

LOW DRAG KAYAKS

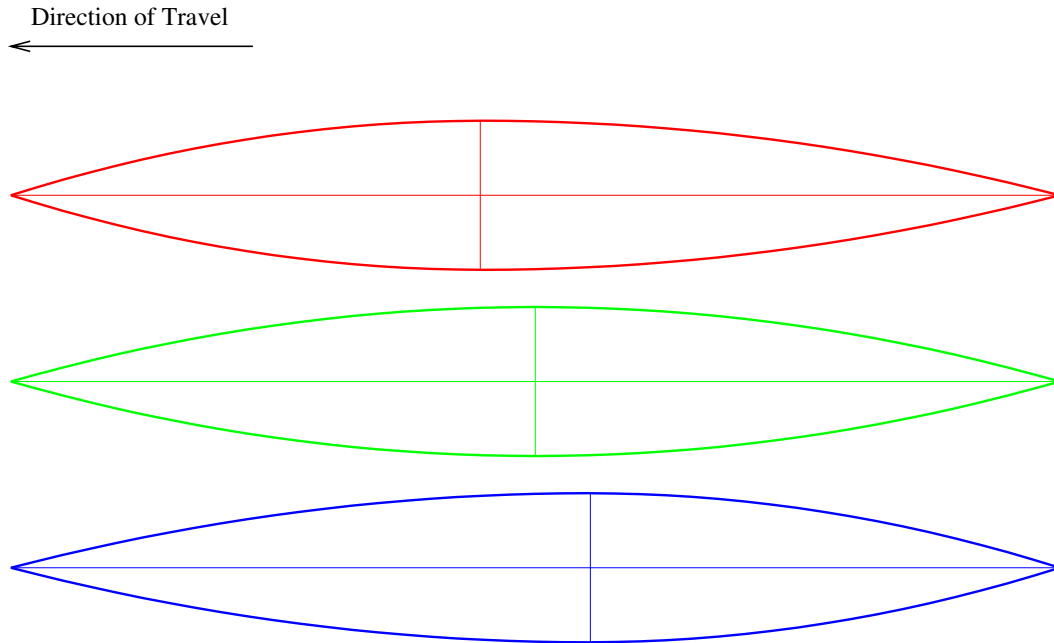
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Cyberiad

