



**Engineering World Health Summer Institute
Guatemala 2018
Final Report**

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Executive Summary

The 2018 EWH Summer Institute in Guatemala was an unexpected program, and yet a successful one. Until this year, Engineering World Health conducted our Central American Summer Institute Program in Nicaragua. Civil unrest in Nicaragua this spring necessitated a last minute change to Guatemala. Our participants took this change in stride and made a real contribution to the Guatemalan healthcare system.

The 9 participants stayed with homestay families for the duration of the program. During the first four weeks of the program, the group underwent intensive Spanish language, cultural, and technical training conducted in Quetzaltenango. After their training, participants were transported to our partner hospitals in Totonicapan, Retalhuleu, and Mazatenango to work in groups of two, three or four. During their 5-week placements, **the participants repaired 67 pieces of equipment worth approximately US \$134,000^[1]. Equipment ranged in complexity from ceiling fans to pulse oximeters, infusion pumps, and autoclaves.**

Participants unanimously said they filled a need in the hospitals. All reported that the staff would bring them more equipment each day, sometimes filling their workstations. All groups completed a secondary project for their hospitals, working with a budget of \$100 per person, to address a hospital need outside of equipment repair. All participants gave high praise to their homestays. One said her homestays were “out of this world amazing,” while another described her Guatemalan hosts as having “beautiful hearts and beautiful homes.”

All of the participant feedback gathered in written questionnaires and oral interviews was overwhelmingly positive, with all stating that they would recommend the program. A participant described the program as feeling “like a family right from the beginning.”

We are grateful to all who helped make this program not only possible, but a success in the eyes of our participants and on-the-ground partners in Guatemala.

Medical Equipment Repair

The 9 participants repaired or completed preventative maintenance on **67 pieces** of medical and hospital equipment, totaling approximately USD \$134,000 [1] of equipment repair service. Their work is summarized in the following charts:

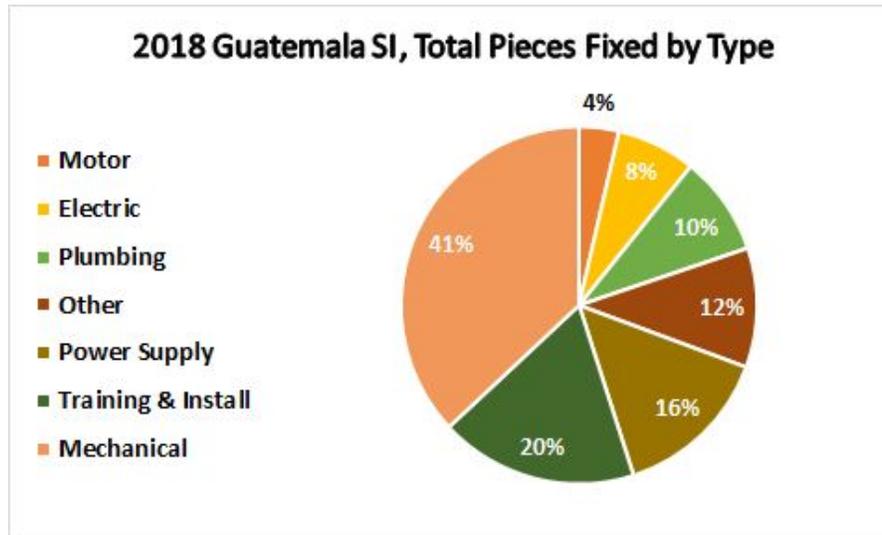
Repairs/Maintenance by Type of Equipment

| Type of Equipment | Total Pieces | Type of Equipment | Total Pieces |
|----------------------------------|--------------|---------------------|--------------|
| Anesthesia Machine | 1 | Lamp, examination | 9 |
| Aspirator/Suction Machine | 1 | Lamp, surgical | 1 |
| Autoclave | 1 | Microscope | 3 |
| Blood Pressure Device, Automatic | 5 | Nebulizer | 3 |
| Blood Pressure Device, Manual | 7 | Phototherapy Device | 2 |
| Ceiling Fan | 2 | Pulse Oximeter | 4 |
| ECG | 1 | Thermometers | 3 |
| Furniture | 4 | X-Ray Film View Box | 4 |
| Incubator (infant) | 1 | Other | 12 |
| Infusion Pumps | 3 | | |

