

Winter 2013

Synopsis of Engineers Without Borders (EWB) trip, Guatemala December 15 to December 24, 2013

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Synopsis of December 15 – 24th EWB Trip

By Willis D. Weight PhD, PE

December 15th, 2013

About 5:30 am nine of us met at the Helena Regional Airport to depart for our second EBW retro-fit structural wall project. I picked up three of the students at the parking lot of St. Charles at Carroll College. We were supposed to depart on Friday December 13th however; our flight was canceled by United Airlines the day before at 4 PM for mechanical reasons. Dr. John Scharf and I spent 2 ½ hours on the phone on Thursday and were able to arrange the departure on Sunday December 15th, which would give us enough time to complete the project without changing our return date of December 23rd. Assembled was Michael Brennan (Helena) – Professional Mentor from Morrison-Maierle, Jonathon Kujawa (California) – Student project leader, Steven Cornish (Helena) – Safety Officer, Brilee Madison (Washington), Dillon Armstrong (Seattle), Jacob Johnson (Kalispell), Kegan Cunniff (Choteau), Patrick Majerus (Valier). One additional student MaKenzie Johnson (Lambert, MT) departed from Billings MT.

In the reorganization of flight schedules not all of us arrived in Houston Texas at the same time. MaKenzie arrived first about 3:30 PM, while Dillon and Jonathon arrived last about 7 PM, having the longest layover in Denver Co. The rest of us arrived in Houston via Denver to Dallas-Ft. Worth arriving about 5:30 PM. Once in Denver we stayed the night, having received vouchers from United, from the flight cancellation for hotel and two meals. It had already been a long day so having a meal together at the Hyatt and heading to bed was a good plan.

December 16th, 2013

Our departing flight for Guatemala City was scheduled for 9:18 am so we had the option of catching a shuttle at 6 am or 7 am. We decided that leaving at 6 am was a better idea as we had no options if we missed the 7 am shuttle. It worked perfectly because we filled every seat. This allowed us to make it through security and check our bags with plenty of time to have breakfast at Ruby's at the Houston airport. Our United Airlines flight to Guatemala City was straight forward and we arrived about noon. We did the long walk to customs, where we got our passports stamped and then found our luggage. They check to make sure your claim checks match your luggage for every bag. At that point you get either a red light or green light option for another look through your luggage or get a free pass. We lucked out and faced the horde of folks waiting for arriving passengers. Sheila McShane waved and I spotted her and her driver Cirilo. They had arranged for a ten passenger vehicle through www.irc-travel.com from Antigua. Guillermo was the driver, part of a family business and his English was good.

The traffic was somewhat heavy for a Monday, but part of it was the Holiday time of year and part was due to construction of the main highway. They have a long term plan of creating a two-way highway in both directions from north to south. We stopped at the Saritas restaurant for lunch. Excellent food and this gave everyone some needed energy. We made a cultural stop at a fruit stand to introduce the

students to fruits they had never seen or tasted before. For example, sugar cane with its sweet Styrofoam-like texture was first-time experience. We did make some purchases of pineapple, water melon, coconuts, and so on. We made it through the fruit check station by the driver stating that “we have just come from the airport”. They waived us on. The roads from San Antonio were especially bad (worse than last trip) being hammered from the just concluded rainy season. We rolled into the clinic about 6 PM and got settled into our quarters. Dinner was hot dogs with chili, sour kraut, beans, mora (blackberry juice). We coordinated with Father Kevin Christofferson about our daily schedule, the drivers and the lunch and dinner times. The students engaged in some soccer action in front of the clinic.

December 17, 2013 – Tuesday

This was the first day of construction work. We enjoyed a standard breakfast of pancakes, beans and tortillas, plantains (a cooked variety of banana, bananas, cantaloupe or another fruit, yogurt and toast. That morning we met our preliminary work coordinator David Ruiz. He supervised the foundation work consisting of soils excavations; rebar framing and pouring of the footings (zapatos). This was an incredible blessing to be able to just concentrate on constructing the walls. (In May 2012 we experienced mixing and pouring 23 yards of concrete Guatemalan style and wanted to avoid a repeat of that event). The awesome thing is David is available to continue helping with future construction and we trust his work. Michael lead the group in measuring, figuring, and getting organized. We organized the students into small groups doing a variety of different tasks. For example, three 1-meter bolts were hand sawn down to four pieces at 9 ¾” each. Another group mixed mortar for the blocks, other cut blocks to size and hauled materials. When the saw started up and I saw the dust flying it occurred to me that we didn’t have respiratory masks, however; Steven the safety officer, produced them from the health and safety kit, so we were good to go. I made sure safety glasses were worn on such tasks. Everyone had something to do and the work progressed well.

