

Fishing For Solutions

Problem Definition

Need a more efficient way to collect fish manure from the bottom of commercial fishery raceways without causing re-suspension of particulates

- Cleaning is done manually and takes around 112 hours/week
- Particle re-suspension decreases water quality and increases potential for fish diseases

Push Screen Method



Vacuum Pump Method



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Client: Scott Williams, Fish Hatchery Manager 1 at Coldwater Wet Laboratory
Sponsor Organization: UI Service Learning Center

Goal

Deliver a prototype that:

- Removes manure from bottom of the raceway
- Is durable
- Is easy to use
- Is cost effective
- Utilizes a simple design
- Is automated and more efficient than current methods
- Increases fish health and fishery productivity

Design Approach

- Step 1- Develop Design:
 Review Previous Group Designs
 Brainstorm New Ideas
- Step 2- Analyze Designs:
 Theoretical Analysis
 Solidworks Modelling
- Step 3- Test Designs:
 Machine Shop
 Flume Testing

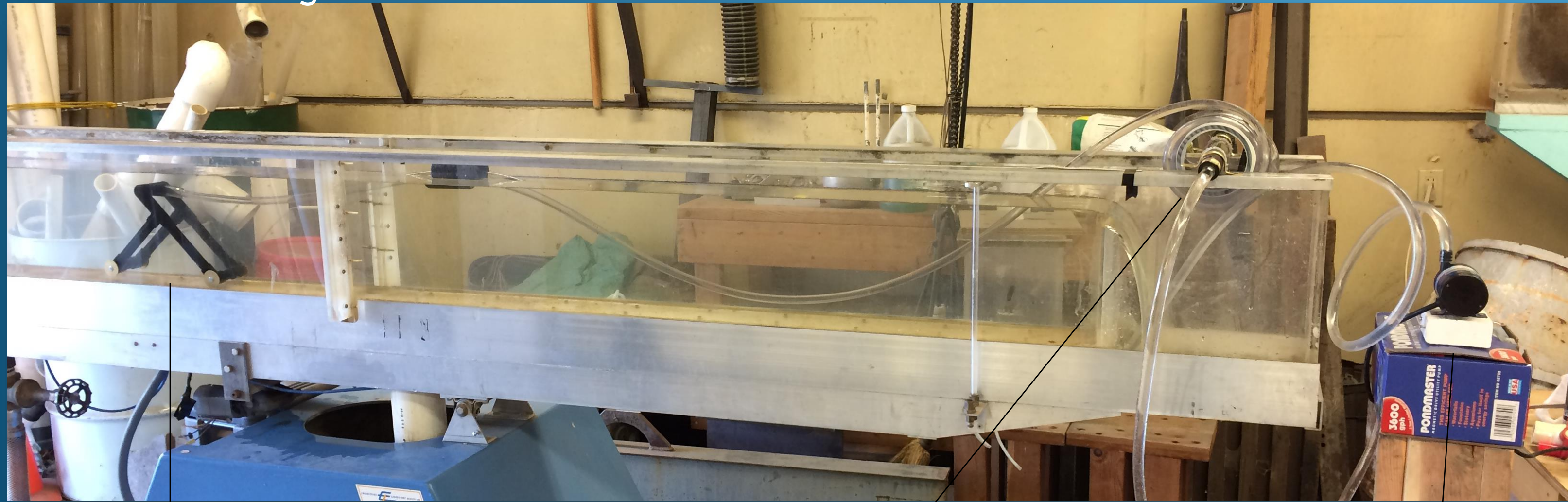
Project Learning

- Fabrication of various model-scale prototypes
- Analysis of piping systems and pump selection
- Solidworks modelling
- Progression through conceptual design and experimental testing phases

Solution

The proposed PVC A-Frame design will be scaled accordingly to fit the full-scale dimensions of a typical raceway found at many commercial fish hatcheries. The frame will ride on the bottom of the raceway sitting on four wheels to ensure that optimal suction bar height is maintained. The frame will be pulled automatically by its outlet hose using an industrial sized reel with a built-in outlet for the effluent water. The fish manure will run through the pump and be sent to the offline settling basin via a direct connection in the QZ-zone.

Model-Scale Design



PVC A-Frame Design



Reel w/ Built-in Outlet



2.25 gpm Centrifugal Pump

Full-Scale Design

