

Engineers Braving International Borders

By: Jay Thrasher

As engineers, architects, or technical professionals of some degree, we all share a similar passion for problem solving. Inside each one of us, we gain a deep sense of fulfillment by picking up our finely sharpened pencil and creating a detailed masterpiece of calculations, crude drawings and or relative measurements. In an unconscious act we redesign the word *problem* to mean *challenge*. Our training has taught us to brave these challenges through use of our rationality, better known as our engineering judgment. Where data is not available we are given a blank canvas to paint a map of assumptions. We are indeed creative professionals always friendly to the unforgiving laws of physics. For most of us, problem solving is more than a line of work but rather a direct challenge to our individual capacity. With every innovative solution that we create, we continue to search throughout our careers for challenges that push us to new levels of awareness.

As the world shrinks and the global population increases, the seemingly omnipresent challenges of poverty in developing communities worldwide are beginning to gain more and more attention in the engineering world. Historically these challenges did not always seem applicable to engineers due to their apparent cultural and political complexity. However, over the years there has been an increase in the number of engineering organizations that now embrace these complexities and are striving to provide engineering solutions to global humanitarian needs. Most notably, our interaction as engineers in developing communities abroad, serves as a tangible experience that reminds us of our responsibilities to the community as well as our capacity for creating change in society.

Excited to start my career and just months before receiving my degree in civil engineering I began searching for a job. I was adamant on pursuing hands-on experience away from textbooks that would prove to challenge me on a level I had yet to endure. After sitting in on different forums and following a number of news stories I began wondering what engineers were doing to address humanitarian issues such as poverty. I researched what politicians and U.N. officials were proposing to accomplish through the Millennium Development Goals but I remained anxious to find an opportunity that was within my reach as a young engineer. To my surprise there were few domestic opportunities that I felt could provide me with the challenge and training I was in search of. So within months of receiving my degree, I was abroad in Santo Domingo, Dominican Republic training under an intensive Water and Sanitation Engineering course with the United States Peace Corps.

After three months of technical, field-based training which incorporated cross-cultural and language preparation, I was sent to a small rural community. My assignment was to spend the next two years organizing and training the impoverished community of La Mulata to construct a 3-kilometer aqueduct from a water source in the neighboring hillside. The community was located on a dirt path far from any developed infrastructure and comprised of 245 habitants. Being on my own, I was confronted with many challenges, not only in my personal ability to cope with the new environment but most importantly in assuming the great responsibility as the community engineer. As an engineer, the most rewarding aspect of this experience was managing such responsibility

in a transparent market where my work single-handedly affected not only my own life but also those of my neighbors.

My Peace Corps experience acted as a true catalyst for my development as an engineer and continues to affect my work on a daily level. I have gained awareness not only into the challenges that face the developing world but I have seen the important role that we engineers play in society at large. This consciousness was born from the many months that I spent among my new friends and family of La Mulata. We would pass countless nights together brainstorming project logistics over candlelight and months on end of project construction sweating beneath the unforgiving sun. My relationship with the people of the community became as important as my engineering work itself. I began realizing that engineers in the developing world do not fulfill their potential by simply providing solutions to technical design challenges. For months the men of the community worked on digging a three-foot deep trench with pick axes and shovels to house the 3 km pipeline of the aqueduct. Women and children followed the work crews of men with their large pots, food and water jugs out into the hillside to prepare lunch over an open fire. This impoverished farming community, notably wealthy in culture and determination, looked at me for guidance and in return taught me the undeniable importance of the relationship between engineer and community. La Mulata acted as a microcosm in which I began to see my role in society take form.

Upon returning home I was curious to explore what career opportunities might be available to domestic engineers that in effect provides them with the realization of their intrinsic value within society. It seemed as though the standard project management model we most often attend to here in the U.S. causes for a very different engineering experience than that of which I had. I started to see that domestic engineers spend much of their work focusing on specialized technical challenges, where they are bound to their office many miles or even days of travel away from the actual project site. This highly calculated project management model, honed for efficiency, is successful here in the U.S. because of a growing surplus of professionals.

Nevertheless in the developing world, where resources and educated professionals are limited, there exists a need for well-diversified engineers, competent in community relations and collaborative approaches. There is an enormous demand on an engineer in the developing world to perform on a more diverse number of tasks, all of which exist on technical, physical and social levels. They are to be capable of training, communicating, and in most cases, able to construct what they design. I have begun to believe that the true knowledge and intrinsic value of the engineer is rooted within their ability to act as the teacher, builder and most importantly facilitator between community and technology, bringing projects from concept to creation. This has shown me how the unique and complex challenges of the developing world serve as one of the best methods for an engineer to gain a deep appreciation of his or her role, abilities and subsequent responsibility in society.

Just shy of my two years of service I was able to train and oversee the construction of the aqueduct. Fresh water was now available at the homes of all the beneficiaries who participated in the project. I realized that even though the physical integrity of the aqueduct will deteriorate over time and will one-day fail, it is *our* deepest hope that the community will have the strength and knowledge to repair and rebuild for generations to come. For this reason, the real success of my work remains present not

solely in the construction of the water system but rather in the strengthening of the community organization. It was my personal interaction as well as my community involvement that taught me what should in fact be the true focus of *development work*.

For those of us who will one day seek experience in the developing world it is necessary to take a deeper look into the impact our actions have on communities with varying cultural backgrounds. I have learned that creating real sustainable change in developing communities is more complex than we tend to imagine. Because of the length of my assignment in Peace Corps I was able to experience the work and consequent outcome of a number of non-governmental organizations (NGOs) and other international engineering initiatives such as Engineers Without Borders (EWB). I have seen among these differing initiatives that each subscribes to its own definition of *development work*. It is therefore every engineer's ethical responsibility to provide their skills in a way that they feel are most conducive to the community. We must keep in mind that with limited resources in the developing world there is no excuse for waste nor abuse of these resources. We have the capability and potential for building complex and lifesaving solutions, but it is within these very same complexities that cause system abandonment and or an inability of repair on part of the beneficiaries. We must be decisive in choosing solutions that are kept simple and that are most focused on involving communities throughout all phases of the project; leaving them in decision-making positions as often as possible.

As significant as it is in the U.S., the process of project turnover is undoubtedly the most critical point for maximizing the lifespan of any system and ensuring its proper function and use. It is within this process that insufficient education and training can leave the customer, client, beneficiary, community member, user, etc. helpless and without means for maintaining their system. Whenever we commit to providing engineering services abroad we should be committed to providing the necessary time as well as technological and psychological support until the project is sustained in the hands of the community. We must remember that in the developing world we are more than engineers --we are capacitors, educators, teachers, friends, and community members that are directly affecting, first handedly, the life of the community.

My engineering experience in the developing world was not a vacation nor was I a passing tourist; I was there to learn and adapt, to join a people and create change. It was a challenge that as an engineer I never could have foreseen. It provided me with great depth and insight into the complexities of community development work and appropriate technologies within the developing world. It has most importantly proven to me the capacity that we have as engineers for providing humanitarian services through our involvement on the most basic community level. Since my return to the United States I continue to explore the significant role we as engineers hold in the world. It is empowering to see the large number of engineers braving international borders and joining groups such as Engineers Without Borders and Peace Corps. Engineers are gaining ground as truly noble professionals, extending their unique skills overseas and proving their capacity as a prevalent world shaping force.