Pilot vessel L16,5m-mod7

Planing Hull Resistance

Razmik Baharyan

Report Time: 25 януари 2018 г., 17:54:26

Model Name: C:\Users\Razmik\Documents\My Works,07092014\Orca3D v1.3 and 1.4-WIP\Pilot vessel \Pilot vessel L16,5m-mod7, half hull_1.3dm

Prediction Parameter	Value
Method	Savitsky
SpeedCheck	Check
HullCheck	Check
DesignMarginPercent	10
DesignSpeed	26 kt
WaterType	Salt
WaterDensity	1025,9 kg/m3
WaterViscosity	1,1883E-06 m2/s
Propulsive Efficiency	50 %

Vessel Data	Value
MaxPlaningLength	14,74 m
MaxPlaningBeam	4,0782 m
DisplacementBare	27,025 tonne-f
LCGFwdTransom	5,333 m
VCGAboveBL	2,105 m
ShaftAngle	9 deg
LCEFwdTransom	0,40098 m
VCEAboveBL	0,48 m

Parameter Check	Value	Minimum	Maximum	Type
LcgBchRatio	1,3077	0,6	3	Computed
FnBchMax	2,115	1,43	13	Computed
DeadriseMidLen	0 deg	0	30	Computed
CLBmax	0,1679	0	0,5	Computed

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Speed (kt)	Fnv	Trim (deg)	Rbare (N)	Rtotal (N)	PEtotal (kW)	PPtotal (kW)
11,000	1,048	5,089	22830,7	25113,8	142,1	284,2
12,000	1,143	5,253	26268,0	28894,8	178,4	356,8
13,000	1,238	5,444	29023,0	31925,3	213,5	427,0
14,000	1,333	5,647	31241,9	34366,1	247,5	495,0
15,000	1,429	5,856	33052,6	36357,9	280,6	561,1
16,000	1,524	6,050	34470,7	37917,8	312,1	624,2
17,000	1,619	6,213	35519,3	39071,3	341,7	683,4
18,000	1,714	6,334	36217,2	39839,0	368,9	737,8
19,000	1,809	6,399	36565,9	40222,4	393,2	786,3
20,000	1,905	6,410	36624,2	40286,6	414,5	829,0
21,000	2,000	6,371	36446,0	40090,6	433,1	866,2
22,000	2,095	6,287	36086,6	39695,2	449,3	898,5
23,000	2,190	6,168	35602,4	39162,6	463,4	926,8
24,000	2,286	6,018	35028,1	38530,9	475,7	951,5
25,000	2,381	5,853	34432,0	37875,1	487,1	974,2
26,000	2,476	5,676	33828,2	37211,0	497,7	995,4
27,000	2,571	5,490	33239,0	36562,9	507,9	1015,7
28,000	2,667	5,300	32673,3	35940,6	517,7	1035,4
29,000	2,762	5,111	32155,8	35371,4	527,7	1055,4
30,000	2,857	4,924	31684,9	34853,4	537,9	1075,8

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Speed (kt)	FnBch	Eff Planing Beam (m)	Eff Deadrise (deg)	Rbare/W	Porpoising	Prediction Check
11,000	0,900	4,035	0,000	0,086	Check	Check=3
12,000	0,981	4,036	0,000	0,099	Check	Check=3
13,000	1,063	4,037	0,000	0,110	Check	Check=3
14,000	1,145	4,037	0,000	0,118	Check	Check=3
15,000	1,226	4,037	0,000	0,125	Check	Check=3
16,000	1,308	4,037	0,000	0,130	Check	OK
17,000	1,390	4,037	0,000	0,134	Check	OK
18,000	1,472	4,037	0,000	0,137	Check	OK
19,000	1,553	4,037	0,000	0,138	Check	OK
20,000	1,635	4,037	0,000	0,138	Check	OK
21,000	1,717	4,037	0,000	0,138	Check	OK
22,000	1,799	4,037	0,000	0,136	Check	OK
23,000	1,880	4,037	0,000	0,134	Check	OK
24,000	1,962	4,037	0,000	0,132	Check	OK
25,000	2,044	4,038	0,000	0,130	Check	OK
26,000	2,126	4,038	0,000	0,128	Check	OK
27,000	2,207	4,038	0,000	0,125	Check	OK
28,000	2,289	4,038	0,000	0,123	Check	OK
29,000	2,371	4,039	0,000	0,121	Check	OK
30,000	2,452	4,039	0,000	0,120	Check	OK

