

Additional notes and lesson learned; the description of the temporary structures assembled in Haiti; and a few suggestions for: **Criteria for the Suitable Design for Haitian Habitation.**

In consideration of the foregoing, I am reminded of the time when Dr. Florentino Latortue, the resourceful structural engineer in Haiti, took us to one of the tent cities. A Haitian came out and complained about the "disaster tourists" who come to look, shake their heads sympathetically, and then drive away in their SUV's never to be seen again. I knew that I could not allow myself be one of those disaster tourists. Therefore, with the Global Dialogues Committee, we formed a goal to generate a few new design ideas for Haitian habitation.

Based on my experience in Haiti, I believe the basic premise that any shelter or dwelling must be "**sustainable.**" The cardinal concepts for this ideology are:

- a) Use of local technology
- b) Use of materials available locally
- c) Use of local manpower
- d) Incorporate the Haitian culture and habitation
- e) Acceptance by the local residents
- f) Teaching Haitians additional skills to improve their lives.

The application of these principles will help facilitate self-help/self-construction in Haiti. The input of local people like Latortue is essential. They will help us identify sites and regions for our viable rebuilding efforts. Due to our limitations, we cannot provide the tent-cities in Haiti with a large number of houses for rehabilitation. However, we will be providing models that motivate people to think and build their own shelters with variations to suit their lifestyles.

The "Nura" dome, or the re-bar kit, built during our initial trip to Haiti, can be used as an example for future prototypes. They are versatile, expandable, movable, and cheap. The Nura dome can be covered in many ways, ranging from using standard tent material, to concrete-soaked cloth, custom-made in Haiti tarps, stucco, and/or foam. A single basic Nura dome structure requires 10 re-bar rods, 1/2-inch in diameter, with 30-foot-long wire ties. The cost of these materials is less than U.S. \$100 in the Dominican Republic, not including joint fixtures, covers, bases, doors, or windows. This was a simple, primitive structure. Nura domes were not well executed or complete and had inherent weaknesses, but they proved to be useful and versatile. One of the beauties of the Nura dome and the PVC structure, which we built in few hours, is that one can relocate them. Bellow I have listed some more qualities of Nura dome:

- A Nura dome is a step up from a tent. It is cheap and creates a 20'-foot-diameter domed space that is 10 feet height and can house a large family.
- It is easy to build. The first time we tried to execute the concept, four local guys offered their assistance and later built a second prototype on their

own, introducing their own innovations. Two domes were built in three hours with unskilled labor.

- It can be reproduced with minimal effort. An entire tent city could become a Nura dome city without having to relocate people to any transit housing.
- It can be reproduced at a massive scale.
- It has the potential to become a new prototype for housing.
- It invites creativity. One of the enduring images for people who visit Haiti is of the tap-tap public transportation buses, each one of them colorfully and creatively decorated. One can imagine a dome covered in decorative panels and painted beautifully.
- It is not a finished product. This is a plus because it leaves sufficient scope for people to customize it to suit their needs. Toward the end of the project, residents asked us questions like "*What about a door?*" "*What are you going to cover it with?*" Our response to most of these questions was, "*this is your decision, what do you want to do with it*" This way we were able to create a sense of ownership, creativity, self-confidence -- all important attributes for a community trying to rebuild its infrastructure.
- Instead of having the tents spread haphazardly, we could formulate a master plan and develop a system to group the model houses.

Since a typical tent city in Haiti (with 100,000 people) has no sanitary facilities, no running water, and no electricity, Mark Freehill (one of our team members, who is neither an architect or an engineer), has suggested the following ideas. I would like to share them with you.

- *Put a market value on human excrement*, the ultimate in making lemonade out of a lemon. Go to a tent city and distribute buckets with lids to be used as portable toilets. Have a person in charge of buying back the full buckets, say for U.S. \$1 a bucket. He/she empties it into a 55-gallon drum and returns the empty bucket. When a certain number of drums are filled, they are sealed for pickup. Then, a truck delivering 55-gallon drums of drinking water can off-load the fresh water and carry away the drums full of excrement to the countryside for processing. (The person buying the slop buckets could make up his/her money selling fresh water.) This will clean up the tent cities and possibly improve local topsoil. Also, this is something that is not complicated to start up.
- *Widen and improve the road joining Port-au-Prince to the border* by paying people to bring rubble from the destroyed buildings to the site. One could compact the rubble as it comes in to extend the road. This way roads are getting filled, people are making money, and cities are being cleaned up. The road will be a monument to the triumph of human spirit, picking up the broken pieces and making Haiti better than it was before.
- *Cluster at least 38 Nura domes to create an open yard*. The courtyard will be community property where one can process waste water, generate electricity, store rainwater, grow food, and have a park. The courtyard activities would be governed by the cluster, helping residents figure out how to live together. It is a rural/urban hybrid way of living. It would be

relatively independent of government services, which have failed in the past. Agriculture can be carried out behind the cluster, away from the road.

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