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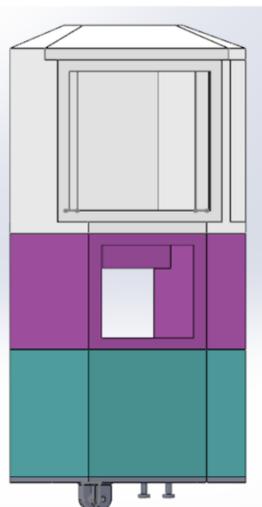
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Abstract

Lake Michigan is a beautiful and important landmark of the midwestern United States, but since the 1990s, the invasive species known as the Round Goby has proliferated out of control. In order to understand the species more, the design of a reusable camera housing was made. The device was designed with the thought of high pressure resistance as the Round Goby are known to reside on the bottom of the lake.

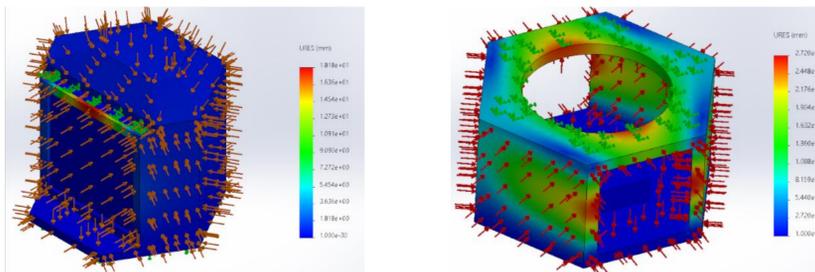
Introduction

The device is made up of three separate sections all for which have a specific task. The top section is a watertight camera housing. The middle section will hold a waterproof light and be open to the environment, and the bottom section will house the Arduino for the return mechanism.

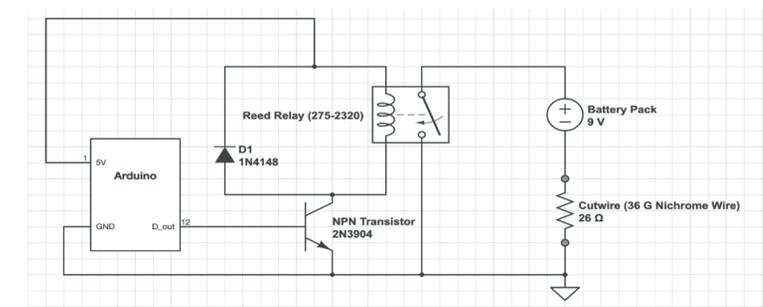


Methods and Materials

There were two designs that were made at the end of this project. They followed the same idea using all of the same designs just different materials. One was proof of concept design while the other was usable device. The proof of concept design used 3D printed PLA and was waterproofed. The second one was made of PVC. Each design will have a polycarbonate window and be attached via stainless steel latches. This allows for easy access to the internal parts.



The return mechanism is controlled via an Arduino Uno that will hold charge for a desired amount of time as it can easily be adjusted. After that time is up, the battery pack attached to the Arduino will release its charge which is linked through the circuit with a nichrome wire. This wire has a very high burn resistance meaning once the charge is released the wire will break. This wire will be holding the weight that is taking the device down to the lakebed. This weight will then be left there and the buoyancy of the device will have it resurface.



Discussion

In the end, data was not able to be collected by either design, but construction of both has shown that they have the ability to collect data in the future. As this device is relatively cheap, the production of multiple devices will allow for a widespread collection of data as multiple devices can be sent down over a large area.

Conclusions

From all our research, designing a device that can withstand pressure up to 150 psi is a challenge. There were many designs that fell apart just because of that problem, but the PVC offers a usable product while the PLA proof of concept shows a more thought out design that can be improved upon in the future.

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