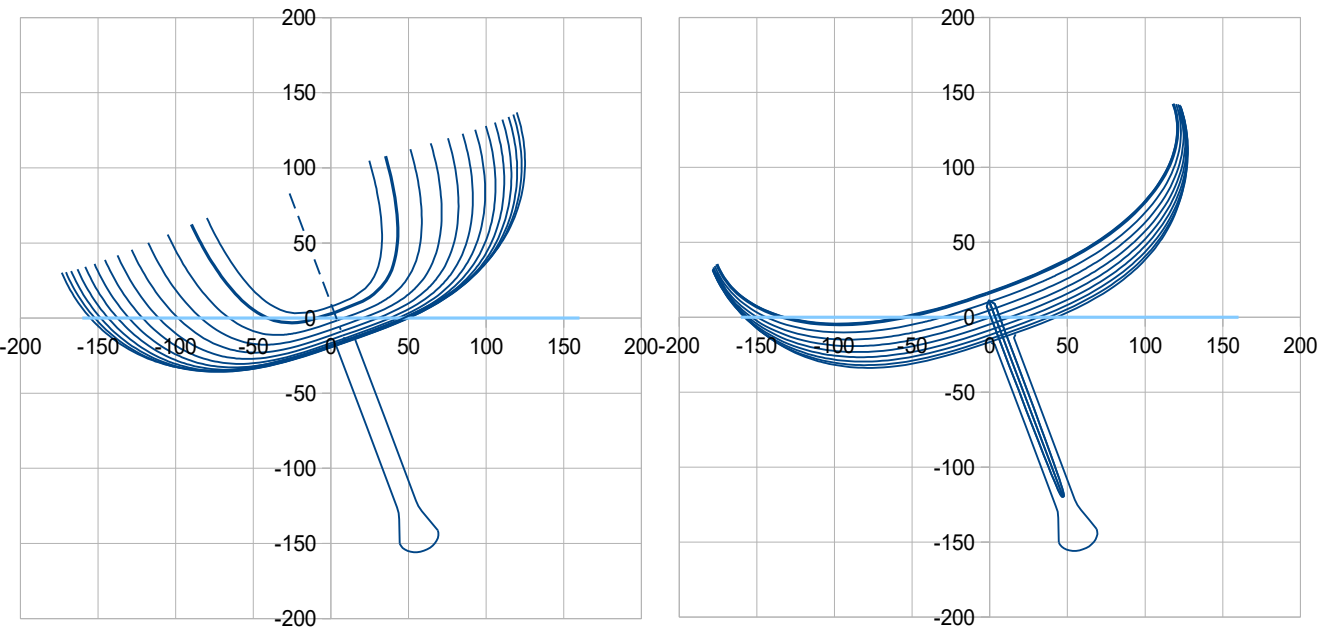
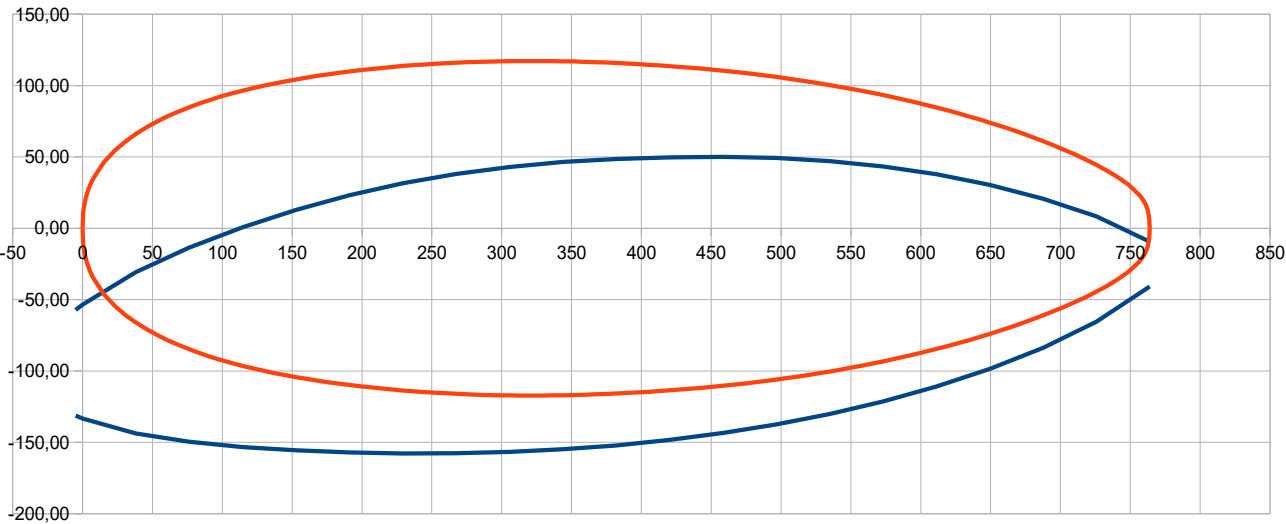
Number	1							
Volume (m3)	0,01293	at X (m)	0,235	X (%Lwl)	3,08	Z (m)	-0,64	
Sw (m2)	0,88	>> ft	0,77			Sxz (m2)	0,42	per rudder
>> ft2	9,49					>> ft2	4,56	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	2,34159	at Xc (m)	3,771	Xc (%Lwl)	49,36	Zc (m)	-0,16	
(kg)	2400	>> ft	12,37			>> ft	-0,52	
>> lbs	5291							
Ballast (kg)	988	at Xg (m)	3,899	Xg (%Lwl)	51,04	Zg (m)	-1,08	
>> lbs	2179	>> ft	12,79			>> ft	-3,54	
>> % Ballast	41,2							
Sw (m2)	18,92	>Sw/D^(2/3)	10,73	Lwl/D^(1/3)	5,75			
>> ft2	203,61			DLR	150	M(lbs/2240)/(Lwl(ft)/100)^3		

