

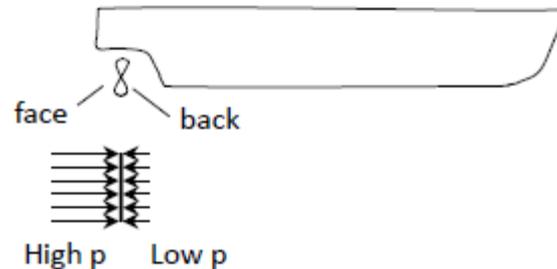
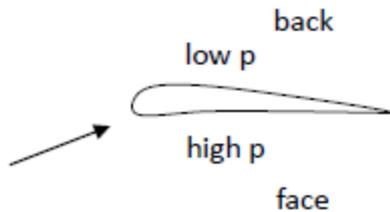


Lesson 3: Propellers

September 28, 2011

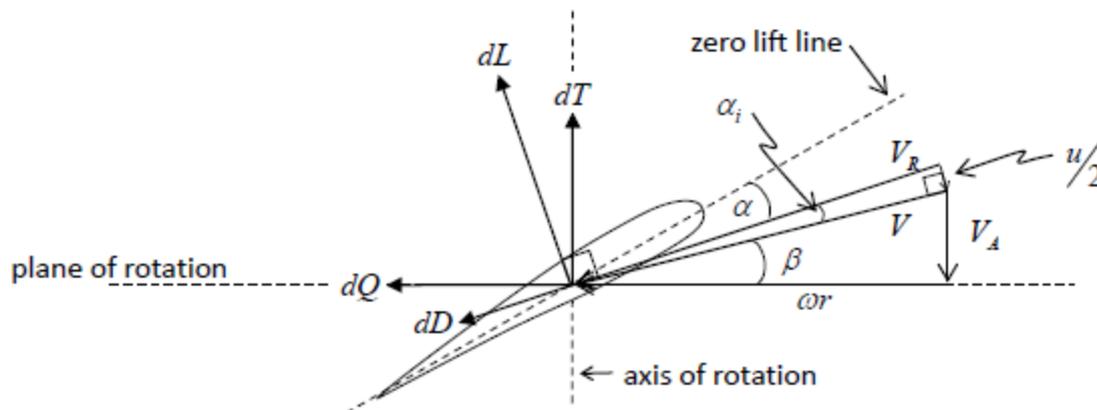
How do propellers work?

- ▶ Propellers cause a difference in pressure on either side of the blades, this pressure imbalance generates lift which pulls or pushes the craft.



Forces on a propeller

- ▶ The propeller generates lift, but like any object moving through a fluid, it also generates drag.
- ▶ The lift and drag vectors can be broken into the thrust and torque vectors.



Designing a propeller

- ▶ Need to compute necessary thrust; need to know how much drag there will be on the ship at the design speed.
 - ▶ Once the necessary thrust is known, various propellers can be evaluated to determine what values of diameter, pitch, skew, and cupping produce the best results.
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Tonight:

- ▶ Finish structure: Assemble the last pieces and decide on final motor locations.
- ▶ Pot (waterproof) motors: This will be done in a few steps...
 - 1. Solder the motors to the tether cable
 - 2. Wax motors, sealing them inside canisters
 - 3. Attach motors to the structure.
- ▶ FOLLOWING DIRECTIONS WILL BE CRITICAL.
FAILURE TO DO SO WILL BE DIRE.

A note on soldering:

- ▶ Always properly preheat your soldering iron. Let it warm up for 3–5 minutes before use.
 - ▶ Clean the tip of the iron with a damp sponge and flux. If necessary, polish it with sandpaper first.
 - ▶ Heat the metal to be soldered before attempting to apply any solder. If you don't, you will form a cold joint that will be brittle.
 - ▶ You shouldn't need to touch the solder to the iron for it to melt, the terminal should be hot enough to melt it. If it's not, see above.
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