

Corbin 39 – VPP with Displacement 15 t and comparison – 05 06 2020

Mass breakdown for the 2 displacements :

D 14000 kg (reminded) :

Mass and Xg, Zg position – early stage estimation	Input data		Results				
	L or S or V m or m2 or m3	mass unit or % Disp.	Mass (kg)	Xg (m)	M Xg	Zg (m)	M Zg
Hull (skin, stiffeners, reinforcements)							
Upper hull	35,85	24,72	886,2	4,86	4306,99	0,65	576,04
Lower hull	25,24	35,15	887,1	4,57	4053,86	-0,41	-363,69
Keel (GRP part)	8,27	46,50	384,6	4,93	1895,86	-1,13	-434,55
Skeg-Rudder (GRP part)	2,44	38,75	94,4	0,46	43,44	-0,89	-83,98
		(kg/m2)					
Deck – roof – cockpit(skin and structure)	32,53	40,27	1310,0	4,87	6379,62	1,31	1716,08
		(kg/m2)					
Rig, sails and deck fittings (for sails service)			625,3	5,55	3472,76	5,51	3446,48
Deck/other various equipment (safety, tender, ...)			200,0	4,87	974,00	1,61	322,00
Cabin accomodation, internal equipment, motor, ...			5380,1	4,22	22725,67	0,16	854,61
Ballast / Lead part	0,35968	11350	4082,3	4,69	19129,62	-1,35	-5495,89
		(kg/m3)					
Rudder and helm / mechanical system			150,0	0,46	69,05	0,00	0,00
Results : Light weight boat >>>			14000,0	4,504	63050,88	0,038	537,08

D 15000 kg, where an extra 1000 kg is added, assumed in the geometrical center of the cabin (at Xg 4,22 m and Zg 0,25 m)

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Rudder and helm / mechanical system			150,0	0,46	69,05	0,00	0,00
Results : Light weight boat >>>			15000,0	4,485	67274,88	0,052	787,08

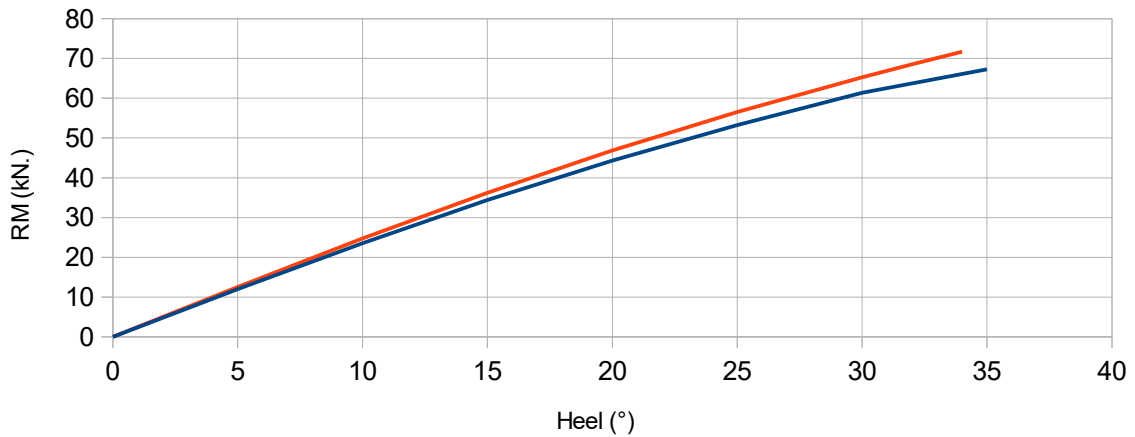
>>> that leads to a global Zg at 0,052 m (instead of 0,038 m when 14000 kg)

Sinkage / H0 linesplan , Lwl and Bwl for D 15 000 kg :

D 14000 kg		D 15000 kg
Sinkage 12,9 cm	>>>	16,7 cm
L wl 10,05 m	>>>	10,13 m
Bwl 3,52 m	>>>	3,57 m

RM curve for the VPPs

Blue : 14000 kg (with Xg 4,505 m ; Zg 0,038 m)
 Red : 15000 kg (with Xg 4,485 m ; Zg 0,052 m)

