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VEX Robotics Competition

Team 751B

The H2rObot: Trial and Error

The H2rObot is a semi-autonomous electronics-free robot that not only can water plants but automatically moves around your yard. For operation, users must simply put a running hose into the center pool noodle, and from there it is completely hands-free. It operates using the pressure from the hose, which is able to rotate the various spoons inside of the H2rObot. Once the spoons spin, it moves the rear axle, thus moving the entire bot. All of the water produced from the hose goes inside of the plastic bin, which then drains out and waters the plants around it through boba straws. With this project, we aimed to use a wide variety of recyclable materials to highlight the different recycling options available that often go unnoticed. Companies like GreenMax INTCO Recycling have recently developed solutions to recycle common items like pool noodles, which were previously hard to recycle. Likewise, wood and metal can be taken to most household waste recycling centers, and some organizations are specifically designed to recycle wood, like Community Wood Recycling. Most importantly, there is rubber. Our project uses rubber bands to connect the axle attached to the spoons and the rear wheels. Other rubber objects like tires often go straight to the landfill, even though there are many rubber recycling facilities available. For the entire project, we used these items:

- 24 biodegradable plastic straws
- 6 nails
- 4 plastic spoons

- 4 popsicle sticks
- 4 tuna cans
- 3 wooden sticks
- 2 rubber bands
- 1 plastic bin
- 1 pool noodle
- Gorilla Glue

Initially, we created a 3D model of what we wanted our bot to look like in Fusion360. After the model was complete, we brainstormed what materials we wanted to use, which ended up being much different than anticipated. We originally were going to use a trash can for the main body, kebab sticks for the axles, ribbon for the chain, and cardboard for the wheels and gears to move the axels. We first realized that a plastic bin would be a much better option due to its shape. Due to our robot's purpose, which involves water, we realized that it would be impractical to use anything cardboard, as it would not last. Our first test using kebab sticks as axles was a complete failure. They were nowhere near strong enough to support the weight of the H2rObot. As an alternative, we decided to try parts of clothes hangers. We had the exact same issue, so we knew we had to switch to something much stronger, which ended up being the wooden sticks. The pool noodle was used like threading to make sure that the hose stayed secure and pointed at the spoons. Instead of using gears, we switched to using the remainder of our pool noodle to grasp onto the ribbon to move both of the axles. Unfortunately, the ribbon didn't work well, so we switched to rubber bands. Initially, our spoons didn't consistently work either. We originally had only two spoons supported by two popsicle sticks on the axle, which meant that the water wouldn't always be pushing on the spoons and moving the bot. When we added another two

spoons, it worked significantly better, and the water was able to consistently push the whole bot forward. Luckily, the amount of water that went into the H2rObot was the perfect amount, as it always stayed full enough to drain out and water the plants but not too full as to make it too heavy or to overflow. We also added sturdier wheels to compensate for the water weight, those being the tuna cans compared to the previous idea of cardboard. The wheels were nailed into the wooden sticks along with the spoons to the upper stick. Although it took our team a long time to perfect the H2rObot and to get it working, the payoff was immense. Not only were we able to create a robot that can nearly automatically water your yard, but we were able to raise awareness for the various types of recyclable materials that often don't get talked about.