

Stock Tank Mixing

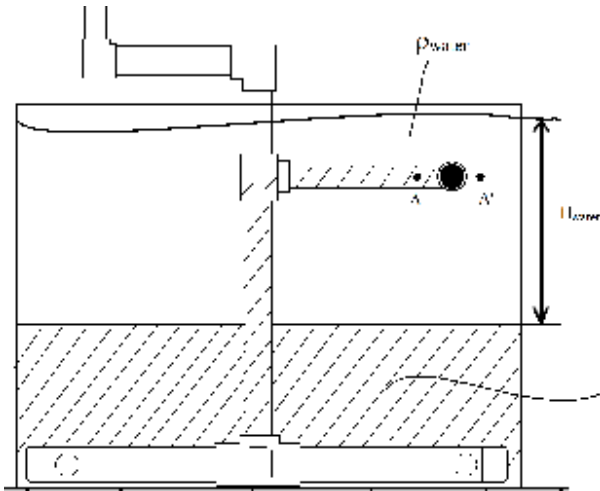
Stock Tank Mixing

The Spring 2014 Stock Tank Mixing team redesigned the mixing process of stock solutions in AguaClara plants.

The primary goal of the Fall 2013 team was to design a centrifugal pump to mix stock solutions, with test designs utilizing a rotating arm that employed the pressure gradient due to rotation to bring dense solution located at the bottom of the tank to the top. End-of-semester tests showed high pump inefficiency due to large amounts of wasted input power due to drag on the rotating arm. The test results prompted entire mixing redesign by the Spring 2014 team.

Two main designs were fabricated and tested on the small scale: a shallow bucket with small holes in the bottom and a plate (each attached to a handle) that were pumped up and down in the stock tank. The bucket design was meant to physically bring dense solution located at the bottom of the tank to the top of the tank while the plate design created turbulence and jets to encourage mixing. Both designs achieved full mixing with the same number of pump cycles, but the plate design requires less time because when the plate reaches the surface height, it is immediately plunged back down to the bottom of the tank. The bucket design, meanwhile, requires waiting for the fluid to drain out before being plunged back to the bottom. Full-scale designs will be based on the plate mixer and will be restricted by stock tank dimensions.

Additionally, a water injection system was designed to deposit the necessary volume of water for the stock solution into the bottom of the tank. This process greatly reduced the amount of manual mixing required of the operator. Any required manual mixing is intended to be performed using the plate mixer described above.





Team Members

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Documents

	Challenges	Tasks	Symposium	Final Presentation
S pri ng '1 4	? Unknown Attachment	? Unknown Attachment	? Unknown Attachment	? Unknown Atta
F all '1 3	? Unknown Attachment	? Unknown Attachment	? Unknown Attachment	? Unknown Atta
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Past Research

File	Modified
File Stock Tank Mixing Spring 2011.xmcd	Jun 10, 2011 by 00d4eab94afcfd33014afd067dc90139
File Water Injection PACI Rotoplas 750 mL FINAL.xmcd	May 07, 2014 by 00d4eab94afcfd33014afd069bfa3d9c

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