Marine Propeller Apparent and Real Slip

Theoretical speed, apparent slip and real slip of a ship's propeller from its pitch, revolutions, ship speed and the wake fraction.

Method: Propeller slip

Input parameters

Unit system: SI

Parameter	Value	Unit
Propeller pitch	4.6000	m
Propeller speed	105.00	rpm
Ship speed through the water	14.000	kn
Taylor wake fraction	0.30000	

Calculated results

Parameter	Value	Unit
Theoretical (engine) speed P N	15.648	kn
Apparent slip (V_t − V)/V_t	10.531	%
Speed of advance V(1 − w)	9.8000	kn
Real slip (V_t − V_A)/V_t	37.372	%
Pitch × revolutions	8.0500	m/s

Notes for this case

• Apparent slip uses the ship speed; real slip the speed of advance of the water reaching the propeller. A rising apparent slip at the same power points to fouling, weather or a heavier ship.

Formula and method

$$V_t = PN, \quad s_a = \frac{V_t - V}{V_t}, \quad V_A = V(1-w), \quad s_r = \frac{V_t - V_A}{V_t}$$

Variables

P	Propeller pitch	m
N	Propeller speed	1/s
V	Ship speed through the water	m/s
w	Taylor wake fraction	-
V_t	Theoretical (engine) speed P N	m/s
s_a	Apparent slip (V_t − V)/V_t	-
V_A	Speed of advance V(1 − w)	m/s
s_r	Real slip (V_t − V_A)/V_t	-
PN	Pitch × revolutions	m/s

Method and standards

Propeller slip definitions.

Assumptions and limits

- Fixed-pitch propeller, steady speed.

References

Propeller slip

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/mechanical/marine/propeller-slip

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.