

2012 Builders Without Borders summary, and a look ahead to 2013 . . .

Dear Friends of Ecological Building,

BWB co-directors Martin Hammer and Catherine Wanek wish to express our appreciation for your interest in sustainable building. Your contributions have supported recent projects that BWB has undertaken in Haiti, and that our partner PAKSBAB has accomplished in Pakistan. Here is a report of our work for 2012 and beyond:



Ti Kay Pay (Small Straw House) Revisited

Approaching its two-year anniversary, BWB's first building in Haiti, the Ti Kay Pay, is performing very well. On the campus of Haiti Communiterie (www.haiti.communiterie.org) in Port-au-Prince, the Ti Kay Pay is now the office for staff members of Future Generations Haiti (www.future.org). Tara Yip-Bannicq of Future Generations explained how "it was our first choice for our office in Haiti."

Questions about strawbale building's durability in Haiti's tropical Caribbean climate have mostly been answered. The Ti Kay Pay withstood recent hurricanes Isaac and Sandy without damage, and after elevated moisture content readings in the building's first few months, its 29 moisture sensors are now consistently showing readings of 10-17%, well below the 20% acceptable threshold. The exterior clay plasters, with a glue-coat finish, have proven remarkably durable against tropical rains, even on the most exposed gable end wall.

BWB continues to search for an appropriate second project for strawbale building in Haiti. Community-built housing in Haiti's rice farming region in the Artibonite Valley is the most likely candidate. Pastor Benite Jeune of Changing Lives Ministries has also expressed interest in strawbale building for teachers' housing in the village of Vignier, just south of Artibonite.



BWB's Jean Louis Elie installs a new earth-block and bamboo partition in the Ti Kay Pay.



Senp Kay (Simple House)

In early 2012, BWB designer and builder Andy Mueller led the design and construction of a prototype structure that explored two wall-panel systems for use in Haiti. A natural panel of wood frame and bamboo with straw-clay infill and clay plaster both sides; and a tilt-up panel of wood frame with re-purposed plastic bottle infill, with wire mesh and cement plaster on the exterior and clay plaster on the interior. This innovative second panel system is nick-named "bottle-and-daub".



Jean Louis Elie and Annio Baptiste apply clay plaster over plastic bottle panels in the Senp Kay.



What If Foundation School Project

BWB architect Martin Hammer and structural engineer Henri Mannik led the design and engineering of a K-13 school for 500 students for the What If Foundation (www.whatiffoundation.org). The first phase of the school, cafeteria and kitchen in the Ti Plas Kazo neighborhood of Port-au-Prince will begin construction in early 2013. Henri Mannik has been working through the challenges that Haiti presents in engineering safe, durable, sustainable, and cost-effective structures.

Key sustainable features of the WIF project include rainwater catchment, photo-voltaic electricity, and a dehydrating toilet system that turns human waste into agricultural fertilizer (www.oursoil.org). Food from on-site gardens and fruit trees will be used in the school's lunch program. Haitian-grown bamboo will be used for much of the roof structure.

As with the Ti Kay Pay, climatically and culturally-appropriate design are central to the What If Foundation School project. Generous natural ventilation, high ceilings, and shading will help keep the buildings cool. A 'galri' (veranda) along all classrooms will provide the common Haitian transitional space from indoors to outdoors that is protected from sun and rain.



Site Section (top) and Courtyard view (above) for a School and Cafeteria for the What If Foundation in Port-au-Prince.

What If Foundation Site Wall

In 2012, site walls were constructed to secure the property of the future What If Foundation School. Many such walls collapsed during the 2010 earthquake, because of poor design and quality of construction. The BWB team created a sturdy wall system of stone, concrete and block. The wall was engineered by Henri Mannik, with construction overseen by Martin Hammer and Haitian-American construction manager Frantz Edouard.

