

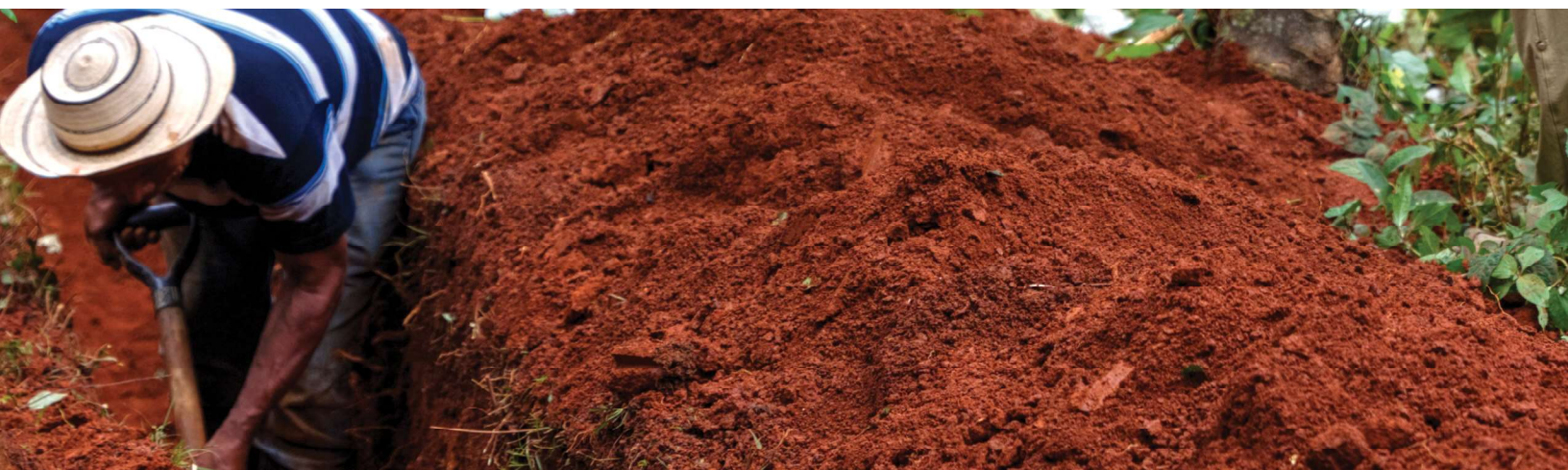


Year End Report

2017



ENGINEERS WITHOUT BORDERS USA
Northeastern University Chapter



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Uganda Design Lead

Phil Gunderson

Panama Program Director

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Panama Design Lead

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Mission

EWB USA-NEU aids communities in developing countries by using engineering solutions to address basic human needs, such as the need for potable water – all the while supplying our student members with educational, transformative experiences.

Vision

EWB-USA's vision is a world in which every community has the capacity to sustainably meet their basic human needs.



From the President

Dear Friends,

I am pleased to share with you all of the exciting progress that our chapter made in 2017! This year, we had programs in all stages of the EWB project process, from assessing a new project to monitoring and evaluating at the close of a project. Our Uganda program was on both ends of the spectrum, working to wrap up our nine years of collaboration with Bbanda and searching for a project in a new community. Our Panama program completed the design of the water distribution portion of the Las Delicias system, and began construction in August. Our Honduras program has been diligently working on the design of a water system in Ocotol, which is our sixth project in Honduras.

This year, ten students, two mentors, and four recent alumni traveled to our partner communities in Honduras, Uganda, and Panama. Additionally, five students and one mentor traveled to the national EWB-USA conference in Milwaukee, and 20 students traveled to the University of New Hampshire for a regional EWB conference.