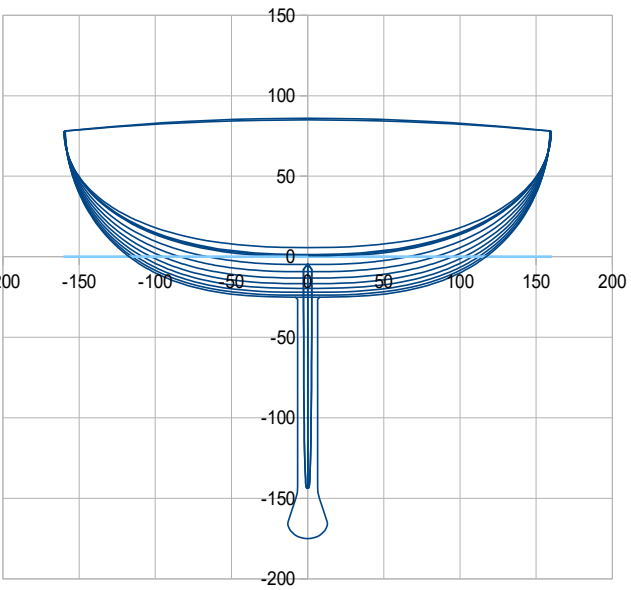
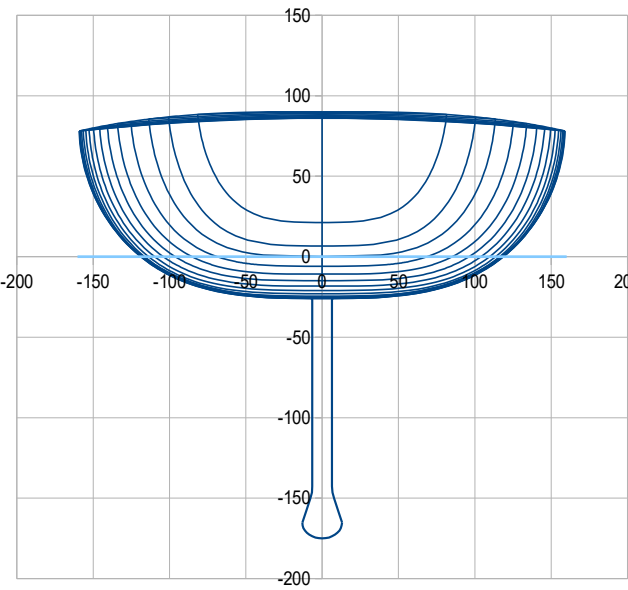