Sensitivity Analysis	Index	To Reduce Drag
Eff planing beam	0,52356	Increase
Eff deadrise	0,81311	Increase
LCG fwd transom	2,2287	Increase
Shaft angle to BL	0,10692	Increase

Prediction Checks

1. A wetted keel length greater than the boat length indicates that the boat is running at small trim and the bow will be immersed. In this condition, the prismatic analysis of the Savitsky prediction will be unreliable and can significantly under-predict the actual drag. However, as this condition typically occurs at pre-planing speeds, the internal hump speed correction accounts for this in the prediction of drag. There is no correction for trim.

2. The Froude number based on chine beam (FnBch) is a good indicator of the development of the spray root and the magnitude of the planing lift coefficient. Results for speeds outside of the Savitsky data set (most often for low speeds below the range) may be unreliable.

3. The lift coefficient (CLb) is a ratio of displacement to the square of speed and chine beam, with a correction for deadrise. This coefficient is a measure of the weight loading for the given planing geometry. We caution against using this method for hulls that produce this data range error.

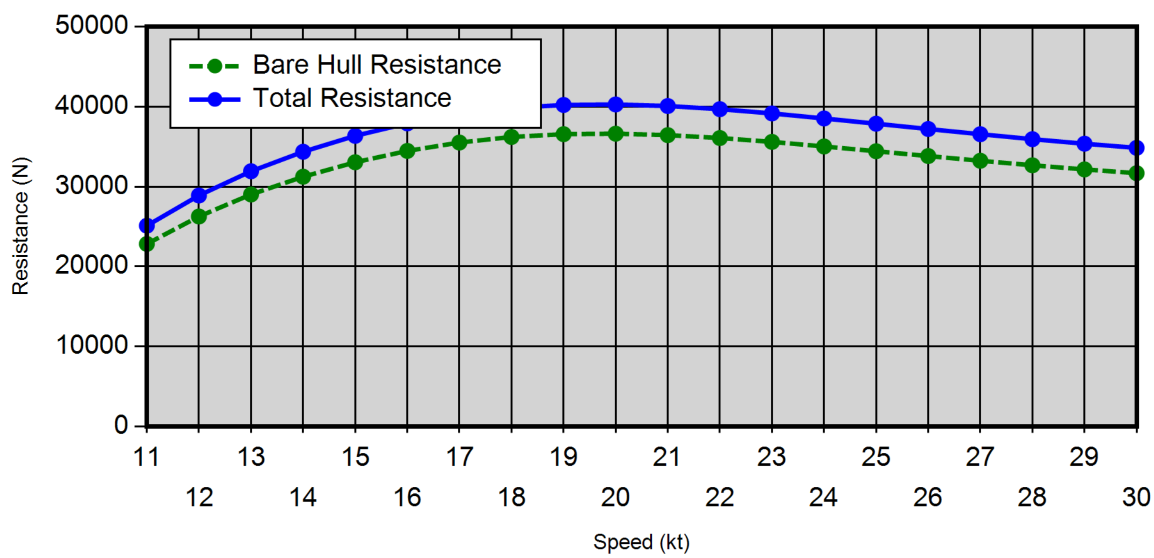
4. The original testing of the models used in the Savitsky analysis were limited to a given range of trim values. Predicted trim values that are beyond the range of the original data set may be unreliable.

