Volunteering Internationally: How a Materials Engineer Can Make a Difference

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Outline

• Motivation
• Ways One Can Volunteer
• Importance of Giving Back
• My Experiences
• Final Thoughts
Quick Biography

- Attended University of Florida
  - BSMSE: 2000
  - MS: 2003
  - Ph.D.: 2007

- Employment
  - American Technical Ceramics
  - NAVAIR
  - National Transportation Safety Board

- Certifications, FBPE:
  - P.E. (Metallurgical): 2012
Motivation

• Had I accomplished everything I thought I would?
• Had I done everything I thought I could?
• In what ways could I give back to others?
Importance of Giving Back

- People need your help
  - Make a difference in someone’s life
- Variety of Levels
  - Local
  - National
  - International
- Variety of Fields
  - Environmental
  - Medical
  - Construction
  - Educational
  - Athletic
  - Occupational
Why Volunteer?

• Learn and develop “soft skills”
  • Project management
  • Communication
  • Networking
• Enhance your resume
  • Gain work experience
  • Broaden horizons
• Build self-esteem and self-confidence
  • Feel needed and valued
  • Improve your health
• Be an ambassador for science and engineering
Why Are Materials Engineers Needed?

• Critical thinking skills
• Organizing skills
• Communication skills
• Understand engineering and construction concepts
• Materials knowledge base unique to our experience
Why Are Materials Engineers Needed?

- Galvanic corrosion
- Clogged drainage
- No viable seepage pit
My Experience: EWB

- International NGO to provide
  - Clean water
  - Sanitation
  - Community infrastructure

- Synergy between
  - Professional engineers
  - Academics
  - Students

- All engineering disciplines
My Experience: EWB

- 5 year commitment to region
- Promote sustainable development
- Train engineers and locals in designing for future development
My Experience: Civil/Structural Engineering

- Concrete knowledge
  - Curing rates
  - Mixing parameters
  - Rebar design

- Soil knowledge
  - Soil strength
  - Foundation design
  - Drainage design

- Water distribution knowledge
  - Piping design
  - Delivery systems
  - Sanitation
My Experience: Planning

- Contact area and identify needs
- Look for funding sources
- Develop engineering plans and drawings
- Present to EWB National Committees
- Correct issues and finalize
- Implementation
My Experience: Planning

- Design and planning phase:
  - 6-8 months
- Implementation phase:
  - 14 days
My Experience: Planning

10000 L Water Tank

Road

Downhill

Homes

PROPOSED PIPELINE B

EXISTING 500 M³ TANK BUILT IN 2003

PROPOSED PIPELINE A
My Experience: Guatemala
My Experience: Nebaj

• Advantages:
  • Arable land and water
  • Receptive villagers
  • Skilled artisans
  • Available supplies
  • Local NGO and Peace Corps

• Challenges:
  • Language barriers
  • Cultural differences
  • Transportation
  • Poverty
Before and After: Xepium
Before and After: Xevitz
Before and After: Visibakvitz
Sustainability: Structures

- **Structures**
  - Facilities must be durable and easily maintainable
  - Materials must be available

- **Personnel**
  - Local skilled workers must be available
  - All parties must understand roles and responsibility
Sustainability: Education

- Health and Hygiene Education
  - Proper hand washing
  - Proper teeth brushing
  - Safe drinking water
  - Cough/sneeze into hands/elbows
- Overcoming cultural biases and superstition
Experience in volunteering applied to work experience - EWB

• Communication and Management Experience
  • Implemented on-site design changes
  • Collaborated with local leaders and contractors
  • Developed construction certification reports
  • Learned a new language

• Design Experience
  • Collected survey and water data
  • Developed design calculations, drawings, cost and schedule estimates
Experience in volunteering applied to work experience - EWB

- Proposal and Grant Experience
  - Underwent peer review
  - Obtained approval from governing authority
  - Submitted grants and collected project funds

- Teaching Experience
  - Mentored other engineers
  - Marketed future projects, provided education for public
What Should My Steps Be?

• Evaluate Yourself
• Explore Organizations
• Take the Plunge
• Don’t be Afraid to Say ‘No’
Questions?