THREE K1 HULLS

Fish, Symmetric & Swede

100kg Displacement



Same Weight, Width and
almost identical Surface Area

TOTAL HYDRODYNAMIC RESISTANCE

=

SKIN-FRICTION

+

WAVE RESISTANCE

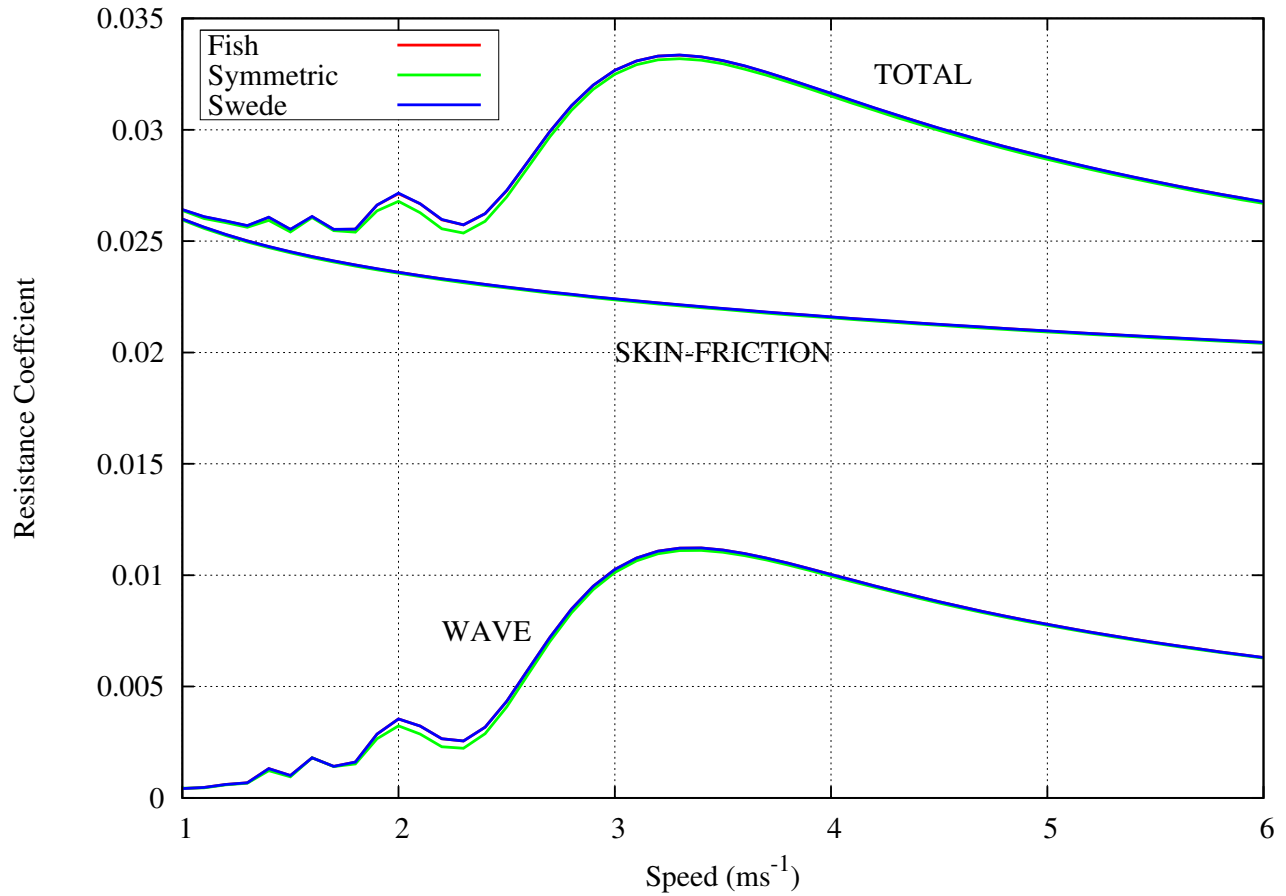
SKIN-FRICTION

1. MAJOR COMPONENT OF THE TOTAL
2. PROPORTIONAL TO WETTED AREA

