



The Atkins Family

Jason, Emily, Savannah,
Nathaniel, and Miriam

Serving in Guinea-Bissau with



April 2019

Wrapping up and getting
ready to head to the U.S.

Homeward Bound *by Emily*

After a year and a half in Guinea-Bissau we are headed back to the U.S. and we can't wait to see you! We will be stateside for 6 months with Jason and the kids leaving in early June and me following them in early July. Since July and August are going to be especially packed with traveling, Jase and the kids are heading back early to give the kids time to settle back in and re-adjust to life the U.S., and I'm staying so that I can lead sessions in the week-long staff training in the end of June.

The kids are all older now, and fairly seasoned travelers, but Jason's got a challenge ahead of him taking an 8, 5, and 3 year old on a multi-plane, multi-day, multi-continent, multi-time zone adventure!

What are you going to do in America?

Miriam: Play in SNOW!!!!

Nathaniel: Talk in English ALL DAY LONG!

Savannah: Three things: Chick-fil-a, Tim Hortons, more Chick-fil-a.



Testing a "running through the airport" configuration!

Another Important Step *by Jason*

We've gotten terrific feedback from the owners of the first batch of drinking water filters the factory released for sale in January. Everyone who got one loves them, and I'm getting requests from neighbors, school co-workers, and missionaries all over Guinea-Bissau to get in line to purchase filters when more are ready. This is a tremendous encouragement and a great sign for both peoples' willingness to adopt the filter in Guinea-Bissau and the financial viability of the factory.

With so much excitement, we're working hard on improving the factory's output to meet the demand. One of our next major areas to work is to solidify our filter testing procedures. The factory tests every filter we produce to make sure it will be effective. The filters that fail are destroyed on the spot to make sure everyone can trust a "Wédé N'fiabm" filter. For the initial batch of filters we released in January, this included a lab e.coli test of every single filter. The problem with this test (in addition to being slow, I can only do about 20 in a day) is that it's expensive. The kit costs about \$10 per test, and with a filter retail price of \$30, the kit causes us to lose money on each filter, after other expenses.



Though far from a sterile lab, I'm doing my best to run accurate testing so we can narrow in on finalized filter testing criteria!

Another Important Step (cont'd) *by Jason*

So, the plan all along has been to use two other tests that can be done without actually testing bacteriological removal rates, but which can assure bacteriological effectiveness by correlating those results to known bacteriological removal rates. The first test involves submerging dry filters, up to their necks, in a dunk tank, to see how long it takes for water to filter into them completely. In the second, we measure how much water flows through the filter during a half hour test run.

The work we're doing currently is to do the bacteriological tests on groups of filters, after having done those two tests, to use the bacteriological results to tell us that, for example, any filter that is between 40 and 72 seconds in the dunk test and flows between half and one gallon per hour will necessarily also be at least 99% effective at removing *E. coli*, without actually having to put *e.coli* through each filter. I'm continuing to do the tests on-site and send results back to Richard, the chemist in California who's driving the project, to try to hone those criteria. We're hopeful that we'll have a finalized set of criteria in place before I leave next month.



The good news is that the filters work in two different ways. First, mechanically, they have pores that will allow water molecules through but which bacteria can't fit through. That's what we're testing for. However, after a filter is approved, it's treated with an anti-bacterial colloidal silver solution (like what's embedded in your running shirt to fight odor-causing bacteria) which absorbs into the wall of the filter and stays there for years, killing any bacteria that touch the filter. We have to test the filters before the silver is applied to them, because after it's applied, even "bad" filters still kill the bacteria. So we want them to be doubly effective-or as my son says when playing board games, "you've gotta have backups for your backups."

Teaching *by Jason*

The last third of the school year for welding is exposure to a smattering of more advanced topics, like welding in aluminum, stainless steel, and cast iron-as well as machining. Many of these topics are ones that I teach, as our two Guinean instructors have less exposure to them (although they're becoming more competent in them as each year goes by!)

We recently did a unit on lathe and mill work, and were able to make parts for a machine I'm building for the water filter factory! It's so much fun when these two projects we love are able to mingle in ways that are helpful to both!



Students machining a keyway into the shaft that will hold the pulley to power the machine's rotation.



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