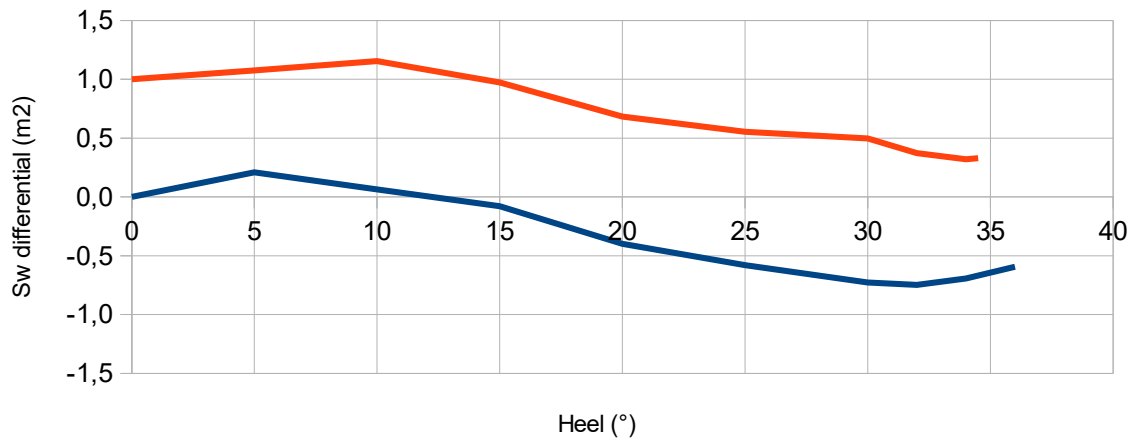


D 14000 kg		>>>	D 15000 kg	
Heel (°)	Average RM (kN.m)		Heel (°)	Average RM (kN.m)
0	0,00		0	0,00
5	11,97		5	12,55
10	23,54		10	24,77
15	34,37		15	36,23
20	44,34		20	46,89
25	53,28		25	56,52
30	61,38		30	65,28
35	67,31		32	68,53
			34	71,68

Wetted surface (at heel 0°) : Sw = 37,32 m2 (D 14000 kg) >>> 38,32 m2 (D 15000 kg)

Wetted surface differential with heel

Blue : 14000 kg (with Xg 4,505 m ; Zg 0,038 m)
 Red : 15000 kg (with Xg 4,485 m ; Zg 0,052 m)



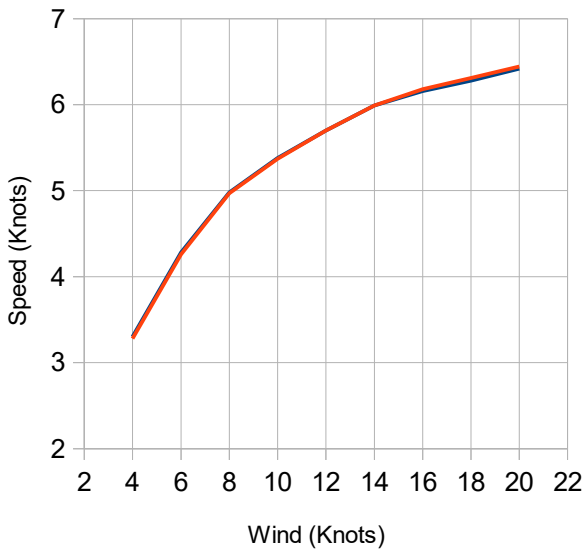
Performance comparison :

Done with 2VPPs (SA-VPP, USVPP) and with the sailplan mk2 49'

Upwind : (with the respective optimum twa(s) used by each VPPs)