WAVE RESISTANCE

1. PROPORTIONAL TO BEAM SQUARED
2. MINIMUM FOR SYMMETRIC HULLS
3. SAME FORWARDS AND BACKWARDS

TOTAL RESISTANCE

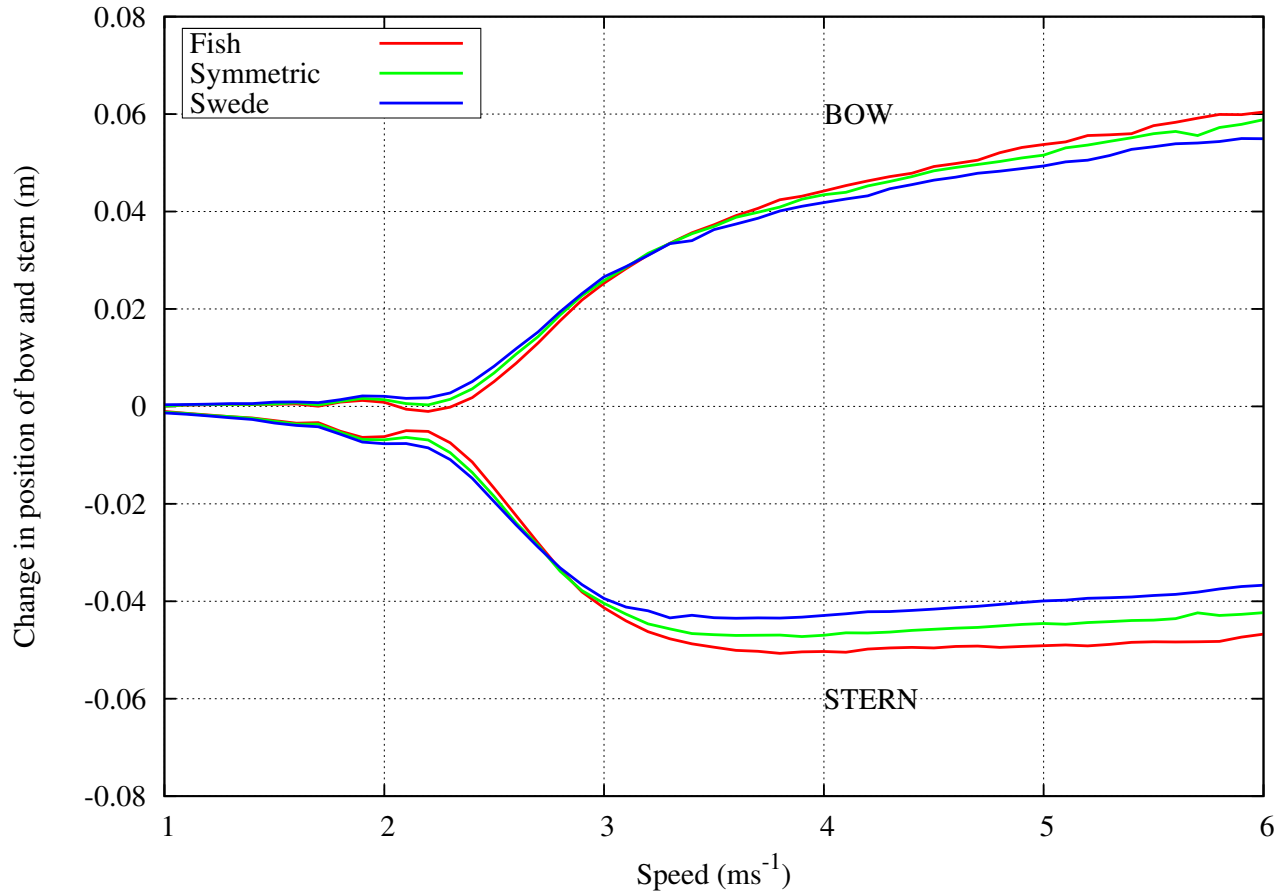


Fish and Swede have identical total resistance

Symmetric hull is best...

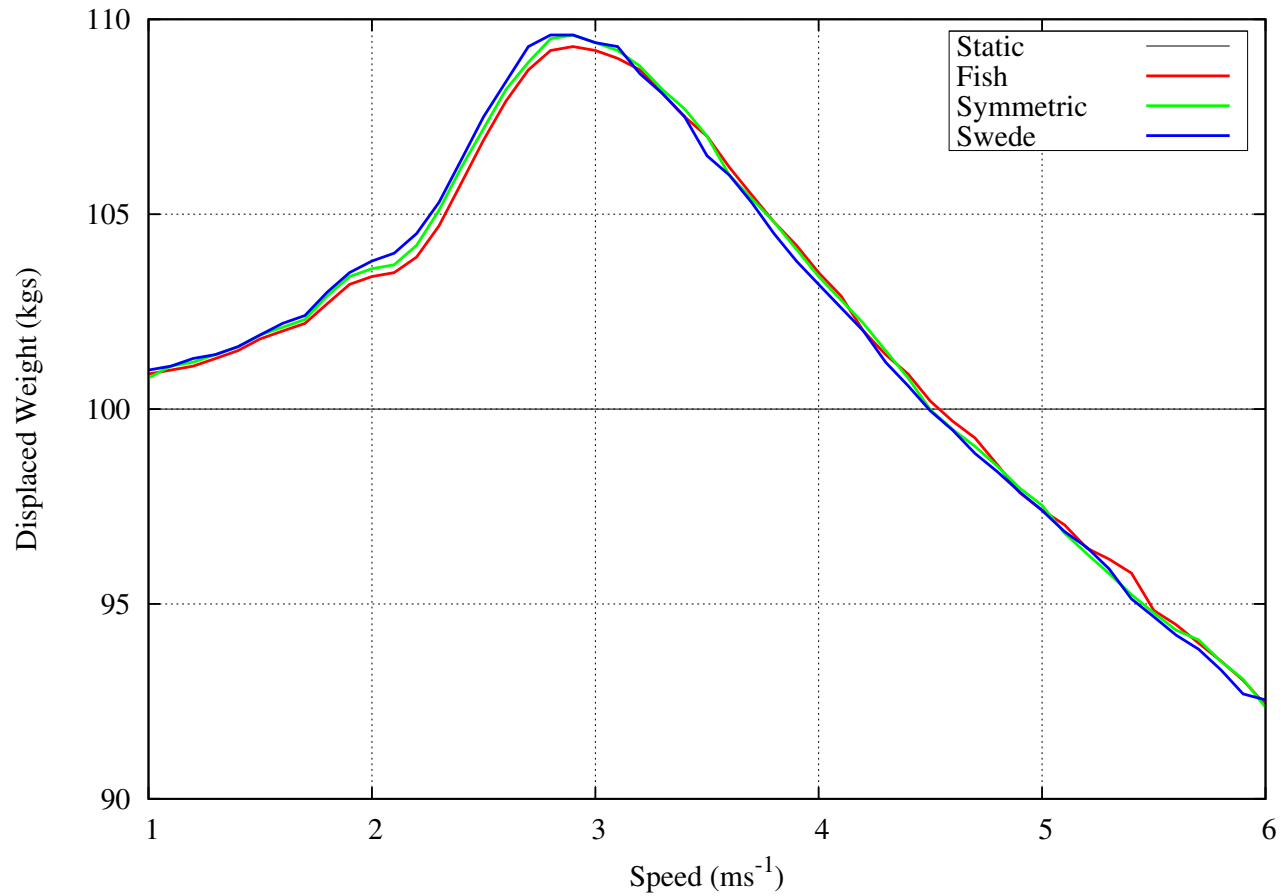
But not by much!