Along with the project work and traveling that we did in 2017, our chapter has continued to grow and prosper as an organization. We had 120 official members in the the 2017-18 academic year, which is the biggest we have ever been! To keep up with our growth, we decided to expand our Executive Board by 36% and add 5 new officer positions. These new positions will allow



our chapter to more efficiently operate and accomplish our goals. I hope that these new positions will also create pathways to leadership for our members. In recognition of our hard work and success, Northeastern University awarded EWB-USA NEU with the Global Influence Award in 2017. I am incredibly proud of all that the Northeastern University Chapter of EWB-USA has accomplished this past year.

None of our achievements would be possible without the generosity of our supporters. I would like to thank you all for continuing to support EWB-USA NEU. We are able to grow and increase our impact only because we have unwavering support from our donors and mentors.

Thank you for your time and support!

A handwritten signature in black ink that reads "Maria L. Franko".

Maria Franko
President 2017-2018

Uganda



In 2017, EWB-USA NEU's Uganda program continued to monitor the Bbanda Distribution System (BDS) and plan for future expansion of the system. The system is the result of 9 years of collaboration between the community of Bbanda, EWB-USA NEU, and our partner organization Village in Focus. The BDS consists of a 50,000 gallon brick masonry water tank, a high yield borehole, 6 tap stands, 11 valve vaults, and over 3 kilometers of HDPE pipeline.

The year brought big changes to the community of Bbanda. Electricity came to the community in late 2016, and with it a variety of new industries. Bbanda now has welding shops, maize mills, a print shop, and a bakery. A South Korean NGO, Saemaul Undong, has given multiple development grants to the community to help improve quality of life and economic productivity. These grants have funded meeting halls,

street lights, and livestock programs -- all facilitated by strong community leaders who have worked to secure funding and oversee projects.

Under the direction of the new Water Board, the BDS has operated throughout the year with very little downtime. In February 2017, the Water Board obtained a loan to connect the borehole pump to the electrical grid and end their reliance on the diesel generator installed when the system was commissioned. The money they collect from jerry can fees is used to pay off this loan, and the lower operating costs of the pump increase the amount of money that they have to finance repairs. The Water Board treasurer's records indicate they are now spending about one-third as much money to run the system. They also took the initiative to build a new, sixth tap stand near a cluster of shops in the town center.

In April 2017, a team of 5 students and our professional mentor traveled to Bbanda to make repairs to the system, check on its status, and collect data for future construction. Since its commissioning in 2015, the water tank suffered major leakage. Prior to the April 2017 trip, students prepared a technical repair plan in collaboration with DN Tanks and constructed a prototype of the tank wall to practice implementing localized repairs. Upon arrival in the community, the Water Board informed the travel team that the tank leaked through the walls as well as at the joints they planned on repairing. The team adjusted the scope of the repair to include the entire tank wall and two pipe intrusions. With modifications to the timeline of the trip and an intense week of labor by local masons, the team removed and recast the concrete liner of the tank, applied a waterproof cement coating, and added multiple waterproofing measures around the pipe intrusions. The team also collected topographical survey data to plan pipeline

routes for two additional tap stands.

Since the trip, the Water Board has not observed any leakage from the tank. In the fall, the region experienced a drought and Bbanda was one of the few communities to have consistent access to water. In December, the Water Board reported that they secured a grant from Saemaul Undong and began construction of the two new taps which EWB-USA NEU planned to begin in summer 2018. With these taps constructed, the BDS will serve almost all of the houses in and around the town. Given the demonstrated capability of the Water Board and the completion of a fully functional system in the community, the chapter will work to close out the project and seek a new partner community in 2018. There are many achievements in Bbanda to reflect on in 2017, and exciting opportunities for the Uganda program in the future.

Article by Phil Gunderson



 1100
residents served

 35
active members

 9
years active

Panama



2017 was an incredible year for EWB-USA NEU's Panama program. Our program has been partnered with the community of Las Delicias since 2014 to construct a new drinking water system for its 230 residents. This past year, we designed key aspects of the Las Delicias water system such as break pressure tanks and river crossings, and our team broke ground on the project during the program's first implementation trip.