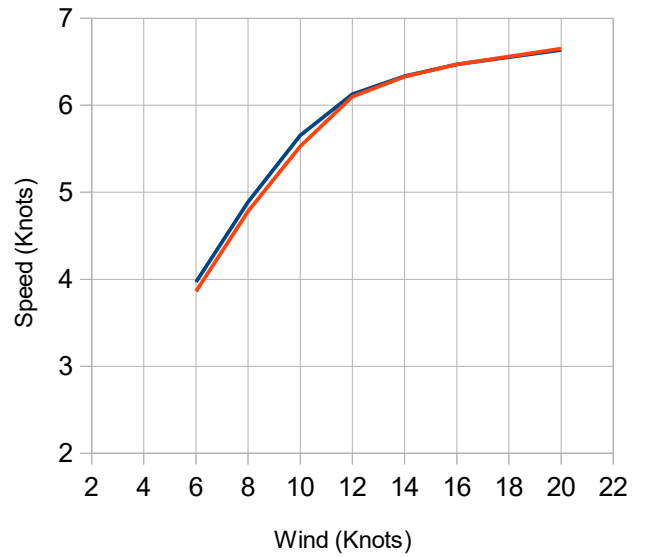
mk2 49' - SA-VPP - Speed when upwind

Blue : 14000 kg ; Red : 15000 kg



mk2 49' - USVPP - Speed when upwind

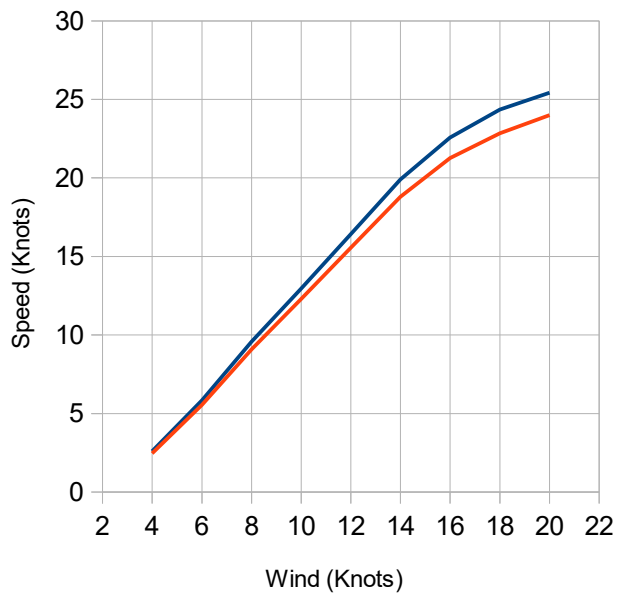
Blue : 14000 kg ; Red : 15000 kg



A slight deficit of speed when wind < 12 Knots
A slight gain of speed when wind > 18 Knots
Order of magnitude < 0,1 Knots

