StaRS Filter Theory, Spring 2015

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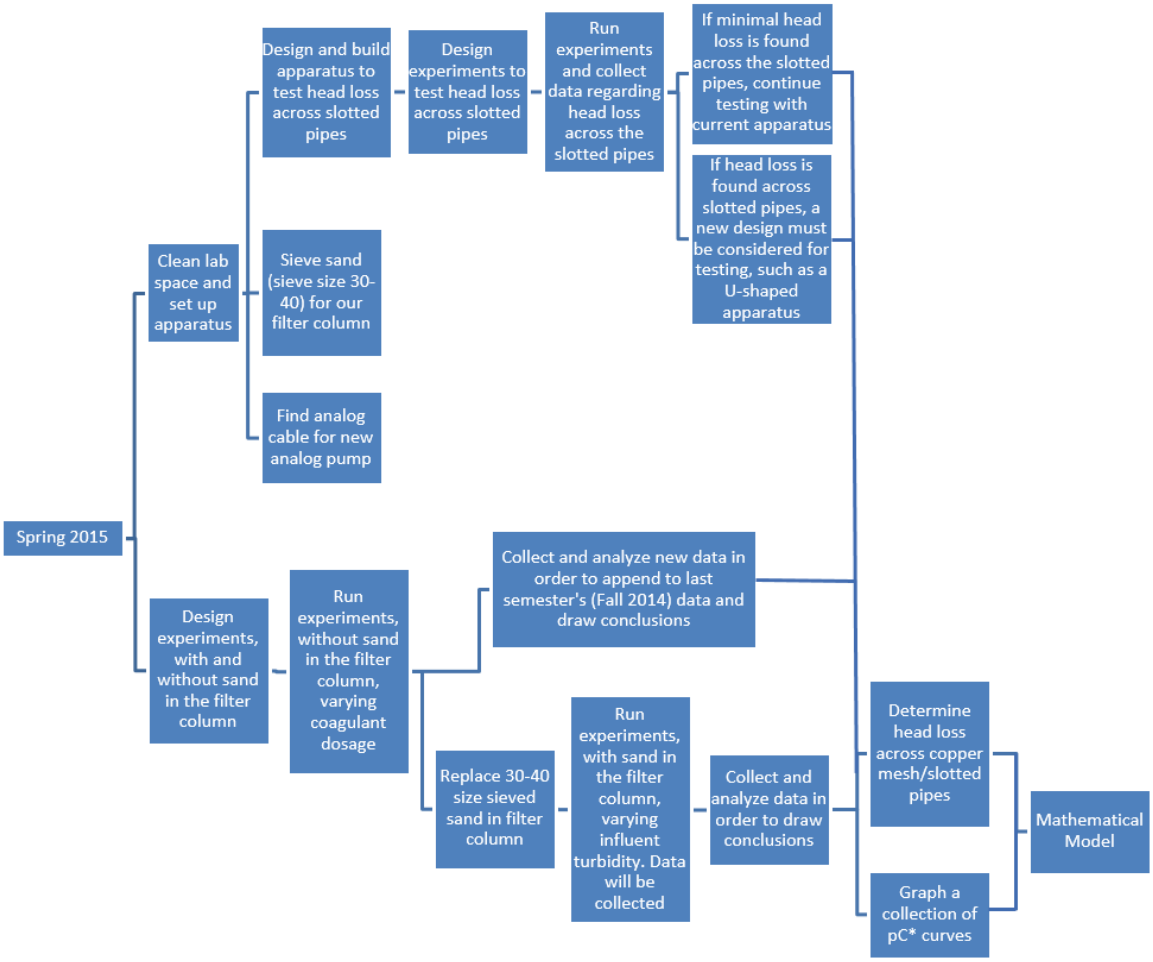
Task Map



Task Details

1. Design and build a slotted pipe testing unit/2/20/15 - Theresa. This unit will test the head loss across actual slotted pipes, instead of the copper mesh this team has been using as a model.

2. Sieve sand/2/13/15 - Alex. Use the shaker in the Geotech Lab to sieve the sand between sieve numbers 30-40. This subteam will also store this sand in a container that will keep the sieved sand separated from unsieved sand, to prevent any unwanted mixing of the sand.

3. Find analog cable/2/13/15 - Nick. Find an analog cable to work with a newly acquired analog pump, which replaced a digital pump used last semester. Adjust the pump as necessary to achieve the required speed.

4. Design slotted pipe experiments/2/20/15 - Theresa. Design experiments to test the head loss across slotted pipes, using this team's newly built apparatus. Find the range of mixtures of clay and coagulant which lead to clogging. Consider factors such as run time, coagulant dosage, and influent turbidity. Write a Process Controller method file for the experimental apparatus.

5. Run slotted pipe experiments/3/13/15 - Alex. Measure head loss over time across slotted pipes. Collect data on head loss and effluent turbidity.

6. Analyze data and assess slotted pipes/3/20/15 - Nick. Determine if slotted pipes are suitable to use in AguaClara filters, based on the head loss through the pipes: If there is minimal head loss through the slotted pipes, continue using the copper mesh to model slotted pipes in the current small scale apparatus. If there is significant head loss through the slotted pipes and thus the copper pipes, design a new injection system for StaRS Filters. One option is a U-shaped design, which other subteams are currently working on and testing.

7. Modify experimental apparatus/3/27/15 - Theresa. Change the apparatus as necessary based on the results of the clogging of the slotted pipes.

8. Design experiments for both sand and sandless experiments/3/27/15 - Alex. Design experiments to ensure that the copper mesh does not result in clogging. Design experiments to test sand filter performance.

9. Run sandless experiments/4/9/15 - Nick. Run experiment to test whether head loss across copper mesh or new injection system is insignificant.

10. Run sand experiments/4/17/15 - Theresa. Add sieved sand back into the filter column. Run a series of experiments varying coagulant dosage. Measure head loss and effluent turbidity of the filter over long runtimes.

11. Analyze data/4/24/15 - Alex. Plot head loss and pC* curves over time, mass of coagulant accumulated, and mass of clay accumulated. Assess filter performance.

12. Create mathematical model/5/5/15 - Nick. Use data to start a mathematical model describing the performance of the stacked rapid sand filter. Experiment with the effect of different parameters.