

Rapid Boat Build

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Reflection

After a careful(ish) consideration of the physics and the drawing of an approximate free body diagram, we settled on a teardrop-shaped boat. We believed that such a shape would ensure that the majority of the mass (the ballast) would move in such a fashion that it would most likely right itself. In retrospect, this would have been true if the boat pivoted around its geometric center, but obviously[1] that isn't how it works. Additionally, we failed to account for the fact that the cans and cardboard were both buoyant, meaning that the only thing on our boat denser than water was duct tape—which meant that our boat didn't displace any water. Additionally, we discovered partway through our design process that our boat was slightly off-balance and consequently sat at an angle. We corrected this with a small cardboard shim to balance one of the cans, which worked well. We Finally, there was a fact that we remembered vaguely during our design process: Spaceships are designed in a roughly teardrop shape so they don't burn up upon reentry. This is—to the best of my knowledge[2]—true, but we interpreted it backwards: Spaceships are designed that way to minimize air resistance, so the equivalent would have been to make the boat move easily through the water. However, we actually wanted the reverse: We wanted the boat to resist movement in the water. Our teardrop-shaped hull was actually quite effective in being hydrodynamic, much to our detriment in actually achieving our goals.

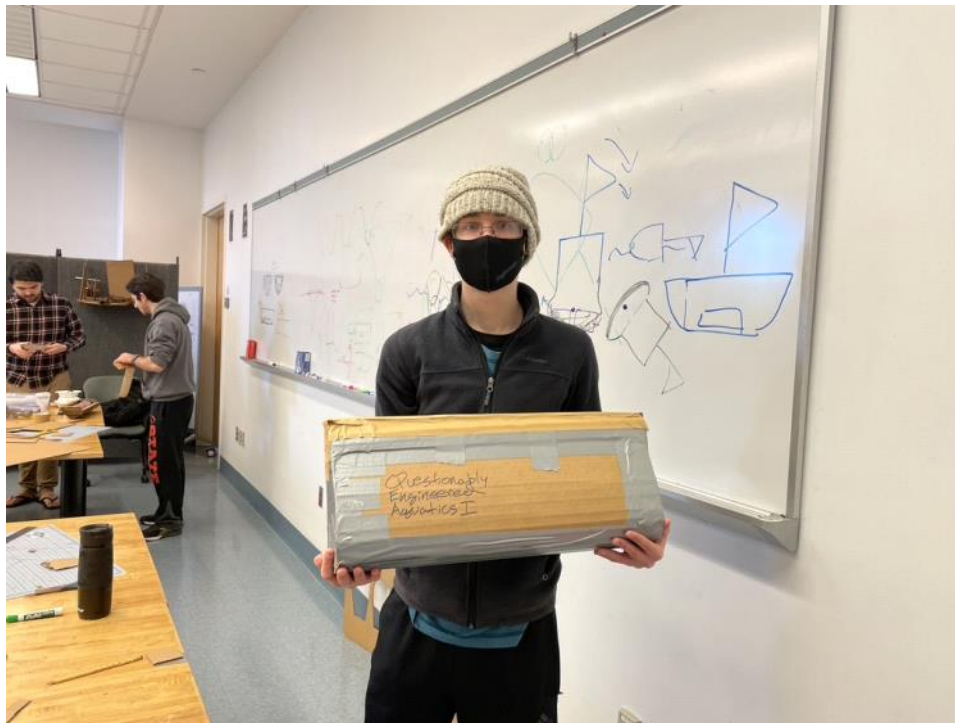
[1] Hindsight is always 20/20

[2] I didn't actually look this up to confirm it then, which was probably not the correct course of action[3].

[3] Hindsight is always 20/20

Some Photos

Here are some photographs of our boat, the *Questionably Engineered Aquatics I*. Given that it immediately fell over when we put it in the water, there was no point in conducting any of the other tests.







After our boat completely failed, due to insufficient mass, we had the bright idea of cutting a hole in the bottom to let water in, therefore functioning as a ballast. While that might sound stupid (and, in fact, it was), it actually did substantially improve the performance of our boat, although not to the extent that you'd consider it "working."