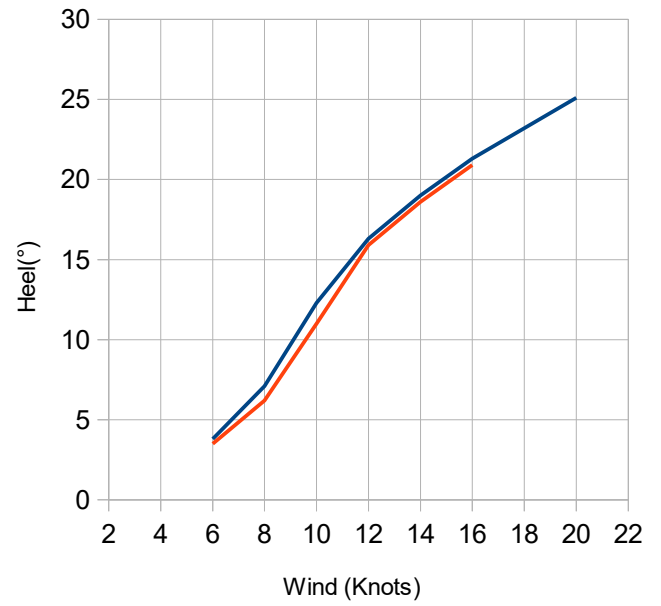
mk2 49' - SA-VPP - Heel when upwind

Blue : 14000 kg ; Red : 15000 kg



mk2 49' - USVPP - Heel when upwind

Blue : 14000 kg ; Red : 15000 kg

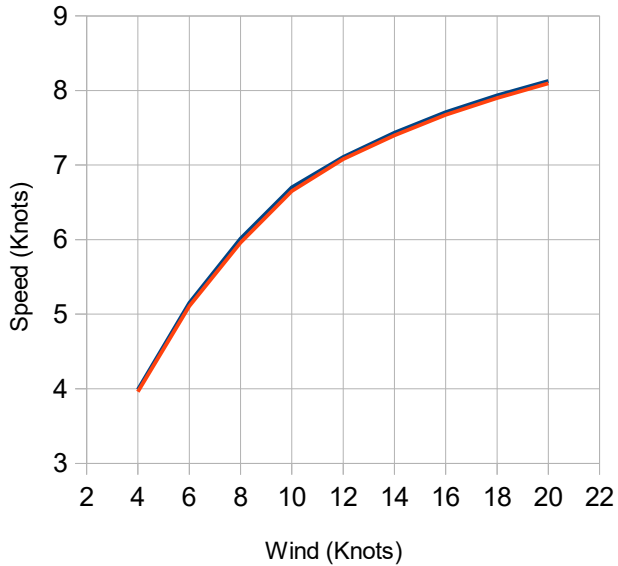


A reduction of the heel angle,
Order of magnitude ~ 0,5° to 1,5°

Beam reaching twa 90°

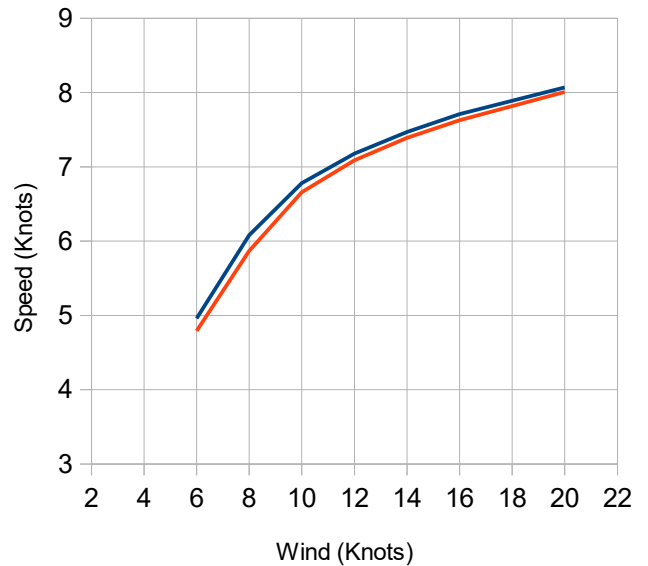
mk2 49' - SA-VPP
Speed Beam reaching twa 90°

Blue : 14000 kg ; Red : 15000 kg



mk2 49' - USVPP
Speed Beam reaching twa 90°

Blue : 14000 kg ; Red : 15000 kg



A slight deficit of speed, more visible with Span, less visible with SA-VPP.

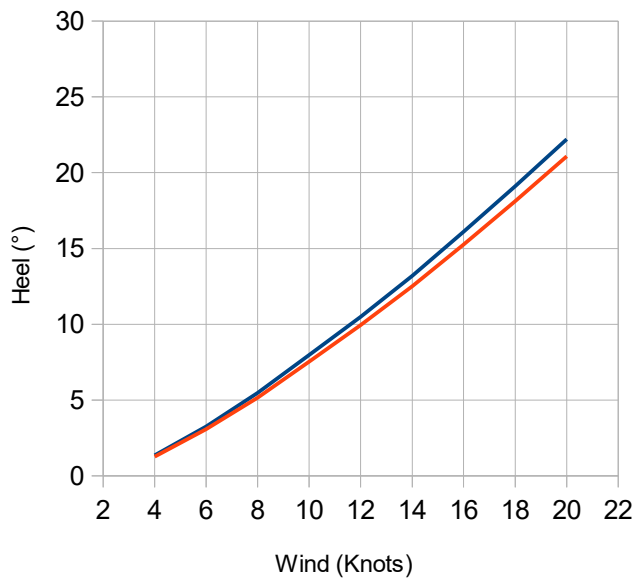
Order of magnitude in average, from USVPP :

< 0,2 Knots by wind < 10 Knots

< 0,1 Knots by wind 10-20 Knots

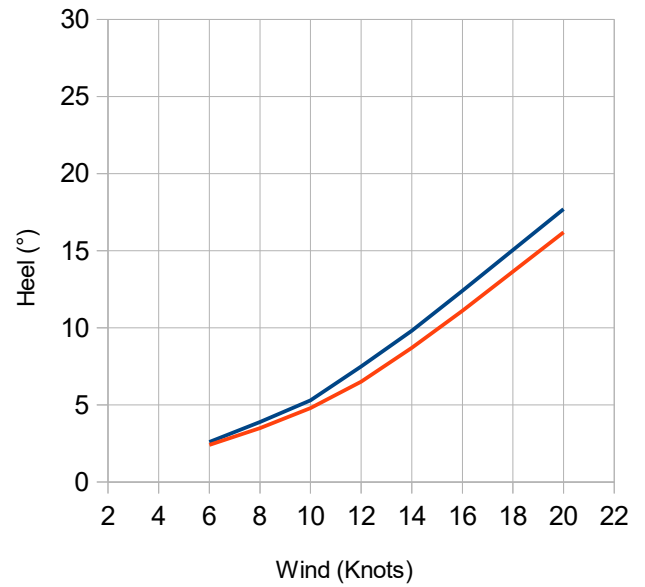
mk2 49' - SA-VPP
Heel Beam reaching twa 90°

