Draft Survey: Mean of Means, Hog or Sag and Draft at the LCF

Mean of means (quarter-mean) draught, hog or sag, trim and the draught at the centre of flotation from forward, midships and aft draughts in a draft survey.

Method: Draft survey: mean of means and first trim correction

Input parameters

Unit system: SI

Parameter	Value	Unit
Forward draught (mean of port and starboard, at the perpendicular)	7.2000	m
Midships draught (mean of port and starboard)	7.6200	m
Aft draught (mean of port and starboard, at the perpendicular)	7.9000	m
Length between perpendiculars	180.00	m
LCF from midships (aft positive)	3.5000	m
Tonnes per centimetre at the mean draught	45.000	t/cm

Calculated results

Parameter	Value	Unit
Mean of means ((T_F + T_A)/2 + T_M)/2	7.5850	m
Quarter mean (T_F + 6T_M + T_A)/8	7.6025	m
Hog (−) or sag (+): T_M − (T_F + T_A)/2	70.000	mm
Trim T_A − T_F (by the stern positive)	0.70000	m
Draught at the LCF on the straight keel line	7.5636	m
First trim correction to displacement	61.250	t

Notes for this case

- Draughts corrected to the perpendiculars first. The quarter mean allows for hull deflection; the first trim correction t·x_CF·TPC/L (in consistent units) moves from the mid-length draught to the LCF. Density and second trim corrections follow in a full survey.

Formula and method

$$T_{QM} = \frac{T_F + 6T_M + T_A}{8}, \quad \delta = T_M - \frac{T_F + T_A}{2}, \quad T_{CF} = \frac{T_F + T_A}{2} + t\frac{x_{CF}}{L}, \quad \Delta_1 = \frac{t\,x_{CF}\,TPC}{L}$$

Variables

T_F	Forward draught (mean of port and starboard, at the perpendicular)	m
T_M	Midships draught (mean of port and starboard)	m
T_A	Aft draught (mean of port and starboard, at the perpendicular)	m
L	Length between perpendiculars	m
x_{CF}	LCF from midships (aft positive)	m
TPC	Tonnes per centimetre at the mean draught	kg/m
T_{MM}	Mean of means ((T_F + T_A)/2 + T_M)/2	m
T_{QM}	Quarter mean (T_F + 6T_M + T_A)/8	m
δ	Hog (−) or sag (+): T_M − (T_F + T_A)/2	m
t	Trim T_A − T_F (by the stern positive)	m
T_{CF}	Draught at the LCF on the straight keel line	m

Δ_1	First trim correction to displacement	kg

Method and standards

Draft survey corrections.

Assumptions and limits

- Straight keel between perpendiculars except the parabolic deflection; calm water.

References

Draft survey: mean of means and first trim correction

Report details

Report reference	FCC-PWVE-XCYM (the same inputs always give the same reference)
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Calculator	Draft Survey: Mean of Means, Hog or Sag and Draft at the LCF
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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/draft-survey-mean-draft

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Reopens the calculator with the inputs of this report.