The program team worked hard throughout the Spring and Summer semesters to design a new drinking water distribution system for the community. With the information collected from previous trips, our team had decided to proceed with a gravity fed water system, but, given the drastic changes in elevation throughout the town, providing water with an appropriate pressure to all of the homes in the community made for a diffi-

cult design challenge. The key components of our design are the break pressure tanks, which reduce the water pressure back to safe levels as it travels downhill. In order to maintain high water pressure on both sides of the valley, our design also includes high pressure pipelines that bypass the break tanks. Each element of the system was designed with a 50-year projected lifespan and uses entirely locally sourced materials.

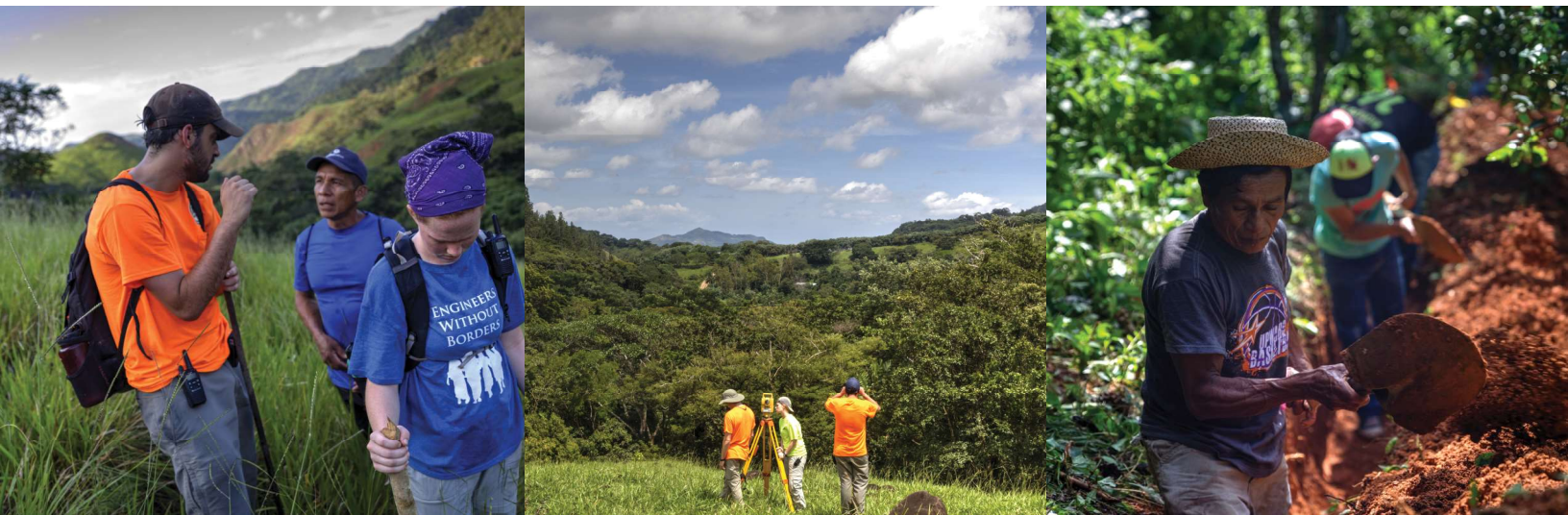
In August 2017, we embarked on our first construction trip. On the trip, we forged new relationships with local vendors, such as Tubotec, a wholesale distributor of PVC pipe, which provided all of the piping for the new distribution system at a discount. After arriving in the community, the travel team shared our design with the water board and the entire community, then began implementation by surveying break tank locations and marking routes for the pipeline.

