

Kadambari's Individual Contribution Page

Spring 2015 Contributions

Ram Pump

Our goal this semester is to conduct a theoretical analysis of the current system and brainstorm ideas for [easier] fabrication of the pump. The latter will include an alternative to the current method of joining the two valves, as well as, establishing a system for spring manipulation. After doing so, we will run the pump for extended periods of time such that we can establish a comprehensive method for determining optimal spring length depending on certain variables, check for wear points, determine ease of repair, as well as, evaluate the status of the ram pump in terms of a permanent component of the AguaClara plant.

Fall 2014 Contributions

Ram Pump

Our goal this semester is to continue improving the ram pump's design and to establish guidelines for optimization. We will be focused on designing a method of containment, attempting at scaling the entire system, and stabilizing the pump. We will conduct experiments to test the effect of the order of components, weights used, size of air chamber, and long-term runs on the efficiency of the system (based on flow rate, pressure, head loss, etc.). Our overlying goal is to establish a close-to-final design of ram pump.

Spring 2014 End of Semester Contributions

Foam Filtration

Even though we weren't able to conduct any tests using the "new" drum, as a whole, the end of the semester brings great results where we manage to accomplish our semester goals. We have finalized calculations/ ordered parts for the chemical dose controller, designed/ put together the pulley system, found compression material (plate) that we feel is feasible, and welded the side drain onto the drum. We were also able to conduct tests to further expand our knowledge of the foam filter, a compression-velocity test and a foam decompression test, the latter of which demonstrated the de-compressibility of foam, whose diameter was 0.75 inch too big for the drum.

For the summer and the following semesters, we are hoping that future foam filtration teams will create a side exit for effluent water by replacing the bulkhead fitting with a spin welding fitting, conduct tests with the new system, and package a system to be sent with Walker and John.

Spring 2014 Mid-Semester Contributions

Foam Filtration

With the semester reaching its peak, we are currently working on upgrading the foam filter. We have planned on improving the compression system such that we make use of pulleys, including a side valve in place of the siphon by the process of spin welding such that it does not intrude on flow of water, and finding a more suitable material for the plunger. And we will then test out these components by conducting a turbidity test. We believe that these improvements will make our system lighter and more user-friendly in order to reach our end goal of a point-of-use system.

Spring 2014 Contributions

Foam Filtration

We aim to re-design the foam filter such that the cleaning procedure is simplified, the LFOM and dose controller components have the potential of being dexterously installed, and the draining technique is more "user-friendly." An underlying goal in all of this is to make the foam filter an emergency unit such that the filter will be ready to use upon arrival/ basic set-up.

Fall 2013 End of Semester Contributions

Foam Filtration

As promised, since the last "check in," the Foam Filtration team *did* look into implementing a single column design. After various calculations and drawings, the final design consists of a single 55-gallon drum, 23" in diameter that uses a ratchet lever hoist and pulley system for "plunging" the dirty water out, as well as a siphon for removing dirty water that resides on top of the compressed foam. The system will also be equipped with an LFOM, chemical doser, and chlorination system-- which will all, including the drum and cleaning system, be mounted on a wooden frame. Similar to the previous semesters, the filter will still consist of 30 and 90 PPI foam, however, it will now be in 4" blocks to allow the operator to manipulate the amount of each to be included as per the turbidity of the water. This system will be taken down to Honduras by myself and a fellow team member in order to exhibit the new system to the AAP there and was submitted as a part of an EPA P3 to be used as an emergency design.

For next semester, we are hoping to therefore, not only work on our design of the foam filter serving as a [permanent component] of an Agua Clara plant, but also improve its capacity of being used as an emergency system,

Fall 2013 Mid-Semester Contributions

Foam Filtration

We are currently in the midst of ploughing through our task list. We have already tested the lifetime of the foam and compression/ decompression abilities. From our tests, we were able to conclude that the foam does not encounter too many problems with mechanical failure, however the structure upon which it sits requires an immense amount of work. There is a need for a more stable structure because of which we are looking into using circular, plastic drums; they would allow for a "tight seal" (between the foam and the filter wall), a sturdy base, and a filter that can visually display its contents. Also, it was discovered that the foam cannot decompress on its own and the string-method of decompressing the foam is extremely tedious, especially when only *one* of the filter columns is being compressed. The team will look into creating a single column filter system and implementing a mechanical arm to create a more efficient and user-friendly system.

Fall 2013 Contributions

Foam Filtration

We aim to determine a design in which cleaning and draining the filters is most efficient, the controller has the ability to turn individual filters on/ off, and a chemical doser is incorporated. We will also try to establish some basic information by researching the lifetime of the foam filters, as well as, the level of turbidity that the foam filters can handle. We are hoping to improve the foam filtration system with the purpose of not only increasing its capacity/ variability, but also having it ready to go for implementation in Honduras this winter.