



A Plug-in for
RhinoCeros®



Orca3D Speed/Power Analysis

"How fast will it go?" The Orca3D Speed/Power Analysis module has two different prediction methods: the Savitsky method to predict the speed/power curve for chine hulls, and the Holtrop method to predict the speed/power for displacement hulls. We have integrated the HydroComp Drag Prediction Library, to ensure reliable, accurate results.

Orca Planing Analysis

Mass and Geometry

Weight: 10000 lbf
 LCG (from origin): 15.8 ft
 VCG (from origin): 0.2 ft
 Propeller LCE (from origin): 27.25 ft
 Propeller VCE (from origin): -2.1 ft
 Shaft angle to baseline: 0 deg

Speeds

Minimum Speed: 10 kt
 Maximum Speed: 40 kt
 Speed Increment: 2 kt
 Design Speed: 26 kt

Margins and Efficiencies

Resistance Design Margin: 5 %
 Propulsive Efficiency: 50 %

Buttons: OK, Cancel

Most of the required input parameters are automatically computed from your model, although the user can input or override the values. Results are quickly generated and professionally formatted, and include checks to ensure the validity of the results. Any parameters that are outside of the ranges of the prediction method are flagged.



Default Project
 Planing Hull Resistance
 Default Company
 Report Time: 9/3/2008 8:33:52 AM

Prediction Parameter	Value	Vessel Data	Value
Method	Savitsky	MaxPlaningLength	27.310 ft
SpeedCheck	OK	MaxPlaningBeam	8.280 ft
HullCheck	OK	DisplacementBare	10000.000 lbf
DesignMarginPercent	5	LCGFwdTransom	10.599 ft
DesignSpeed	26 kt	VCGAboveBL	0.200 ft
WaterType	Salt	ShaftAngle	0.000 deg
WaterDensity	1025.9 kg/m ³	LCEFwdTransom	-0.851 ft
WaterViscosity	1.1883E-06 m ² /s	VCEAboveBL	-2.100 ft
Propulsive Efficiency	50 %		

Parameter Check	Value	Minimum	Maximum	Type
LcgBchRatio	1.28	0.6	3	Computed
FnBchMax	2.69	1.43	13	Computed
DeadriseMidLen	17.67 deg	0	30	Computed
CLBmax	0.08	0	0.5	Computed

Speed (kt)	Fnv	Trim (deg)	Rbare (N)	Rtotal (N)	PEtotal (hp)	PPtotal (hp)
10.000	1.280	4.570	5994.5	6294.2	43.42	86.84
12.000	1.540	5.380	6677.2	7011.1	58.04	116.08
14.000	1.800	5.950	6919.1	7265.1	70.17	140.34
16.000	2.050	6.130	6863.9	7207.1	79.55	159.10
18.000	2.310	5.980	6664.2	6997.4	86.89	173.78
20.000	2.560	5.650	6464.5	6787.7	93.65	187.30

Holtrop Speed/Power Analysis

Mass and Geometry

Displacement: 20021.083 tonne-f
 LCB (from origin): 79.817 m
 Lwl: 152.463 m
 Bwl: 24.964 m
 Tx: 8.000 m
 Half Entrance Angle: 40.300 deg
 Stern Coefficient: -25.000

Awp: 3220.356 m²
 Wetted Surface: 4634.009 m²
 Ax: 196.110 m²
 Transom Area: 0.000 m²
 ABulb: 0.000 m²
 ZBulb (from origin): 0.000 m