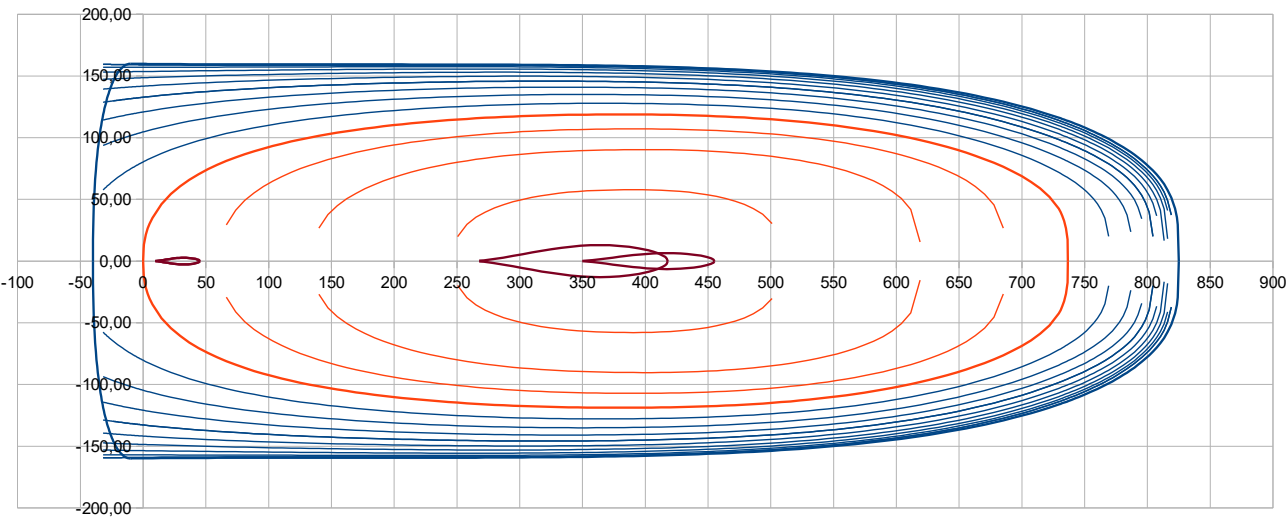
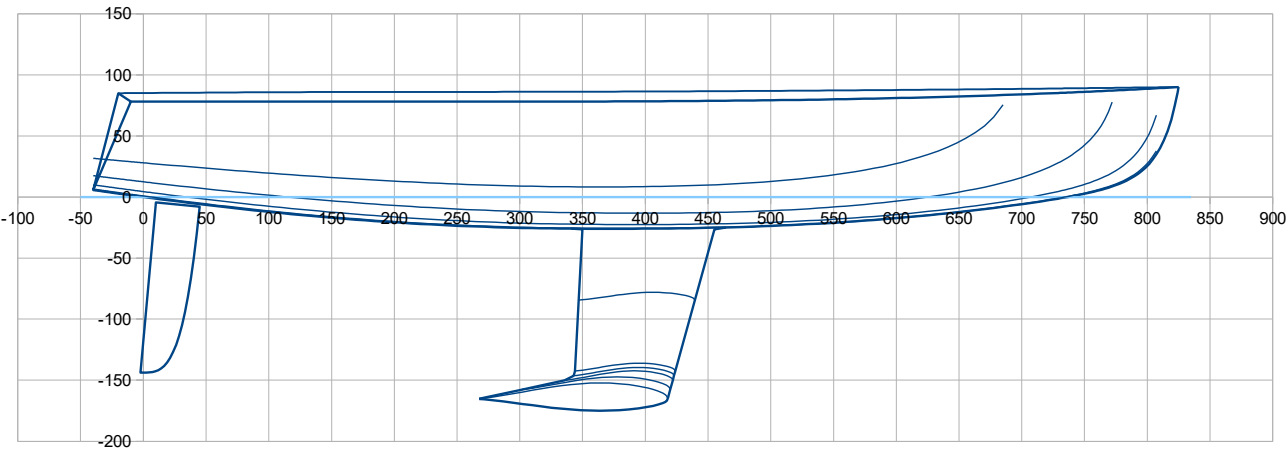
With 20° heel angle :

