Real World Innovation: Dam Safety
Reeths-Puffer Robotics

Muskegon Michigan, United States

Abstract

We want our robot to be able to see dam cracks and potential leaks. Instead of having humans being underwater for a period of time, we can have our robot do the inspections instead. With our robot doing the inspections we will have more inspections that are being done with a better quality.

Background & Motivation

We decided on the dam safety idea because last year in Midland, Michigan, two dams broke and caused flooding and the level of water to rise in Michigan. These floods caused a lot of damage. Our families houses also flooded because of the increase in water level in the State of Michigan. This is important to us because we have personal experience in misfortunes like this.

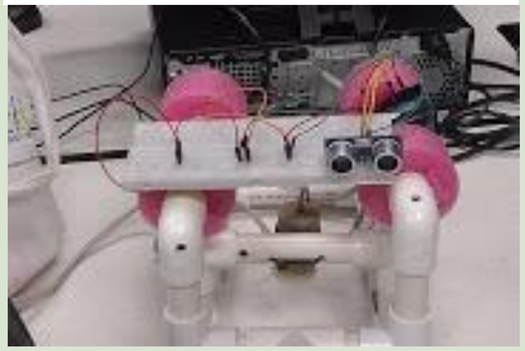
Results & Discussion

We found that more safety checks could happen for dams using our robot. We would use a ultrasonic sensor to check if there was a crack in the dam wall. The ultrasonic sensor looks for gaps in between objects. Another sensor we looked at is the ground penetrating sensor to check for deeper cracks.

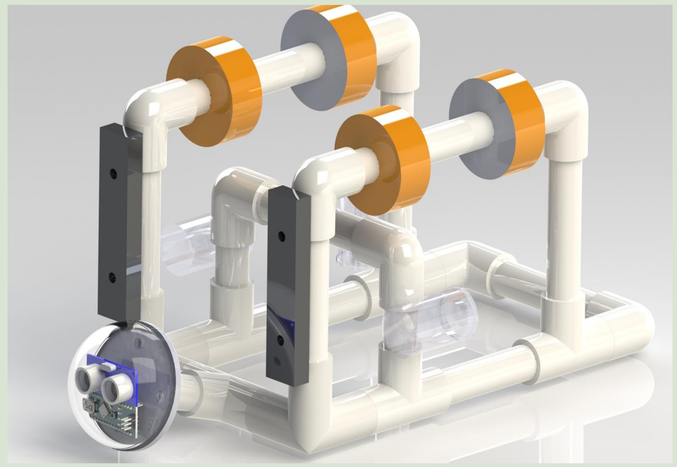
Midland County residents sue state of Michigan over Edenville Dam failure

In this Wednesday, May 20, 2020, photo, people survey the flood damage to the Curtis Road Bridge in Edenville, Mich., over the Tittabawassee River. The bridge sits just south of Wixom Lake where the dams failed. (Neil Bloke/The Grand Rapids Press via AP) (Neil Bloke, MLive)

We used our ROV from last years competition as the base model. We felt like it was more buoyantly stable to hold sensors than our robot from this year.



This is a mockup of what the ROV would look like. It is holding parts to a ultrasonic sensor and a ground penetrating sensor.



Methodology

If we made this prototype, we would have to add somewhere to add a camera. And we would need to add a faster motor just in case the dam breaks. We would like to add an ultrasonic sensor to tell if there is any breaks or leaks and to alert if the dam is going to break soon to tell them to get away from it. The sensor would also do a sound wave drawing, and it would make a drawing of what is happening down by the dam.

When the Dams Broke in Midland, Michigan

July 17, 2020

Next Steps

What is next for our project is that we need to test the ultrasonic sensor on materials that have cracks and materials that don't have cracks. This will help us get a base measurement that we could use to determine if concrete has any type of crack.

Acknowledgements

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- Dave Bartkowiak Jr. https://www.clickondetroit.com/news/michigan/2020/05/26/midland-county-residents-sue-state-of-michigan-over-edenville-dam-failure/, May 26, 2020