Blue : 14000 kg ; Red : 15000 kg



mk2 49' - USVPP
Heel Beam reaching twa 90°

Blue : 14000 kg ; Red : 15000 kg

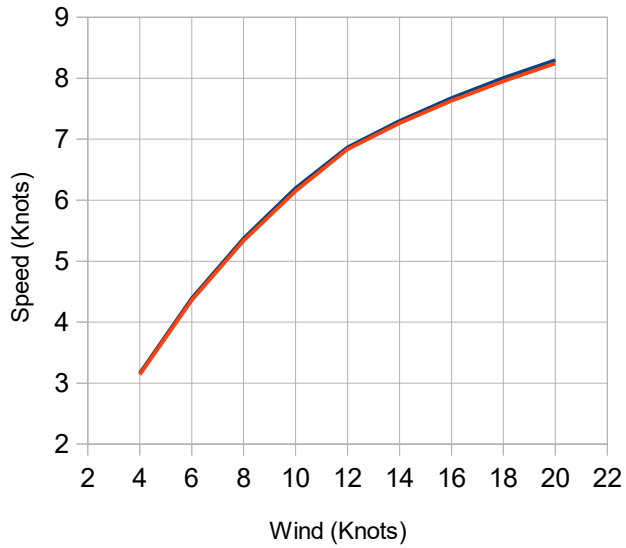


A reduction of heel angle, especially by breeze
Order of magnitude : ~ 1° to 2°

Downwind twa 135° with spi

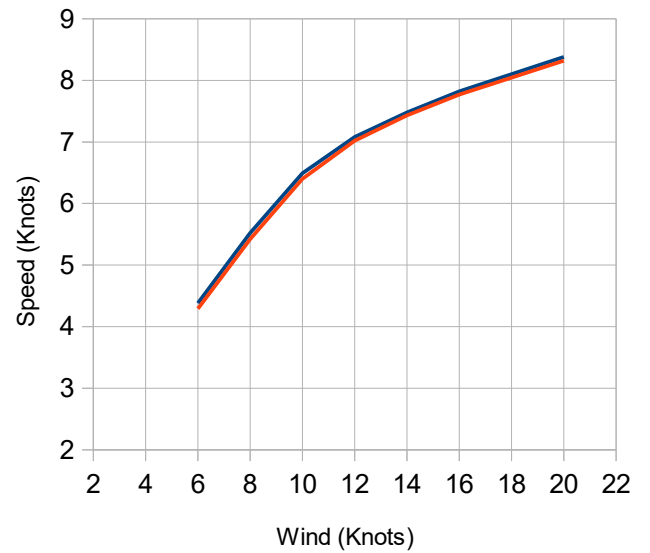
mk2 49' - SA-VPP
Speed downwind twa 135° with spi

Blue : 14000 kg ; Red : 15000 kg



mk2 49' - USVPP
Speed downwind twa 135° with spi

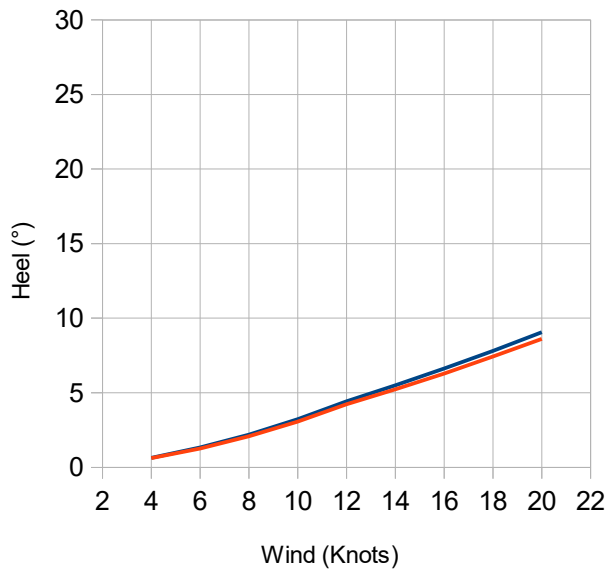
Blue : 14000 kg ; Red : 15000 kg



A quasi no deficit of speed, < 0,05 Knots.

