

Learn From My Many Mistakes

When engineers are doing the building, you can't contain your labor costs or your medical costs for missing fingers.

By Mike Rainone

In December, I wrote about some of the tribulations with the start up of Active Water Sciences, LLC, one of PCD's affiliated companies that has the sad misfortune of having me as its CEO. At this point, it might be interesting to catch up on what has happened, with the aim of allowing you to learn from my many mistakes.

Late last year, we began working 12 hours a day, seven days a week, to produce the first two units of our new product, a revolutionary wastewater treatment system. Six units in all had been purchased by the military and two were due to be shipped to Afghanistan in mid-January. Housed in 20-foot shipping containers, each unit was destined for a separate Forward Operating Base (FOB), and could serve a base of about 600 service personnel.

The overall architecture for this technology is comprised of three 20-foot shipping containers. One container houses a control unit, which consists of the computer; a fermentor for the bacteria (the key to the operation of the system); a generator and filter.

A second container holds the treatment unit, the heart of the system. The treatment unit consists of two large tanks of membrane bioreactors and a primary sedimentation tank. Finally, a buffer unit also houses two tanks, one for surge acceptance and one for equalization, which provides a steady stream of wastewater to the treatment unit.

Over a six-week period, we quickly designed and built two such systems. While we didn't make our mid-January deadline, our distributor, who had anticipated how awkward we would be in building these units from scratch, moved the deadline to the end of the month, and we were able to ship in time to meet the new deadline.

I'm proud to say we have moved from a perfectly functioning operational prototype to a very polished, professional, robust and over-engineered production unit.

LESSON #1: Never tell your staff the real deadline. In this case, lying is good, because the work will expand to fill the allotted time.

Our story isn't really a tale about engineers running amok. Our story involves engineers wor-

rying about the future. Here's the scenario: our units are headed to Afghanistan where a Maytag repair man can't just zip over to your FOB to fix giant wastewater processing units, at least not without an armed convoy. We can't send our guys over there every time something needs a tweak or a whack to start operating properly again. So we've had to try and imagine every possible scenario of failure, sabotage, stupidity or bungling.

Compounding this is the fact that our product will be on display to every environmental officer in the U.S. armed forces, NATO, the U.N., and nearly every other disaster relief group on the planet.

While we believe our unit is unsurpassed, the rest of the world is looking for proof. Failure is not an option at this juncture and given these inducements to perfection, engineers can and will run amok — and you can't do a darn thing to stop it.

LESSON #2: At a minimum, try to avoid a situation in which your engineers are actually doing the building. They will look to the ends of the earth for ways to improve the design, on-the-fly, regardless of the cost, especially if they have wrenches in their hands. When engineers are doing the building, there is no way to contain your labor costs, nor your medical costs for missing fingers.

Given the \$800,000 price tag for the two units, one can appreciate the importance of having a terrific banker lined up to help even out the potholes in the cash flow regulation. Unfortunately, that banker relationship I bragged about in December, fell through. After sitting on our loan request for nearly two months, we were denied.

Our primary lender's cowardice was saved in three ways. First, our customer put up a sizable down payment for every unit, which was appropriate and helpful. Next, the local economic development foundation put up a substantial loan, with the requirement that we actually remain in the area and employ a certain number of people for the duration of the loan. Finally, our university partner's bank, treasuring the \$200 million that the university runs through the bank

every year, granted us a substantial line of credit.

LESSON #3: Never trust a banker, no matter how long you've known him. Also, set a deadline for reply and move on if he misses it. Don't feel bad about hurting a banker's feelings — you know he won't feel bad about hurting yours.

The toughest lesson of all is that, at some point, you have to let go of your baby and get it out the door. It will not be perfect. It will have some flaws.

You will know you can do better. You will lose sleep over something you just can't put your finger on. Oh, and it will be the first time the technology is tested in the real world, and every person that can make a difference in your future will look at it and judge it. This all makes that first launch exponentially tougher.

Maybe every aspect of launching any new business is like that. Maybe you can never have enough money, and maybe you're always uncertain. Somehow, you soldier through, making the best decisions you can.

LESSON #4: You must eventually trust your design, your engineering and trust that your Failure Modes & Effects Analysis (FMEA) process has brought your product up to the best possible standard before you launch—but launch you must.

Despite all of the trials mentioned above, the final lesson is that it is all worth the effort. Once your first product is shipped, orders are coming in and you've done it on your own, it all becomes clear.

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