Instrumentation of Wave Energy Converter

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Introduction

The wave energy converter (WEC) is a device that uses the mechanical motion of the waves to power a reverse osmosis system (RO), which turns seawater into drinkable/potable water.

The WEC can be broken down into 4 main sections

- The Float / Frame
- The Power Take off system (PTO)
- Reverse osmosis System (RO)
- Mooring system

Objectives

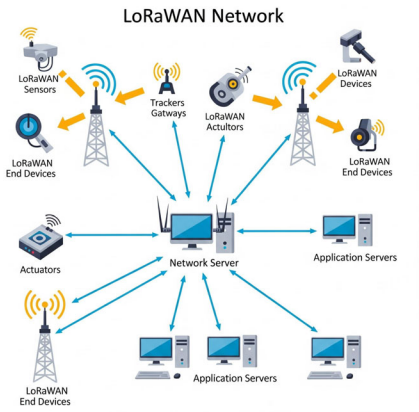
The goal for this summer was to work on the instrumentation for the WEC.

- Learning about instrumentation
- Looking at types of long range communication for data
- Looking at cost for energy, communication, and data
- Bearing Removal

Instrumentation

- Encoders & Sensors
- LoRa Communications
- Energy, Communications, & Data Budgets
- Rotary Encoders & Load Cells

LoRa Communications



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Bearing Removal

Bearing to the Reverse Osmosis (RO) Pump Housing

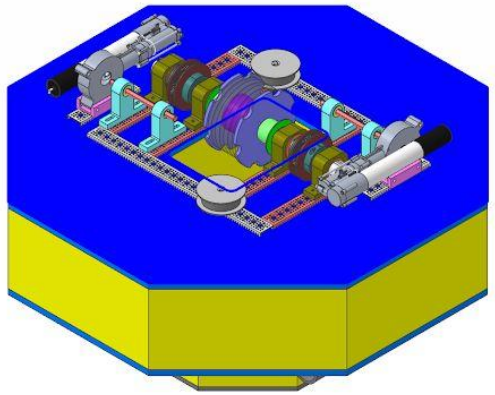
Bearing before removal

Removal with Dremel of inner race & rollers

Bearing removed of the inner race & rollers

Removal of outer race by machining

The housing without the bearing & outer race



Water Bro's WEC Version-2025

Conclusions

This project is based on the proof of viability from NREL HERO WEC, thus allowing for the opportunity to do research in this area as it is a novel technology.

From this project, key takeaways include learning about different types of instrumentation, as well as communication protocols and budgets. Another aspect was removing a bearing that had been in sea water for some time and then in storage for a year before removing.