David Ruiz and I went into town (Santo Tomas) to arrange for drilling holes in the angle iron and to arrange for finishing materials (ceramic tile, pegamix) and additional block; 215 – 8” by 8” by 16” blocks and 80 - 6-inch by 8” by 16” blocks for fixing the large steps broken during the excavation process. These materials were arranged at the business known as Don Pepe’. Samuel was the albañil (bricklayer) for one wall (Wall 4) and Jose’ was the lead person on the second wall (Wall 3). We helped lift block over the rebar, cut block, and mudded the spaces between the blocks. Lunch for all was held on the 3rd floor roof. Judy, a visiting teacher from Guatemala City, led the cooks in bringing the meal up. Christmas tamales with raisins, plums, olives, and chicken, fruit and fruit drink. They also brought us an additional container of water as many had emptied their water bottles working in the heat. We successfully raised both walls 6 courses (4 feet) and set the horizontal beam. It was a very successful first day. Dinner was Chow Mein, papaya, bread and fruit drink. We all walked over to the Cajero (ATM) but there was no money available. The festivities of the days prior to the Feast of Saint Thomas were underway, live music, Ferris wheel, other games, gambling, food and other vendors with their wares for sale. So we needed to try again another day. It was a very upbeat festive atmosphere.

December 18, 2013 – Wednesday

After another great breakfast on the way up to the La Asuncion School we stopped by Julio's iron business to pick up the angle iron and plates with holes drilled. Brilee and MaKenzie painted the metal pieces with gray paint for protection. A plumb bob was used to locate where to drill the holes upward into the second floor slab. Wall number 4 was located right under the ramp leading to the library. While drilling holes we had to move the drillhole locations from hitting a metal plate that extends two inches inward from the outside edges. This was only an issue on the two outside drillholes. The more interior holes did not encounter this problem. We eventually got it done. We had to penetrate 6 inches so that epoxy could be used to hold the #5 rebar into place. Michael got the epoxy gun working correctly so all the rebar for both walls were put into place (four holes at each end). We cut rebar long enough to insert into the holes, while reaching the top of the 6th course surface (4 foot level). We had to have the bricklayers refrain from continuing laying block until the rebar for these structural beams could be accomplished (a good reason to have a supervisor overseeing the work). We used tie wire to secure the upward extending rebar from the walls and footings with those extending downward from those epoxied into the holes. Everything was good and tight. The beam blocks had to be cut to fit around the rebar. At that point we were able to raise the wall upward with additional courses. This was a better design than having a third overlapping rebar segments tied to shorter. Scaffolding (Andamio) was put into place to be able to build upward.

Above on the second floor we had to remove ceramic tile and the pegamix down to the concrete slab to make room for the metal plates on the ramp leading to the library for wall number 4. This was done with hammers and chisels. We had enough clearance to cover the plated, bolts and nuts without having to create a raised concrete ramp. We went into the library and drilled holes through the slab to ready for the time when wall number 3 would be anchored with $\frac{3}{4}$ " bolts (to angle-iron underneath to plates above). The wrenches needed to tighten the nuts were located and we found out that we were short in the number of anchor bolts. We improvised by putting a nut and large washer and another nut to make a wide enough head to make the anchor bolts effective. Lunch was served: fried chicken, salad, beans & tortillas & salsa, and white pineapple (the best we had ever tasted).

By the end of the day the walls were up nine or ten courses, with the beams at the 12-course level (eight-feet high). All holes had been drilled with everything ready to just build the walls the next day. It was another very successful day. Dinner was hamburgers, macaroni salad, tomatoes, tortillas, onions, bananas and cantaloupe. We were introduced to some of the local pyrotechnics in the evening after dinner; such as 100-shot roman candles and other interesting explosives. The weather was cool enough at night to need one sheet and one blanket.

December 19, 2013 – Thursday

We did not arrive at the work site until 8:30 am. Being a Thursday it was a Mercado (market) day and everyone voted to walk through and see what that was all about (another cultural opportunity). Just about anything you could think of was available for purchase, with items lying on tables, in large containers, or on cloth surfaces. Because of yesterday's preparations we only had to mix mortar and

grout and build walls. The following two recipes were mixed by shovel on the ground: 1) Grout – Two 94# bags of Portland cement, six 5-gallon buckets of 1-inch rock, eight 5-gallon buckets and water as needed; 2) Mortar – One bag of cement to four 5-gallon buckets of sand, with water added as needed to the right consistency. By lunch we were at the 8-foot level with both walls and with the horizontal rebar beams in place. Lunch was an incredible lasagna, beans, tortillas, water melon and pineapple drink.

