# als347

## Andrew Sargent's Individual Contribution Page

### Summer 2009 Contributions

I worked with Nanditha Ramachandra on creating the Automated Materials List. We went through the Variable Naming Guide and found all the necessary variables to calculate the different volumes and surface areas for each of the plant's components. From those computations, we found the total amount of material needed to construct each component and, ultimately, the entire plant. We then created the Automated Materials List Design Program page and included both the inputs and outputs for the algorithm.

Upon gaining a better understanding of the configuration of the plants, we went through and reconstructed some of our equations to represent the current design process. After improving the calculations, we looked into the idea of including a price list but that idea was later deemed unnecessary.

We successfully ran our completed Materials List through the design tool and fined tuned the wiki page. We also received feedback from the engineers in Honduras. They posed an idea for a more efficient format and we began implementing it. The engineers also explained some of the newer component designs and how we could change the formulas to match the updated plans.

Finally, we made a list of the future challenges for the next students that work on the materials list and also added a link to the design tool server on the materials list wiki page.

### Fall 2009 Contributions

I have been working on editing the design of the tanks at the end of the inlet and exit channels. The new design has the tanks cantilever off the side of the sedimentation tank, whereas the old design had the tanks extend from the base of the plant to the top of the sedimentation tank. I have edited the MathCAD file "SedTank - w/Pieces" to change the height of the tanks and to reflect the new design. This new design saves materials and allows for the new drainage system.

I am also editing the AutoCAD script for the design of the distribution and waste piping system (inside "SedTank - w/Pieces"). I am rotating the waste pipe elbow in the exit tank so that it faces the inlet tank. I am also changing the elbow in the inlet channel to a tee so that a pipe can be created that connects the inlet channel to the exit channel for the waste system.

I edited the Inlet and Exit Channel wiki pages to reflect the new design. The Inlet Channel page was replaced with the Inlet Channel Weir page, which has all the updated information on the channel design. I also edited the information on the exit channel weirs to reflect the changes in the new design and address weir specifications. I changed the information on determining the geometry of the exit channel to take weir design (perpendicular or parallel to length of the channel)into account.

I have further edited the design of the inlet channel tank so that it does not hang off the side of the sedimentation tank. The new design makes the sedimentation tank symmetrical by shifting the inlet tank inward to reflect the design of the exit channel tank.

The inner exit weir elbow has been rotated to face the inlet tank to allow for a connecting pipe for the drainage system. The inlet weir elbow has been transformed to a tee so that the both the exit and inlet tank can have the same drainage system.

I edited the details in the inlet channel design program wiki page so that the exit weir specifications for design are more clear. I also deleted the Inlet Channel Weir wiki page because it was used to replace the inlet channel design page and is no longer needed.

### Spring 2010 Contributions

I have been working with Andrew Hirshfield to continue modifying the inlet and exit weir tanks. I have made design changes to the heights and positioning of the tanks so there is no overlap with inlet channel or the weirs. I have added the pipe connecting from the waste elbow in the exit weir tank to the inlet tee and have rotated the tee to meet the waste system guidelines. All changes have been added to the sedtankw/pieces MathCAD file.

We are also working on creating a design for a drainage channel along the inlet channel side of the sedimentation tank to handle all sludge and waste from the plant.

I have created a Wiki page for the inlet and exit weir tanks and Andrew Hirshfield is helping add to it.

The inlet tee has been correctly rotated and the connecting pipe dimension has been corrected for the automated design. I also changed the elevation of the tee, elbows, and weir pipes so that the midpoint of the tee and elbow outlets are equal to the origin points of the sedimentation tank drain valves. The elevations were also changed with the fact that the drain channel origin will be at z = 0 in mind.

I added the inlet channel pipe plugs to the sedimentation tank code. They were lost when the chimney design was scrapped.

I spent a good part of the second semester debugging various plant designs by testing them with the Beta Server and the ADT. I found various errors in different parts of the plant and delegated the fixing of these tasks to other members of the design team and also fixed the errors in the codes that I was familiar with. Debugging the plant designs was the most beneficial task I have undertaken while working on the AguaClara project. It helped me learn about different parts of the plant and expanded my knowledge in different areas of design for the project. I have had a great time working on the project this semester and look forward to coming back in the fall and continuing my work.

### Summer 2010 Contributions

I worked with Brian White to create tutorial files for future teams to learn AutoCAD and MathCAD. I annotated the file sedtank w pieces and wrote an algorithm description as well as list directions to complete each step. We also went through and added detailed documentation to the Sedimentation Tank MathCAD file.

I did more work with debugging on the ADT. I found overlapping errors for low flow rates and added a design constraint to the number of sed tanks to overcome this error. I have more work to do with debugging this issue.

Lastly, I changed the design of the weir tanks to be extensions of the channels instead of boxes at the end of channels. I encountered a problem with the inlet channel side and plan to fix it next semester if I am unable to finish it this summer.

## Fall 2010 Contributions

I am working on creating an automated design of the drain channel for the online design tool. Nanditha and I have contact the engineers in Honduras for their input in the design. They helped us determine the positioning of the channel which is crucial to the coding. We have also met with Monroe to determine design assumptions and constraints that must be considered while designing the channel. I also wrote and iterative code that finds the optimal head loss from which the geometry will be determined.

We then coded the channel by creating two cross sections, one and the beginning of the flocculator and one and the end of the sedimentation tank, and lofting them together. May helped create a Loft function in the MtoAtranslators page which allowed us to do this. The channel is now drawn completely with the correct slope derived from the headloss. The channel was designed with a conservative approach in mind, so future changes could optimize the volume to its absolute minimum. Finally, I documentated the code files, transferred them over to the source file. Testing is the next step.

## Pages Created

Automated Materials List Design Program
Automated Materials List Inputs
Automated Materials List Outputs
Inlet and Exit Weir Tank Design Program
Drain Channel Design Program