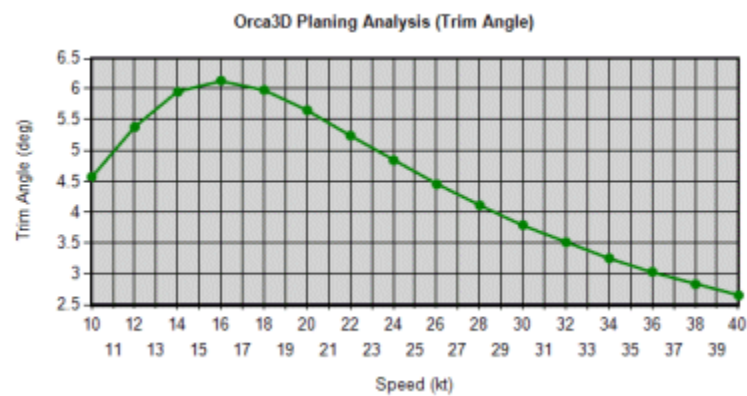
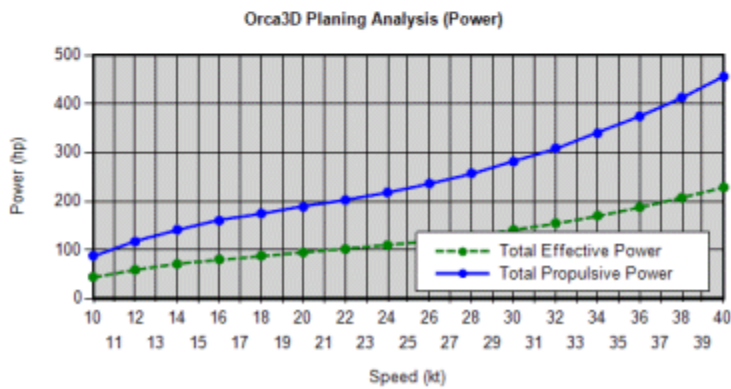
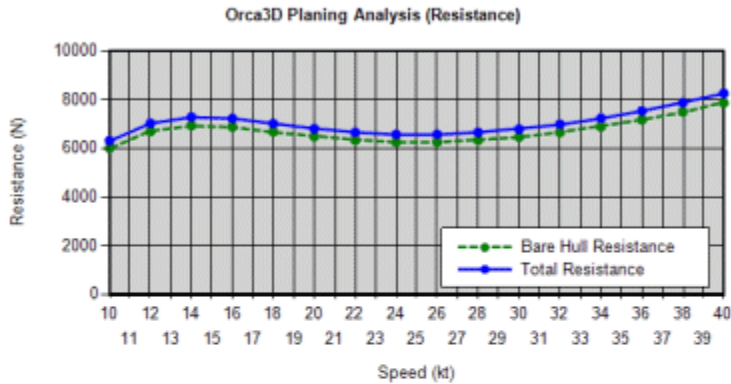
Speeds

Minimum Speed: 10.000 kt
 Maximum Speed: 20.000 kt
 Speed Increment: 1.000 kt
 Design Speed: 20.000 kt

Margins and Efficiencies

Resistance Design Margin: 0.000 %
 Propulsive Efficiency: 50.000 %

Buttons: OK, Cancel



Holtrop Analysis Report

Default Project
Displacement Hull Resistance
Default Company
Report Time: 10/1/2008 7:18:38 PM

Speed (kt)	Fv	Rbare (kN)	PEtotal (W)	PPhotal (W)	Prediction Check
12.000	0.380	192.4	1187809.92	2375619.84	OK
13.000	0.412	233.0	1558416.57	3116833.14	OK
14.000	0.443	284.1	2045904.84	4091809.68	OK
15.000	0.475	349.1	2694138.16	5388276.32	OK
16.000	0.507	432.8	3561977.20	7123954.40	OK

Sensitivity Analysis	Index	To Reduce Drag
Max section area	0.69	Increase
Waterplane area	0.81	Decrease
Immersed transom area	0.02	Decrease
LCB forward of transom	0.46	Decrease

Prediction Checks

- The Holtrop prediction method has a defined upper limit of 0.80 for the length-based Froude number (Fn). Extrapolating speed beyond this value is not recommended.
- The Holtrop prediction method contains a calculation parameter (Lambda) that is used to estimate the humps and hollows in the drag curve. Anecdotal experience and testing by HydroComp have identified combinations of parameters that can produce significant errors with the Holtrop method. The relationship between Lambda and length-based Froude number (Fn) has proven to be one such indicator of potential errors. The prediction results may be unreliable for speeds that exceed this Lambda-Fn relationship.
- The Holtrop prediction method is based on a variety of hull forms, including collections of transom-stern round-bilge hulls. As part of a broader evaluation of prediction methods for high-speed round-bilge hulls, HydroComp has identified a combination of parameters pertaining to the affect of stem geometry that is an indicator of potential errors. The prediction results may be unreliable for speeds that exceed this indicator.

Notes

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

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In addition to predicting the performance, the analysis gives insight into how to improve the performance, with a Drag Reduction Analysis. Four key parameter are evaluated, and recommendations given on adjustments to optimize your design; Planing Beam, Deadrise Angle, LCG location, and Shaft Angle.