By 2:30 PM we were up to 14 courses at the end beams and 16 courses for the walls. Wooden framing was placed so that the remaining space could be hand-packed with concrete. We were having issues lining up red painted plates or angle iron with gray painted ones (red ones were left over from last year) but after some intense drilling we got all the holes to line up and were able to twist the nuts onto the bolts. It was getting near 5 PM but we needed to complete wall number 3 that was partially hand-packed. We could finish off wall number 4 the next morning because none of the anchor bolts or materials behind the angle iron were hand-packed yet. We mixed one more batch of mortar and Kegan and Brilee packed it in, as they were the only two who could stand on the scaffolding without hitting their heads. About 5:30 PM we were done with wall number 3 and we washed buckets and loaded into the truck to descend down to the clinic. The students stand in the back holding onto a metal frame so they can wave at the passersby. The ever friendly children would smile, wave, and shout out “gringos”.

We arrived at the clinic right at 6 PM. This was an issue because we were scheduled to play soccer against the Clinica’s team on the town’s main soccer field. We were there within 15-20 minutes. The floodlights were switched on. It cost \$30 US (Q250) to play, however Sheila took care of the fee, which allowed us to play until 7:30 PM. Sheila also provided us with Irish Gallic Association shirts that said Donagel Creameries on the breast. It was pretty epic running about on a regulation-sized playing field on astro-turf under the lights. Everyone got to play and had a great time. We managed two goals, losing 6 to 2. Both teams came to the clinic for a meal in a celebration setting. Sheila made a short speech. The decibels of the noises of the evening seemed to be increasing with more pyrotechnics and live music running later each night.

December 20, 2013 - Friday

We were greeted with bright warm sunshine and enjoyed our usual traditional breakfast. We assembled at the La Asunción School to inspect our work. One of the anchor bolts was showing in the back, but Michael packed it in and it was done. Mortar was mixed for hand-packing the second wall. Jose’ put a concrete cover over the chiseled area on the ramp to the library, covering the plates, bolts and nuts. Mortar was first poured and flattened via a board sliding it back a forth over the surface. Additional smoothing was done via a trowel. To make a hardened, smooth surface, cement was hand sprinkled over the surface and re-troweled. This was done twice and the surface glistened. The cement powder seemed to draw moisture upward to give it a “wet look”. Omar lead the mortar mixing detail and once again Kegan and Brilee finished wall number 4 with the hand packing. Jonathon, Dillon and Steven carried the buckets (bótes) of mortar down and Patrick and Jacob helped with the cleanup. Michael and I inspected the front of the school where additional sheer walls will be needed. Michael explained, that with the current cantilevered wall construction, the seismic load shaking the building would be transferred from the 2nd story to the 2nd story slab via the vertical walls to the slab. The energy would

then be transferred through the cantilevered beams to the lower 1st-floor vertical walls. At First they wouldn't move much but then they would shudder, suddenly fail, and collapse.

We were done with our wall-construction goals by 10:30 am so Jose', Samuel, and Omar came with us to the spring water supply, leading the way. I had promised George Gerard from Libby, MT Rotary we would conduct a GPS survey from the school to the spring to help them better estimate materials needs and where structures would need to be constructed to support a new water pipeline. This was a hike through the jungle where approximately 35 GPS readings were taken. I used a Garmen hand-held GPS unit and had many readings that were ± 15 feet. Only a couple of readings were ± 50 ft in the most dense parts of the jungle. Everyone enjoyed the "jungle experience". We didn't return the way we came to avoid the difficult footing found in the jungle and emerged onto a switch-backing dirt road back down to the nearby town and then back to the school. We arrived at the clinic once again about 3 PM where we enjoyed an unbelievably good m6le with rice, salad of broccoli, onions, and cauliflower, tortillas and fruit and Horchata drink. Everyone got free-time to relax until dinner. During our free-time Jacob Johnson had an interesting experience with a couple of the local young ladies who ventured into the clinic yard. I was standing there next to him and they asked me in Spanish "what is his name?" (Jacob). The next question took me by surprise, 'how many children does he have?'. I said he was single and they said "maybe can go with my friend, who immediately blushed"?. At that point he and I headed back to the clinic porch and they departed. Dinner was spaghetti and bread. The cooks left early because of the feast celebration activities.

About 8 pm after the 7 PM mass was the procession of St. Tomas. Approximately 16 men carried the saint, while women carrying candles walked in front with a brass band and a congregational following. Designated stops in various streets were made to set down the load while a barrage of fireworks would go off. These could be firecrackers, aerial displays and so on. At one stop we reached the Ferris wheel in the center of fair activities and the load was set down once again. An elaborately constructed metal framework was covered with fireworks, which went off in approximately 8 stages, starting at the bottom and culminating at the top were chandelier-like fireworks would spin and a flying saucer- like ring that whizzed up into the sky. Just as I was thinking "man this is going to hurt when it comes down", it exploded into a shower of sparks across the sky. It was stunning! The level of craftsmanship and coordination of the stages was very impressive. The various stages included spinning wheels showers of sparks that changed colors and plenty of shrilling whistles. Without much of a delay from the roof of a 3-story building across the way an aerial, rapid-fire barrage of fireworks zipped into the sky for 18 straight minutes with an impressive finale. The Ferris wheel was about 20 m high powered by a vehicle axel. The rotation velocity was quite fast, taking only 7 seconds for a chair to make a complete rotation. During the fireworks display the Ferris wheel was stopped but not unloaded. The riders sat at some risk to the fireworks activities. Afterwards we found a place where we could buy ice-cream and called it a night. The bombs went off every hour through the night and the constant throb of live music continued until about 1 am. It was not a restful night.