Notes

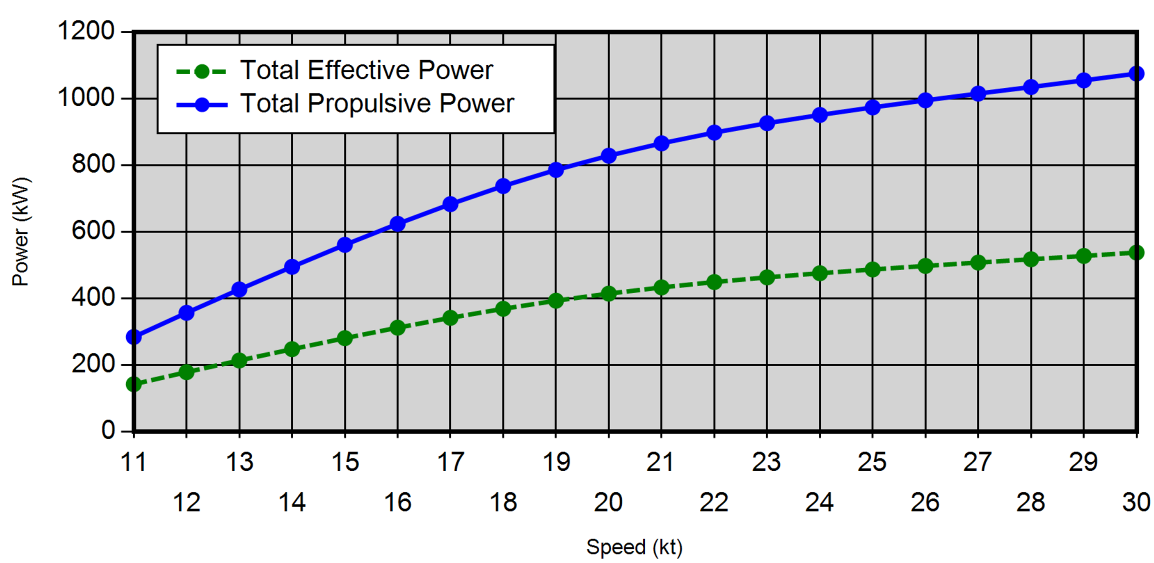
A Sensitivity index with a higher value has a greater influence on drag. Sensitivity values greater than 1.0 are considered significant.

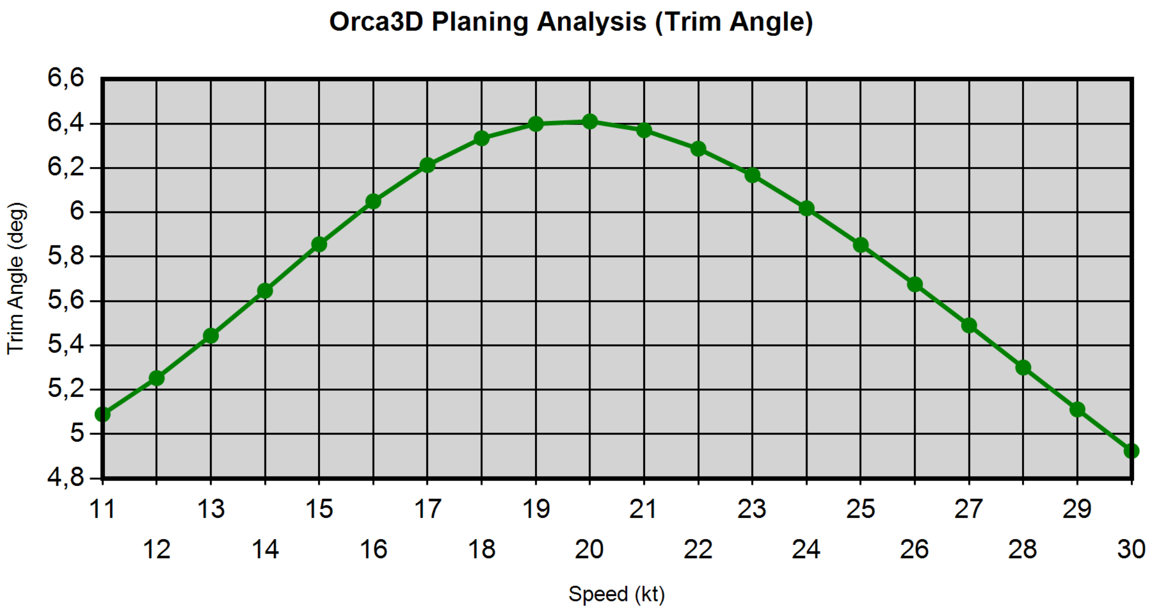
PPtotal represents the total propulsive power. Its precise definition depends on how the user specified the propulsive efficiency. If the user input the quasi-propulsive efficiency, then PPtotal is the total delivered power. If the user specified overall propulsive efficiency then PPtotal is the brake power.

Orca3D Planing Analysis (Resistance)



Orca3D Planing Analysis (Power)




Orca3D Planing Analysis (Trim Angle)
Trim Angle (deg)
6,6
6,4
6,2
6
5,8
5,6
5,4
5,2
5
4,8
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
Speed (kt)