A team of Haitian masons and local laborers, including Jean Louis Elie and Annio Baptiste, who helped construct the Ti Kay Pay (Small Straw House), worked hard through the tropical heat of August, September and October to construct the walls, and persevered through the interruptions of Hurricanes Isaac and Sandy.



BWB's Rodney Constant lays the stone base of the site wall.

Materials Research in Haiti

BWB continues to explore, use, and promote natural building materials and systems in Haiti such as straw bale, straw-clay, bamboo, wattle and daub, and adobe. There are also times when use of the predominant Haitian building materials of reinforced concrete and concrete block is appropriate where high structural strength or high durability are required. However the 2010 earthquake revealed poor quality of construction in most buildings in Haiti using these materials.

BWB co-director Martin Hammer oversaw research and testing of these materials to assure safe engineering and construction of BWB projects in Haiti that might rely on these materials. This included testing of samples of various concrete mixes, samples from block makers, and steel weld samples. Civil engineering professor Mark Aschheim tested these specimens at the University of Santa Clara, yielding important data and an understanding of the strengths of these materials in Haiti. Collaboration with Build Change (www.buildchange.org) has also connected BWB with trained block makers who are now capable of making much stronger concrete blocks than are commonly available in Haiti.



Concrete samples being made . . .
and then crushed to test strength.

Future Haiti Projects

Discussions continue with the following organizations for design and construction of future projects in Haiti: **Help Hayti** (www.helphayti.org) for a prototype internet café in Fond-Verettes. BWB member Andy Mueller will visit and survey the site with Help Hayti's director in January.

Kay Angel (www.kayangel.org) for an orphanage near Jacmel for 12 orphans who are HIV-positive

Devoted to Children (www.devoted2children.com) for a small orphanage in Cayes-Jacmel



Pakistan Straw Bale and Appropriate Building

In 2007, BWB partner PAKSBAB (www.paksbab.org) initiated a rural Community Development Program (CDP), designed to engage severely disadvantaged families, in the construction of their own straw bale houses. To date PAKSBAB has trained about 70 people and has built 38 straw bale houses in northern Pakistan, mostly for low-income families. The houses are one-story and range from 1-room with veranda (357 sf) to 4-rooms plus bath, kitchen and veranda (1024 sf).

The standard CDP home is comprised of two rooms and a veranda, with an optional kitchen. Each family contributes labor and some building materials, if possible. With local community input, PAKSBAB selects project beneficiaries based on their need, vulnerability, and willingness to participate in the home building process. Preference is given to victims of the 2010-11 floods or 2005 earthquake, widows with small children, and people with disabilities.

Straw bales suitable for building are not available in Pakistan, therefore PAKSBAB has developed a system for making straw bales using manually operated farm jacks and locally fabricated compression moulds. PAKSBAB encourages and supports independent local enterprises to manufacture and supply straw bales and other building materials for its projects.

Additional appropriate building methods that PAKSBAB is promoting include passive solar, rainwater catchment, solar lamps, high-efficiency cooking and heating, and the use of natural building materials such as light straw clay, wattle and daub, and cob.



Natural Building Workshops & Internships

Each year at BWB's home base in Kingston, New Mexico, hands-on natural building workshops are offered for an affordable fee. In 2012, Austin natural builder Frank Meyer (www.thangmaker.com) along with his crew Brad King, Sarah Schmidt and Aaron Ralls, offered instruction in strawbale and cob construction, plus natural plasters, with presentations on strawbale design essentials by Catherine Wanek, water levels and simple composting toilets by Derek Roff, and water harvesting by Asher Gelbart. Plans are underway for more hands-on workshops in April and August 2013, with internships available. Future announcements will offer details, or inquire at mail@builderswithoutborders.org



Haiti: Children in Ti Plas Kazo , Port-au-Prince – Many will attend the new school to be built by BWB in partnership with the What If Foundation.



Pakistan: A Pakistani family on the veranda of their new straw bale home built by PAKSBAB.



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