The help of the community and water board members was critical in enabling the travel team to pick break tank locations and pipe routes where the ground could be easily excavated and land owners wouldn't be negatively impacted. The community was proud to finally begin construction on their new drinking water system, and continued to dig trenches and assemble the buried pipeline for several months after the travel team left. To date, they have completed construction of the first half of the system.


oversee the construction of pipeline bridges at various rivers crossings to ensure that our designs are constructed accurately in these high-pressure zones. Furthermore, we hope to scout additional water sources higher up in the mountains in order to feed more abundant water sources into our new distribution system in the near future. This, along with our efforts this year, will help meet the daily water needs of Las Delicias' growing population for generations to come.

Looking ahead, we are hoping to send a team in early 2018 to construct the second half of the distribution system. While in-country, we will discuss new designs and plans for the future with the water board and hear how construction has progressed in our absence. During this upcoming trip, we plan on staking out the remainder of the distribution system to guide the future excavation of the pipeline route. We will also

Article by Max Heudeborg



 250
residents served

 46
active members

 3
years active

Honduras



2017 was a productive year of design for the Honduras program as we continued to work with the 400+ community members in the villages of Ocotal and Potrerillos. With the data collected from our two assessment trips in 2015 and 2016, we spent the year designing for the first implementation phase of a new water system which will serve the two communities.

With a comprehensive 30-page report, we laid out the design possibilities for every component of the proposed system, from the enclosure of two groundwater springs three miles west of the community to a distribution system with individual tap stands at each of Ocotal and Potrerillos' 70+ homes. Each alternative design was analyzed for viability based on criteria such as cost, sustainability, and community input. For our first phase - the enclosure of the two springs - we found the best option to

be the construction of a "spring box", a brick masonry structure which will capture water for the system and protect it from surface contaminants. Much of our work in 2017 was focused on the design of this spring box, ensuring that it will serve its purpose without disturbing the surrounding soil and will be structurally sound.

In addition to the spring box, our team used hydraulic analysis software to model and design a path for the transmission main, which will be constructed in phase 2 of the project. We will use this design on our next trip as a surveying guide, so that we know as much as possible for our next design phase.

In October 2017, a small group of EWB alumni travelled to Los Planes, a community we worked with in 2007 to build a water distribution network. The goal of the trip

was to make repairs on the community's storage tank, which had been poorly constructed by a third party in 2008 and was showing severe cracking and substantial leaking. The team was able to resurface the interior walls of the tank to prevent further leakage. While in-country, the same team also briefly visited another past partner community, El Carrizalito, to assess an electric pump that had been damaged by power surges caused by lightening storms. The team hired a local electrician to replace a component in the pump and got it working once more. Our group is working with the community to assess possible ways to mitigate future risk of failure. The travel team also visited Ocotal after receiving word that their current system had been damaged and was not regularly operable. The community is currently working with a nearby village which shares the same source to construct a new temporary water main in order to maintain reliable water access, and


will be contacting EWB-NEU for design assistance as needed.

The new Ocotal-Potrerrillos water system is one of the largest projects our EWB chapter has undertaken since its inception in 2004. We are excited for our first implementation trip in August 2018, where we will work with the community to start construction on phase 1 of their water system.

Article by Mike Hebert



 430
residents served

 39
active members

 14
years active



Alumni Spotlight

Caitlin Candee

Every year, we like to recognize an alumni of our organization. Every member contributes to our organization, but some shine far and above the rest. Caitlin Candee is one of those who, year after year, gave her all in pursuit of our mission, and she continues to do so today.

Caitlin's interest in EWB started much before she came to Northeastern -- she cited it as one of the reasons she arrived at the school. She joined our organization at the beginning of her freshman year and committed more and more until she was elected President in 2012. Under her leadership, our club started to focus on student betterment, shortening the learning curve for new members, and implemented the (now annual) Bootcamp, a day-long training held for new members every fall.

In her time at Northeastern, Caitlin was a part of two trips to our partner community in Uganda -- but her service didn't stop when she graduated: she was an essential part of an alumni implementation trip to a partner community in Honduras when students could not travel due to safety concerns. When asked about how EWB affected her time in college, Caitlin said "EWB was the community that I related the most to; it was the defining feature of college for me". Her advice to current EWB students is to "take advantage of the really practical skills EWB



Caitlin in Bbanda, Uganda in 2011

offers! Even if you're not a member of the travel team, go to their trainings -- they are such a useful learning tool!"