December 21 2013 – Saturday

The morning was pretty hot (80's) reminding us of how blessed we were to have mostly cloudy conditions and that it could have been much hotter during our construction activities. We settled our business affairs getting David Ruiz paid and gathered the remaining receipts for materials and packed up. Our driver (named Jose') arrived about 9 am to take us to Antigua. The traffic was pretty heavy but we managed to arrive about 12:30 PM. We stayed at the Las Campanas Hotel (Avenida El Desengano #24, tele 7832-3396). It was a nice place, very reasonable. We had two -2-bed and two-3-bed rooms. The 3-bed rooms were \$12 US per person (Q100) and the 2-bed rooms were \$18 US (Q140) each. Antigua has 18th century colonial architecture construction that they maintain as a code for all buildings. Some buildings are even from the 1500's. It is a tourist area and very safe. Everyone enjoyed being able to shop, explore, and experience the local culture without having safety issues.

December 22, 2013 - Sunday

I ventured over to the famous archway at 6 am to capture a photo of the Volcan de Aqua under the archway with no one on the street. About 9 am most of us went to church and we continued to enjoy the splendor of this exciting town. We consolidated luggage into one room so they could clean the others until our driver arrived at 3 PM. The driver (Guillermo the same driver as the beginning) took us to Guatemala City via the new section of the Pan-American Highway (one year old). He mentioned that if we got up an hour earlier we could arrive at the airport within 45 minutes from Antigua and be able to enjoy another evening in Antigua. This is worth considering for another trip. The accommodations at the Novo Hostel in Guatemala City are very comfortable and inside was nicely decorated for Christmas. For dinner we ordered 4-large pizzas from Pizza Hut with Coca Cola and 7-Up. The students rave about the Central American pop because it is sweetened with cane sugar rather than high-fructose corn syrup. It was a lazy evening.

December 23, 2013 – Monday

Up by 4 am we gathered our luggage into three waiting taxis who took us to the airport within about 5-minutes from the Novo Hostol. Things went smoothly at the airport. (It is wise to arrive early rather than trying to be there less than 1 ½ hours before the flight, when most of the others passengers arrived). We boarded and arrived in Houston. The first task is to pass through customs. From Houston MaKenzie flew to Denver and on to Billings. Jonathon and Dillon had different flights from Denver than the rest of us (Michael, Brilee, Kegan, Steven, Jacob, Patrick and I). We arrived in Denver at 2:30 PM and waited, hanging out until about 6 PM. Boarding was to begin at 6:40 PM when United Airlines suddenly canceled our flight! Not only us, but they cancelled about seven other flights (everything to Montana and North Dakota). We quickly made our way over to a growing line at the nearby customer service desk. After about an hour we found out that we couldn't get flights into Helena until perhaps Christmas day. That was unacceptable to us so we inquired about the level of refund we could get for cancelling the last leg of our flight. We were quoted about \$250, so we made the decision to rent a vehicle. Our luggage was not retrievable in a timely manner so we booked online a minivan and left without our luggage. About 10 PM we began driving for Bozeman. We took turns through the night. At Douglas

Wyoming it was snowy and icy. Michael and I were up front driving into a 'white out' just before Buffalo Wyoming while the radio droned out with "Rocking around the Christmas tree" (Patsy Cline?) one of the songs from the first Home Alone movie. It wasn't Polka music but it was a similar story of one trying to get home by Christmas. Fortunately after we reached Sheridan Wyoming the roads were somewhat improved. By the time we reached Billings the morning light was beginning to show, but we found ourselves in freezing rain conditions. At Bozeman, Stephanie (my wife) and Steven Cornish's mother picked us up so we could leave the one-way vehicle at the Bozeman airport and ride the rest of the way to Helena without having to rent two other vehicles (they didn't have another minivan). We arrived into Helena late morning and by about noon students needing to drive onto other locations (Spokane, Kalispell, and so on) were all able to get underway and arrived home safely. Whew! that was a long haul for the return travel but as members of the Carroll Student Chapter of Engineers Without Borders we were able to solve every obstacle that came into our path. Merry Christmas 2013 to all, and to all a Happy 2014!