Data to enter		Results					
Heel (°)	20,0	Disp. Heel 0°	2,34159				
Height (cm)	10,4809	> Disp. (m3)	2,34159	Mom (m4)	1,262	Mom (kN.m)	12,69
Trim (°)	-0,953	Xc heel (m)	3,771	/ Xc 0°	3,771	> Xc 0° - Xc heel° (% Lwl)	0,00
		Yc heel (m)	-0,54	/ Yc 0°	0,00	Obliquity (°)	4,87
		Zc heel (m)	-0,17	/ Zc 0°	-0,16		
		Sw heel (m2)	17,39	/ Sw 0°	18,92		



With a « full » scow bow :

Scow 1,0 : Loa : 8,65 m ; Lwl 7,37 m ; B 3,20 m ; LCB : 3,78 m ; D 2400 kg ; **Cp 0,630**



Hydrostatics data :

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

2.1 Hull

Loa (m)	8,65	Lwl (m)	7,37					
>> ft	28,38		24,17					
B (m)	3,20	at X (% Lwl)	-5,4					
>> ft	10,51							
Bwl (m)	2,38	at X (% Lwl)	52,0	> Bwl/B	0,741			
>> ft	7,80			Freeboards (m) >				
Tc (m)	0,2601	at X (%Lwl)	50,0			Aft	Midship	Fore
>> ft	0,85					0,78	0,78	0,90
Displacement at H0 (m3)	2,19310	at Xc (m)	3,777	Xc (%Lwl)	51,27	>> ft	Zc (m)	-0,09
>> lbs	4956	w. seawater	1025	kg/m3			>> ft	-0,31
Disp at H(cm)	-3	at Xc (m)	3,792	Xc (%Lwl)	51,48		Zc (m)	-0,08
Disp at H(cm)	3	at Xc (m)	3,764	Xc (%Lwl)	51,10		Zc (m)	-0,11
Cp (%)	63,00							
Sf (m2)	14,77	at Xf (m)	3,703	Xf (%Lwl)	50,26	>>> Xc – Xf (%Lwl)		1,00
>> ft2	158,97	>> ft	12,15					
Angle immersed sheer li (°)	26,1	at section C4 (40% Lwl)						
Sw (m2)	14,96	>Sm/D^(2/3)	8,86					
>> ft2	161,03							
Shull (m2)	32,73	at X (m)	373,08	Z (m)	0,11			
>> ft2	352,25	>> ft	1224,02	>> ft	0,35			
Sdeck (m2)	23,96	at X (m)	370,90					
>> ft2	257,89	>> ft	1216,86					

2.2 Keel

Vol. keel (m3)	0,09022	at X (m)	4,013	X (%Lwl)	54,47	Z (m)	-0,81	
Mass keel(kg)	658,57320	>> ft	13,17			>> ft	-2,65	
>> lbs	1452							
Vol. Bulb(m3)	0,04533	at X (m)	3,675	X (%Lwl)	49,88	Z (m)	-1,61	
Mass bulb(kg)	330,94	>> ft	12,06			>> ft	-5,29	
>> lbs	730							
Draft oa (m)	1,75	Sw (m2)	3,54	Sxz (m2)	1,35			
>> ft	5,74	>> ft2	38,08	>> ft2	14,49			
LCR (m)	4,18	LCR (%Lwl)	56,68	method : keel profile extended to the waterline, 25% c at 45% draft oa				
>> ft2	44,95							

2.3 Rudder(s)

Number	1							
Volume (m3)	0,01293	at X (m)	0,235	X (%Lwl)	3,19	Z (m)	-0,64	
Sw (m2)	0,88	>> ft	0,77			Sxz (m2)	0,42	per rudder
>> ft2	9,49					>> ft2	4,56	

2.4 Hull + Keel + Rudder(s)

Displacement at H0 (m3)	2,34158	at Xc (m)	3,764	Xc (%Lwl)	51,10	Zc (m)	-0,15	
(kg)	2400	>> ft	12,35			>> ft	-0,51	
>> lbs	5291							
Ballast (kg)	990	at Xg (m)	3,900	Xg (%Lwl)	52,94	Zg (m)	-1,08	
>> lbs	2181	>> ft	12,79			>> ft	-3,53	
>> % Ballast	41,2							
Sw (m2)	19,38	>Sw/D^(2/3)	10,99	Lwl/D^(1/3)	5,55			
>> ft2	208,61			DLR	167	M(lbs/2240)/(Lwl(ft)/100)^3		

With 20° heel angle :

Data to enter		Results					
Heel (°)	20,0	Disp. Heel 0°	2,34158				
Height (cm)	11,9489	> Disp. (m3)	2,34158	Mom (m4)	1,436	Mom (kN.m)	14,44
Trim (°)	-0,435	Xc heel (m)	3,764	/ Xc 0°	3,764	> Xc 0° - Xc heel° (% Lwl)	0,00
		Yc heel (m)	-0,61	/ Yc 0°	0,00	Obliquity (°)	2,44
		Zc heel (m)	-0,16	/ Zc 0°	-0,15		
		Sw heel (m2)	17,60	/ Sw 0°	19,38		