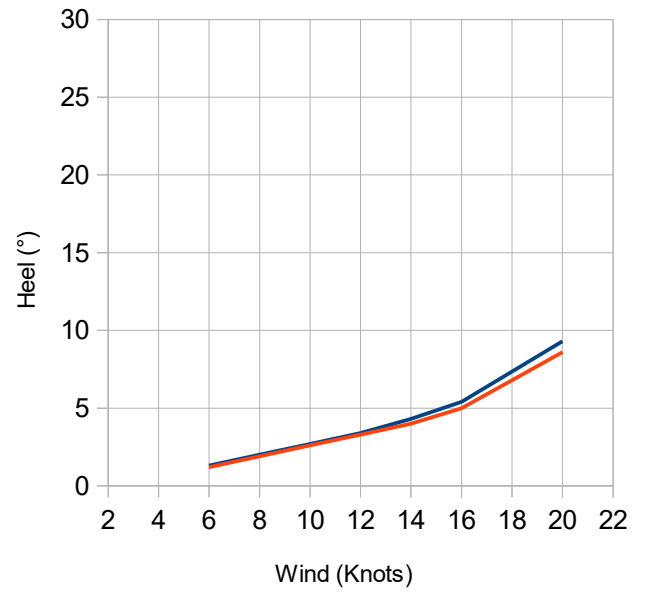
mk2 49' - SA-VPP
Heel downwind twa 135° with spi

Blue : 14000 kg ; Red : 15000 kg



mk2 49' - USVPP
Heel downwind twa 135° with spi

Blue : 14000 kg ; Red : 15000 kg

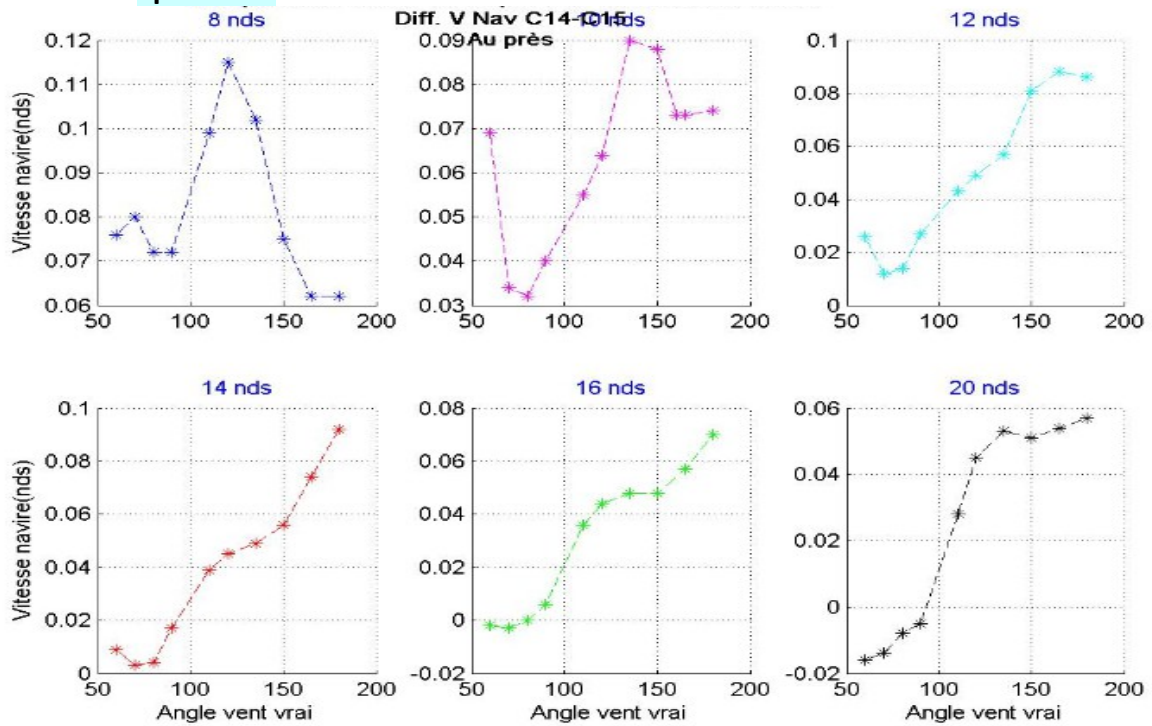


A slight reduction of the heel angle for wind > 16 Knots

Speed differential with USVPP :

(Speed with D 14 t) – (Speed with 15t)

Spi down :



Spi up :