SQUAT



Fish squats most. Least buoyancy in the stern.
Swede squats least. Most buoyancy in the stern.

DYNAMIC DISPLACEMENT



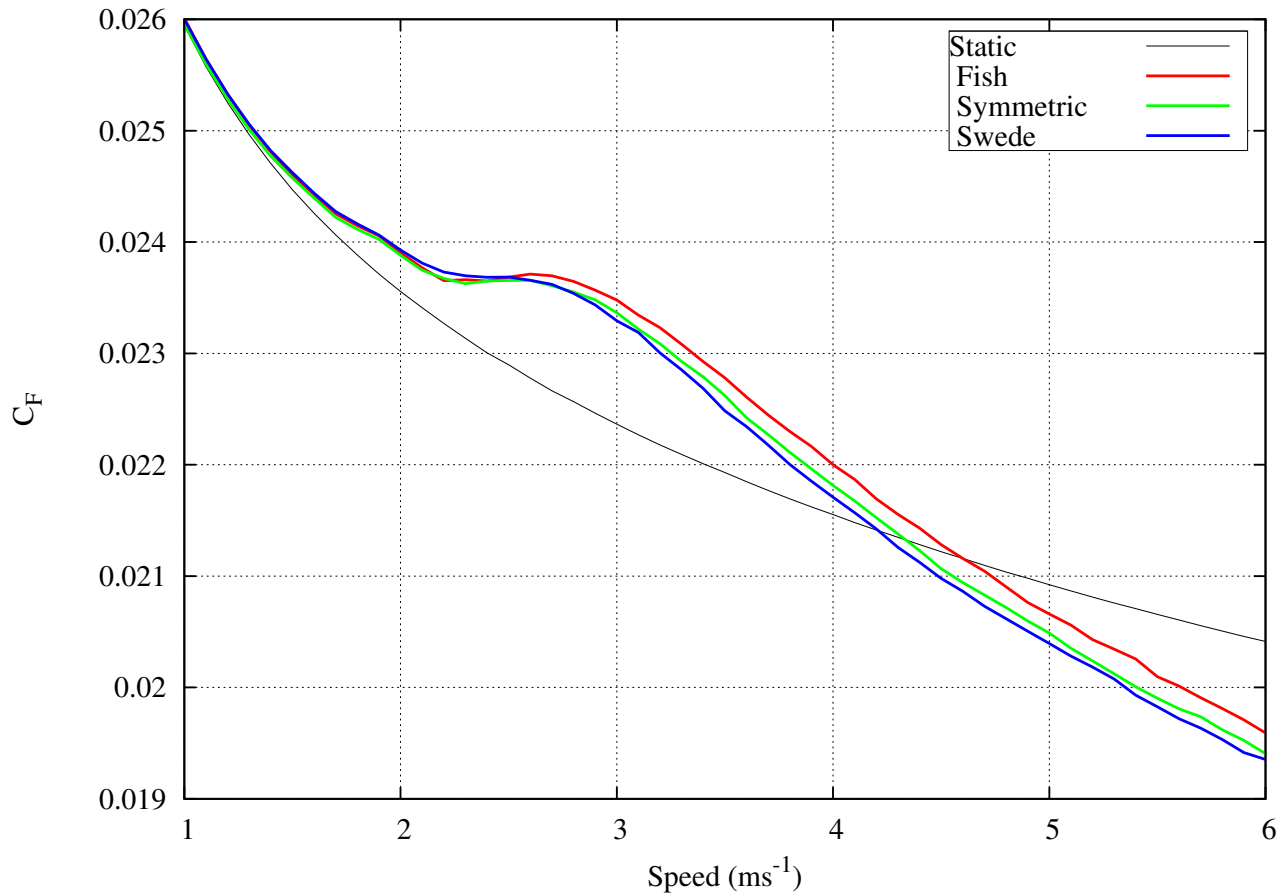
Squatted Values

About 9 kg more at 3 ms⁻¹

About 7 kg less at 6 ms⁻¹

BUT THAT'S NOT PLANING!

