

Supplementary material to the paper:

## “A customised Finn dinghy rudder for optimal Olympic performance”

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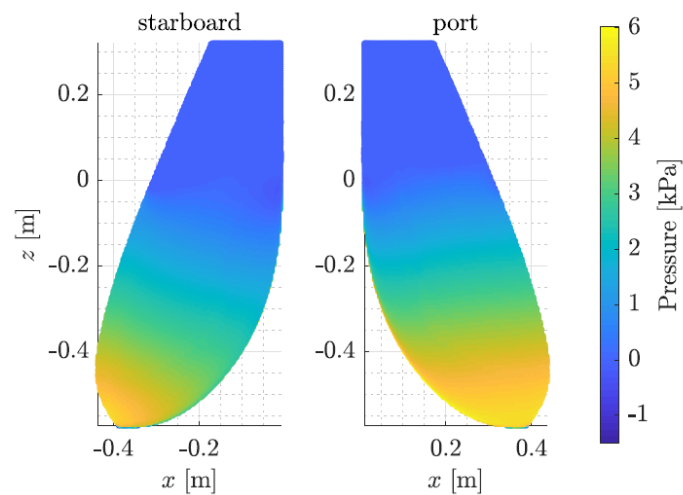
Michael Stadler <sup>1</sup>, Brina Blinzler <sup>1</sup>, Adam Persson <sup>2</sup>, Christian Finnsgård <sup>2</sup>, Max Salminen <sup>3</sup> and Martin Fagerström <sup>1,\*</sup>

<sup>1</sup> Department of Industrial and Materials Science, Chalmers University of Technology, SE-412 96 Gothenburg, Sweden.

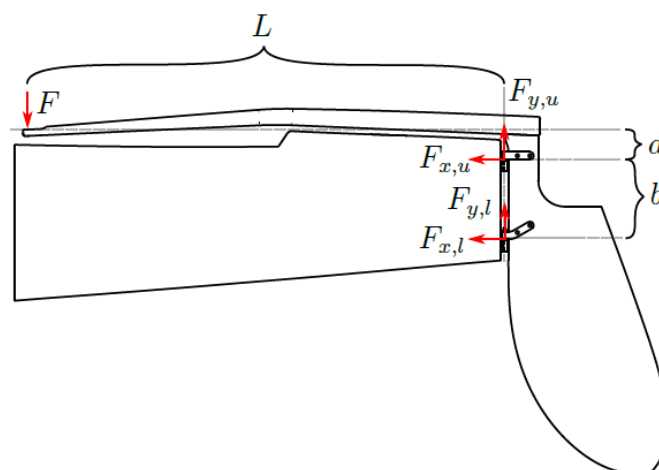
<sup>2</sup> SSPA Sweden AB, Research, Box 24001, 400 22 Göteborg, Sweden

<sup>3</sup> SWE Sailing Team, Swedish Sailing Federation, Af Pontins väg 6, 115 21 Stockholm, Sweden

\* Correspondence martin.fagerstrom@chalmers.se; Tel.: +46-70-224-8731



**Figure S1.** Pressure distribution on the rudder surface during normal sailing conditions estimated via Computational Fluid Dynamics simulations.



**Figure S2.** Illustration of the sailor supporting condition where the load of the sailor is idealised as a point force  $F=1\text{kN}$  exerted at the tip of the tiller.

**Table S1.** Mechanical properties used for XPREG XC130 Prepreg Carbon (Toray T700S) 3K, 300 gsm.

<b>Property</b>	<b>Value and unit</b>
Areal weight (per ply, including resin)	447 g/m <sup>2</sup>
Ply thickness	0.3 mm
Longitudinal modulus	135 GPa
Transverse modulus	8.6 <sup>1</sup> GPa
Out-of-plane modulus	8.6 <sup>1</sup> GPa
In-plane shear modulus	4.7 <sup>1</sup> GPa
Out-of-plane shear modulus	3.1 <sup>1</sup> GPa
Major in-plane Poisson's ratio	0.27 <sup>1</sup>
Out-of-plane Poisson's ratio	0.4
Longitudinal tensile strength	2550 MPa
Transversal tensile strength	69 MPa
Out-of-plane tensile strength	69 <sup>1</sup> MPa
Longitudinal compressive strength	1470 MPa
Transversal compressive strength	100 <sup>1</sup> MPa
Out-of-plane compressive strength	100 <sup>1</sup> MPa
In-plane shear strength	60 <sup>1</sup> MPa
Out-of-plane shear strength	32 <sup>1</sup> MPa

<sup>1</sup> Estimated value based on similar material with data from [6].

**Table S2.** Mechanical properties used for XPREG XC110 Prepreg Carbon (Pyrofil TR30S) 3K, 210 gsm, 2/2 Twill.

<b>Property</b>	<b>Value and unit</b>
Areal weight (per ply, including resin)	362 g/m <sup>2</sup>
Ply thickness	0.25 mm
Longitudinal modulus	55.1 GPa
Transverse modulus	55.1 GPa
Out-of-plane modulus	7 <sup>1</sup> GPa
In-plane shear modulus	19.5 <sup>1</sup> GPa
Out-of-plane shear modulus	2.7 <sup>1</sup> GPa
In-plane Poisson's ratio	0.04
Out-of-plane Poisson's ratio	0.3
Longitudinal tensile strength	521 MPa
Transversal tensile strength	521 MPa
Out-of-plane tensile strength	50 <sup>1</sup> MPa
Longitudinal compressive strength	483 MPa
Transversal compressive strength	483 MPa
Out-of-plane compressive strength	170 <sup>1</sup> MPa
In-plane shear strength	125 <sup>1</sup> MPa
Out-of-plane shear strength	65 <sup>1</sup> MPa

<sup>1</sup> Estimated value based on similar material with data from [6].