Since graduating, Caitlin has been working with Build Health International in Haiti, and says that EWB was the foundation for the work she does now. She serves as the highest trained surveyor for the organization in Haiti, and still uses the hands-on skills that she first learned in EWB. Recounting her most memorable times with EWB at Northeastern, Caitlin says: "At the end of my junior year, as president, after we had pushed to get the year end report out and prepare for the donor reception, we [the leadership team] all ended up in the EWB

office and were just giddy -- that community, a bunch of good kids, with the same goal -- to make the world a better place -- was wonderful to be a part of."

In her time with EWB-USA NEU, Caitlin was directly responsible for landmark organizational changes and improving the lives of both students in the Boston community and residents in our partner communities abroad. In the end, she says, "EWB made my career in international development concrete -- it gave me the skills to make it possible and in reach".



Students work with local masons in Uganda to assess tank repair options

Bootcamp

New members of EWB-USA NEU were welcomed to the organization at another successful fall Bootcamp training. Bootcamp is a day-long event that our organization has held annually since 2012, aimed at shortening the learning curve and integrating new members into our design committees. Bootcamp grows every year; this year 80 students attended, as compared to just 20 at its inception. This year, the day was structured to follow the phases of a design project and started with a redesigned assessment activity intended to jumpstart critical thinking and define the focus of our work in EWB. Students then moved into design presentations and activities where students are trained to perform basic hydraulic modeling. The day closed with a talk

on monitoring and evaluation, focusing on how to make sure that the work we do is addressing the problem that we initially set out to solve. Thanks to all that attended or helped out with this year's Bootcamp!



Bootcamp attendees at work

Senior Spotlight

Emily Katzner

Emily Katzner joined EWB-USA NEU as a freshman mechanical engineering student seeking a meaningful outlet to apply her engineering skills in service to others. Little did she know, the organization would become a central and shaping constituent of her undergraduate education at Northeastern.

In 2015, during her tenure as Honduras Program Design Lead, Emily traveled on the team's inaugural assessment trip to the community of Ocotal. She returned to Ocotal the following year as Trip Lead on the second assessment trip. The data collected on these assessment trips were critical in the design of Ocotal's distribution system, which will provide water to some 400 people. In addition to taking leadership positions during her travels, she served as translator on both trips, interfacing between community members and the EWB-USA NEU design team. Olivia Ahner, former Honduras Design Lead and a member of the 2016 travel team, said of Emily's leadership, "It was incredible to watch such an effective communicator address the needs of the Ocotal Water Board. She has a unique way of seeking solutions, adapting, and making plans on the spot."

In addition to providing invaluable technical support to the Honduras Program, Emily has had a remarkable impact on her peers. Speaking on panels in front of prospective



Emily in Ocotal, Honduras in 2016

students was one of Emily's favorite jobs - her enthusiasm for EWB-USA NEU's mission is infectious, and she has inspired countless engineers to join EWB-USA NEU's ranks. Kelsey Shukis, former Honduras Program Director, shared that "Emily's leadership and welcoming personality are the sole reasons that I joined EWB. Her amazing work ethic and willingness to help everyone make her one of a kind."

Emily's contributions to EWB-USA NEU made her a natural candidate for President of the organization, a role that she occupied from June 2016 to May 2017. I had the pleasure of serving as Vice President of Development by Emily's side, and was continually

impressed by her dedication to excellence and willingness to collaborate. We spent many late nights pouring over grant applications, reports, and donor correspondences; it was clear that maintaining the professional and respected reputation of EWB-USA NEU was Emily's first priority. Thanks to her uncompromising dedication to producing quality work, she not only maintained this reputation, but augmented it.