Repairs by Hospital

| Hospital | Items Touched | Repaired | Abandoned | Repair Percentage |
|--------------|---------------|-----------|-----------|-------------------|
| Hospital 1 | 31 | 16 | 15 | 52% |
| Hospital 2 | 47 | 31 | 16 | 66% |
| Hospital 3 | 33 | 20 | 13 | 61% |
| Total | 111 | 67 | 44 | 60% avg |

Repairs by Type of Fix



Secondary Projects

Each team is encouraged to complete a secondary project for their hospital during their placement. Through interviews with hospital staff, the participants identify a need in the hospital, then are given a budget of \$100 per person to use in a creative way to provide for that need.

Hospital 1

This group's secondary project was building a playground for children in front of the external consultation area. Participants hired a local welder to build a seesaw, swings, and monkey bars. The group spent about one day clearing the ground and removing trash and rocks. The welder and a crew worked to construct and paint the playground, while the EWH participants installed tires as a safety measure under the monkey bars and seesaw (not pictured).



Hospital 2

This group's secondary project was renovation of the hospital's waste management system. Many sharp objects (broken glass and used needles) and improperly disposed waste were scattered along the exposed soil and street of the dumpster, posing a contamination hazard to the adjacent hospital. Additionally, a ramp leading up to the dumpster house was an inconvenient obstacle for older hospital staff. The auxiliary dumpster house had broken windows, a broken door, and no roof.

For the project, the group cleaned the trash from the soil and the street. A welder was hired to install new windows, a new door, and a new roof for the auxiliary house. The EWH participants painted both the main and auxiliary houses to renovate the dumpster houses and hopefully promote proper use. They collected all sharp objects carefully and safely disposed them in the proper, red sharps containers. Finally, maintenance staff assisted in cleaning the pile of trash from the street and placed mandatory bins on the street for disposal.



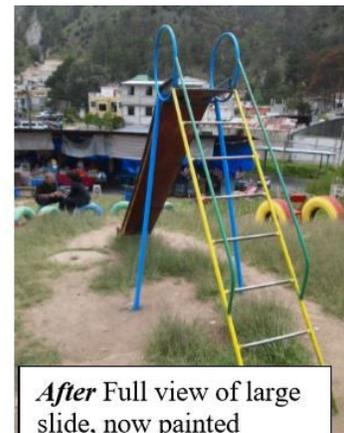
Before



After

Hospital 3

This group worked on hospital playground repair/beautification. Previously, there were broken and dangerous slides and broken swing sets; all of the equipment was rusted and had faded or chipped paint. The participants were able to repaint all of the equipment, remove the broken swings, install a tire swing in their place, have the slides welded, make a “tire balancing beam,” make a tire tractor, and have two benches installed in the park.





Tire tractor



New benches



Tire balancing beam

Participant Debriefs and Feedback

Engineering World Health seeks not only to assist the hospitals in which our participant volunteers work, but also to influence the volunteers' own development as engineers and as global citizens. Our participant feedback was very positive. When asked if they would recommend this program, everyone answered yes. Some of the words used to describe the program were challenging (in a good way), unforgettable, and breathtaking. All felt very needed by the hospital, enjoyed being able to repair highly necessary equipment, and found their work gratifying. One participant said it sharpened his sense of curiosity, another said the program "taught me a lot about being a better human in general." The On The Ground Coordinators and Instructor received overwhelmingly positive feedback.

Acknowledgements

The On the Ground Coordinators were Paul Kline and Luis Portillo. The engineering courses were taught by Professor Iyad Obeid of Temple University. Language and cultural training were provided by Do Guatemala. Thank you to all who helped make this program possible.

[1] EWH estimates the mean value of each repair at USD\$2000