

STATIC & ROTATIONAL EQUILIBRIUM

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Austin Com. College, Austin Texas jpcise@austincc.edu & New York Times June 18.2017 by Chris Clarey

Kiwis, After Rewinding a Painful Loss in Their Minds, Hit Fast Forward



INTRODUCTION: These AC45 Americas cup boats 2017 skim over the water at up to 60 mph on dagger board hydrofoils. See graphics at left. The forces (on sail, on boat by weight, V & H forces on dagger board) and lever arms about the axis of rotation at dagger board are as indicated in graphic.

QUESTIONS: (a) Using concept for rotational equilibrium: $\Sigma T = 0$, when angular acceleration = 0 find force on sail F?
 (b) Using conditions for static equilibrium in X & Y direction:

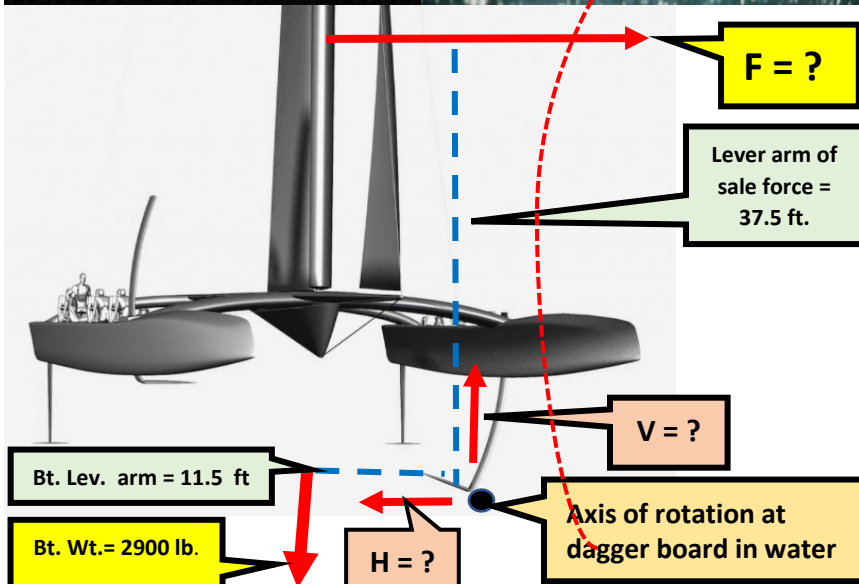
$$\Sigma F_x = 0 \quad \Sigma F_y = 0$$

Find V & H ON dagger board by water?

ANSWERS: (a) F = ~890 lb.

(b) V = 2900 lb., H = ~890 lb.

COMMENT: These new sailboats Fly more like airplanes than boats we are used to.



HAMILTON, Bermuda — The last time Glenn Ashby sailed against Oracle Team USA in an America's Cup match, it ended in crushing disappointment. The United States had stormed back from an overwhelming deficit to finish off an unlikely 9-8 comeback victory over New Zealand to retain the Cup in San Francisco in 2013.

"It was brutal, and you often wonder why and how, and all that sort of thing," Ashby said in a recent interview.

But on Saturday, Ashby, now the skipper of Emirates Team New Zealand, was smiling in the Bermuda sunshine after his team had swept the opening two races of the 35th America's Cup match.

This long-awaited rematch, at least for now, is off to a promising start for the Kiwis, who brought a revamped and much younger crew manning a boat full of innovative touches that looked particularly nimble in light winds that ranged from eight to 12 knots on the Great Sound.