

SAIWI Trip Report: Kenya 2013

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May 20 – June 19

Four SAIWI students traveled to Mua Hills, Kenya in order to build a ferro cement (thin walled) water tank and install a gutter system in order to collect rain water runoff from a rooftop. The trip was planned for a month because no one was sure how long it would take to build the tank. The reason for this is that the tank had to be designed after the site was assessed. The tank ended up taking 15 days to complete, so it was decided to install a plastic tank and gutter system at another location with the remaining time.

May 25 – June 12

The first step in building the tank was to visit the site, which was a local community organizers home compound. This site was chosen by the in country contacts because it would allow access for many people to come see the construction process. It was decided that the tank would be on the eastern side of the main house to store the rainwater from the largest house on the compound. Based on the open area size, the tank was decided to be 7 feet in diameter.

The next day the two team members met with a local builder to design the tank and discuss construction techniques. The majority of the tank design came from the book “Water Tanks”. It was decided that the best design was a conical tank with a domed roof, which would have the same height dimension as it’s diameter to be more efficient with materials.

Shopping for materials could not be scheduled until Tuesday, so the team went to dig the foundation pad on Monday.

Shopping for construction materials took place in the town of Machakos, which was approximately 1.5 hours away by car. On the first shopping day we purchased almost all of the materials. Some of the thing that had to be purchased later was more cement, the sand, and the gravel.

The next day we installed the gutter system on two sides of the main house which is pictured in Figure 1.



Fig 1: Gutter system on main house.

The next three days were devoted to pouring the foundation over the wire mesh base, building the wall frames, and plastering the inside of the walls. The inside was plastered only after plastic was wrapped around the walls to ensure the plaster did not just squeeze through the holes in the walls. The walls were constructed of layers of wire mesh, chicken wire, and a thick gage wire wrapped around it all and tied in place. The walls were set before the foundation was laid so that they were structurally sound. See Figures 2, 3, and 4 for these steps.



Fig's 2, 3, 4: Foundation wire, wall frame, plastic wrapped walls with plaster being shoveled in by student.

After the weekend the outside of the walls were plastered on one day, a shopping trip was made for more supplies for the roof the next day, and the fourth team member arrived in time to help cut and tie the dome roof frame together on the fourth day. The roof was covered in chicken wire, the manhole was cut out of the roof, and the dome was attached to the top all in one day, which can be seen in Figures 5 and 6. These tasks took us to the end of the third week.



Fig's 5 and 6: Plastering the outside wall, constructing the domed roof.

The next week was extremely productive with the completion of the cement tank and the installation of the plastic tank. The remaining steps for the cement tank included installing inlet and outlet pipes, installing the manhole and cover, and mortaring the inside and outside of the roof. Figure 7 shows the back side of the tank with gutter inlet. Figure 8 show the filling of the tank so that it can cure, and it also allowed us to check for leaking. Figure 9 shows the team of students and one other volunteer in front of the completed tank. The plastic tank took two days total to complete; one day for planning and supply buying and one day for gutter and tank installation. The completed tank with its proud owners can be seen in Figure 10.



Fig's 7 and 8: Completed tank and filling.



Fig's 9 and 10: Completed cement tank and plastic tank.

The last four days of the trip allowed for the students to have some much needed downtime. These days included a trip to Kimana for a safari where the students learned about the nature reserve park and saw native African animals in their habitat. One day was also dedicated to seed harvesting and dispersal into flood ditches to hinder the erosion of the ditches during the heavy rains.

Overall the trip was a resounding success with the completion of two tanks instead of one, while staying well under budget. The students learned valuable skills like designing in the field, hands on construction skills, problem solving, and all of the benefits of an international cultural trip. If a future trip were planned, it could be centered on the enormous problem of road erosion which can be seen in Figure 11.



Fig 11: Road erosion in Mua Hills.