SKIN-FRICTION

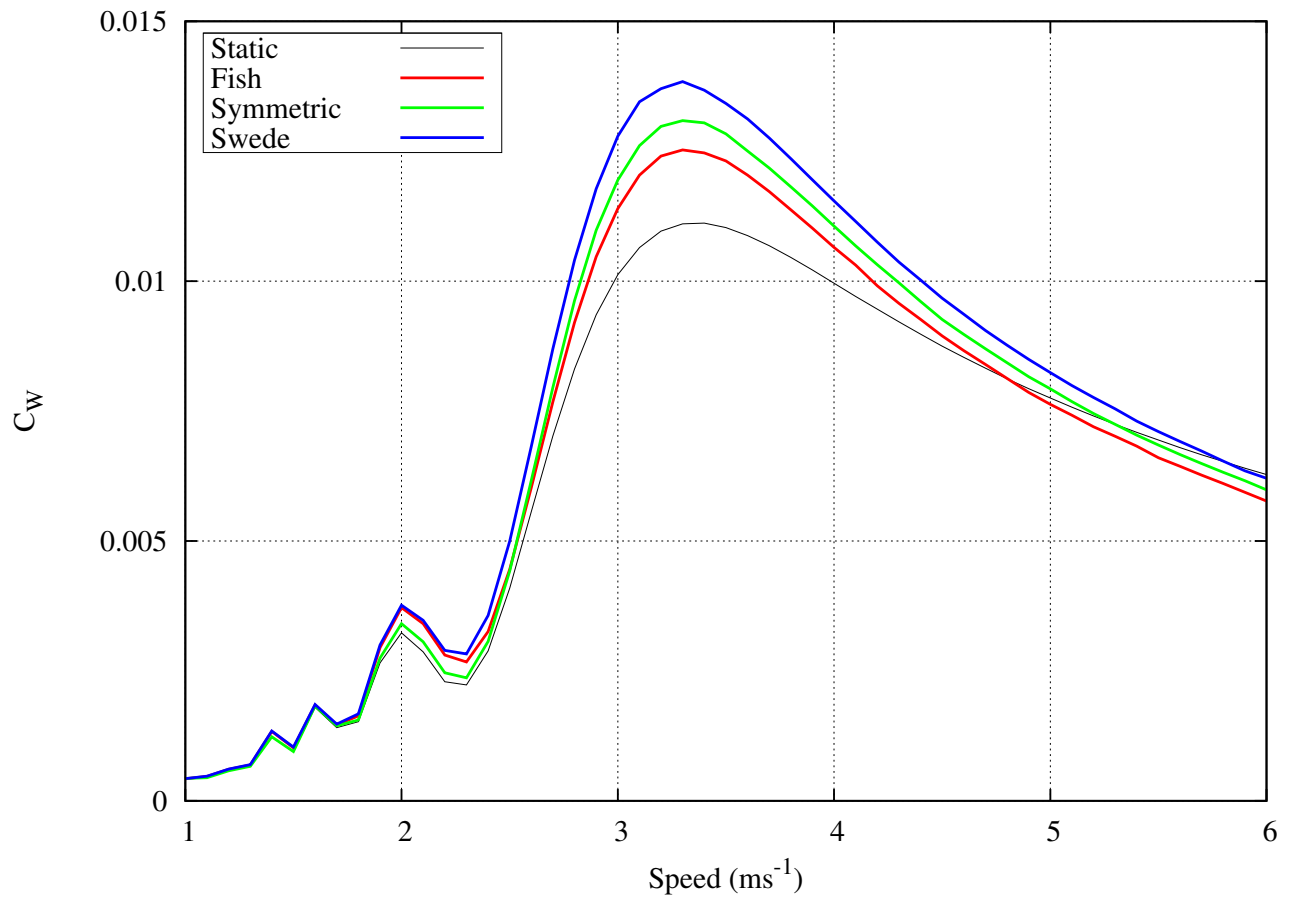


Squatted Values

About 5% higher at 3 ms^{-1}

About 5% lower at 6 ms^{-1}

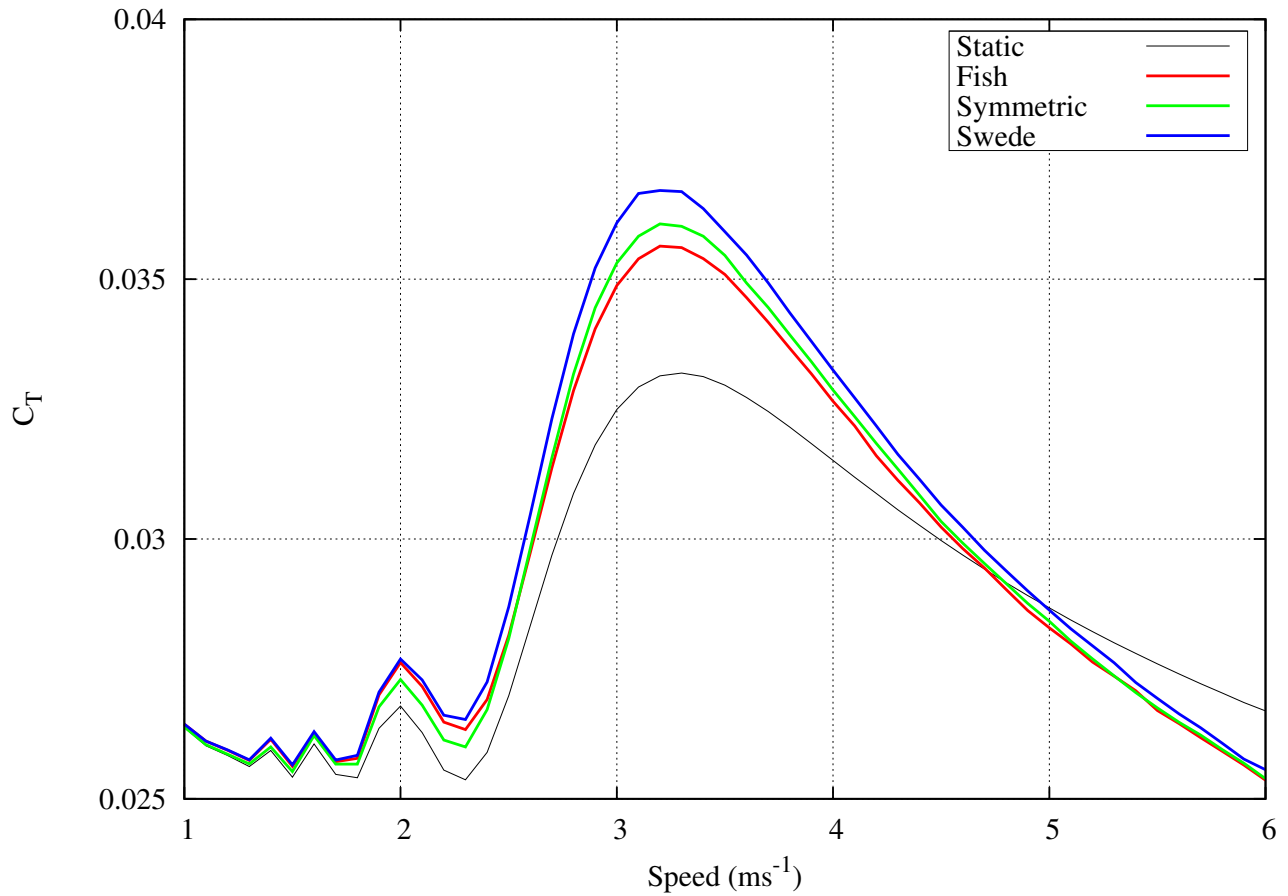
WAVE RESISTANCE



Squatted Values

About 13% to 25% higher at 3.3 ms^{-1}

TOTAL RESISTANCE



Squatted Values

About 7% to 11% higher at 3.3 ms^{-1}

Almost no difference at mean race speed.

SOMETIMES YOU CAN GET LUCKY!

TAKE-HOME LESSONS

1. NO MAGIC BULLETS

Kayak hulls are already highly-evolved.

No possibility of large improvements
with simple convex hull shapes

2. SQUAT IS IMPORTANT

Analysis based on static values can be mis-leading.

FURTHER WORK

How does the location of the paddler
affect sinkage, trim and resistance?