Emily would like to express her thanks to Dan Saulnier, Honduras Program Mentor and EWB-USA NEU faculty advisor, along with Miranda Taylor, her roommate, program

director, and friend, for their continued support. Emily will graduate with her Bachelor of Science in Mechanical Engineering in May of 2018. We feel exceptionally grateful that she has chosen to dedicate so much of herself to our organization throughout the past five years and wish her luck in her post-graduation endeavors.

Article by Elaine Kehoe

Local Conferences

In addition to the national conference, our chapter attended two other EWB conferences this year -- one at the University of New Hampshire and one at the University of Connecticut -- to network and learn. Our attendance at these local conferences is vital for the continuing education of our members -- it's a wonderful way to learn about administrative and technical techniques in use by other chapters. Highlights from this year's conferences included a day-long, intensive promotional video workshop at UConn and problem-solving simulations covering topics such as mitigating pollution (on a budget) and water source discovery. Members from our organization presented at each conference; at UNH we led an abbreviated version of our Bootcamp training,

and at the UConn conference, we presented lessons learned from the Uganda Program's work with boreholes. With every conference we attend, the knowledge base in our club spreads to more people, and we're looking forward to more in the future!



Conference attendees at UNH

National Conference

On October 6th, EWB-USA NEU ventured out to Milwaukee to learn about all of the recent happenings at EWB-USA and to share some techniques that have helped make our chapter successful.

The two-day conference included presentations by EWB-USA staff and members, including our very own Tim McGrath, Phil Gunderson, Denzil Leach, and Maria Franko. Tim and Phil presented on Lesson Learned in the Life of a Borehole, based on our chapter's experiences with boreholes in Bbanda, Uganda. Their presentation covered both the technical and cultural aspects of drilling, operating, and maintaining a borehole. With a more administrative focus, Maria and Denzil co-presented with EWB-USA staff on fundraising strategies. Maria and Denzil talked about how chapters can form and maintain strong relationships with corporate sponsors. Fundraising is an important factor in the success of every EWB chapter, and we hope that strategies we shared will assist other chapters to be successful.

Throughout the conference, emphasis was placed on the themes of increasing positive impact and empowering communities. EWB-USA's new strategic plan, EWB 2.0, also focuses on these themes. EWB 2.0 calls for a focus on a field driven approach to increase



Conference Attendees in Milwaukee, October 2017

the impact the EWB. To facilitate this field driven approach, EWB-USA will open more in-country offices. In December, EWB-USA announced that their third in-country office will be in Uganda. EWB-USA will also prioritize working in countries that have the greatest need, limited engineering markets, and safe travel conditions. EWB 2.0 will help EWB-USA more efficiently meet its dual mission of equipping leaders and empowering communities to meet their basic human needs.

After the conference, back on campus, the attendees presented to other EWB-USA NEU members to share lessons learned at the conference. We look forward to sending more members to present at and attend the 2018 National EWB-USA conference in San Francisco.



Our Partners

Each of our design programs relies on an NGO partner to facilitate communication with our partner communities and assist our teams when in-country. Our work would not be possible without them, and we would like to thank them for all they do!



Sustainable Harvest International's mission is to preserve the environment by partnering with families to improve well-being through sustainable farming.

SHI supports our Panama program.

The mission of ACTS is to foster cross-cultural understanding and to promote sustainable programs for health, education, agriculture and economic development.

ACTS supports our Honduras program.



Village In Focus works with the people of Bbanda, Uganda to improve their access to clean water, appropriate healthcare and education.

VIF supports our Uganda program.

Finances

Revenues

Corporate Donations	\$18,746.55
Personal Donations	\$18,259.00
Grants/Awards	\$13,250.00
Student Contributions	\$5,130.00
Total	\$55,385.55



Expenses

Honduras	\$10,658.08
Uganda	\$12,246.76
Panama	\$20,517.01
Student Betterment	\$5,295.22
Administrative	\$6,150.08
Other	\$1,690.72
Total	\$56,557.87

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