

## DISCUSSION ON SECTION 1 (DESIGN & CONSTRUCTION TECHNOLOGIES) :

*This selection represents the discussion as recorded during sometimes lively debates. Many of the papers crossed the lines between technology and dissemination and therefore this Discussion includes some references to papers which are presented in Section 2.*

### Emergency shelters:

In reply to questions from the floor, David Sorrell commented that the PermaTent units could be stored easily on specifically designed frames. In the Enfants Du Monde pilot programme now being implemented the beneficiary communities would develop their own preparedness plans including the PermaTents as emergency shelters. It was also envisaged that there would be central stores of PermaTents for temporary emergency deployments, perhaps after floods. Where people had lost everything then it would be hard to recover the assets and the disaster victims might be given the shelters.

The question of trading the units is a recurring problem with all building materials. Once the materials were in the ownership of beneficiaries then the new owners could do as they wished with the assets. The distinctive shape of the units might discourage disposal.

The design requires special equipment to crimp-curve the corrugated sheets. This is new technology requiring good quality control. There are plans to develop manufacture in Bangladesh but it is not likely ever to be a local technology.

### Retrofitting :

Prof J R Choudhury commented that the contribution by Fernandez et al. (See Section 2) reflected present experiences in Dhaka, particularly in relation to existing designs. Many existing buildings are likely to be unsafe during earthquakes. One option for strengthening them is to apply ferrocement renders to turn unreinforced masonry into effective shear walls. He also suggested that the heavy roofs of the LGEB models 10B and 10C would make them unsafe in earthquakes.

### Construction materials :

One contributor suggested that modern chemical treatments could extend the life of bamboo for years and would add only 50% to the initial cost. Iftekhar Ahmed replied that there are sometimes problems controlling quality of such treatments and the chemicals are toxic so there can be adverse effects

on the environment. He was then asked "Why doesn't the private sector plant more bamboos to overcome shortages?". He said that as bamboo takes 5 years to produce a return, not many regard it as a cash crop. Normally, rice growing takes priority. Bamboo is also used for paper making and as scaffolding.

There was a lot of discussion of the Grameen Bank house design (Section 2). The four RCC pillars were thought to give good durability but not complete hazard resistance against major events. These pillars were produced by Grameen and were thus of consistent quality (2,000 psi concrete) while the infill walls constructed by the householder might not be so good.

In reply to the question what reinforcement was used in the constructions in Latin America, Andrew Maskrey said that the houses were wooden-framed with mud/cement panels which made them flexible and light. He also remarked that one building attribute found to be popular in some parts of Latin America is its resistance to gunfire. Concrete blocks give significantly more protection than traditional materials during civil wars!

### Design and supervision of building work :

Although the Grameen Bank designs had been produced by engineers who also supervised manufacture of the RCC pillars, no instruction was given to the homeowner.

Ian Davis asked why so few construction professionals became involved in low income programmes. Was it seen as a low status job for engineers? He wondered whether development issues were covered by BUET studies? Robert Hodgson suggested that as the contents of undergraduate engineering courses were closely regulated by the engineering institutions, there was no time available for other studies. This was often as much a problem for UK universities as for BUET.

Andrew Maskrey was asked who made the designs for the Latin American Houses. Was there a risk of too much input by western intellectuals? His response was that appropriate design could come only from the people who will live in the houses. NGOs are best placed to arrange this; the engineering should come later.

### *Which brings us to the FIELD VISITS.*

### December 4th : FIELD VISITS

*Some 40 or so of the participants took advantage of a fascinating tour arranged to inspect a variety of house-building activity in rural Bangladesh.*

#### National House Building Research Institute (NHBRI), Dhaka

Where better to start than with a visit to introduce the many functions of the National House Building Research Institute? As well as producing design Standards, this body investigates construction failures and has a programme of research into appropriate homes for vulnerable families in high risk areas.

Inspection of the many trial structures generated considerable but un-recorded discussion among participants. Flood-resistant houses on stilts jostle with floating homes, innovations in wind bracing and developments in aerodynamic shapes.

#### Grameen Bank, Harirampur

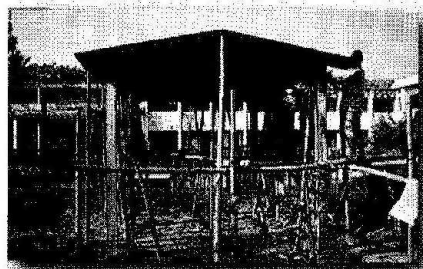
As an example of implementation, the Grameen Bank project at Harirampur, near Aricha Ghat, provided plenty of food for thought. Participants were able both to examine the technical features of the Grameen model house and to talk with the owners. This community had been recently resettled after displacement by erosion of the nearby banks of the River Padma. These houses had tin-shed walls which their owners considered durable but to have poor thermal properties. The application of Grameen's credit programmes to housing was considered appropriate by participants.

#### Local Government Engineers Department (LGED), Manikganj

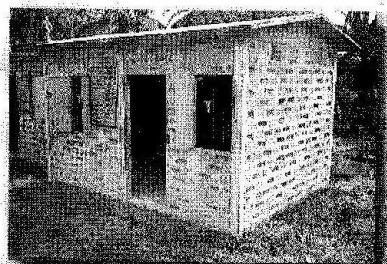
Replete after a magnificent luncheon generously provided by LGED in Manikganj, the group went on to look at a nearby village market development. This showed LGED's commitment not only to improvement of individual dwellings but also to the creation of community centres. Sustainability was integral to this commitment, resulting in the inclusion of technologies such as the biogas generator which powered market facilities.

#### The PermaTent

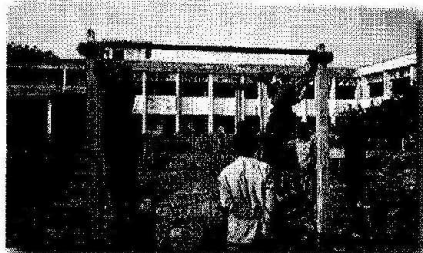
The last stop of a very full day was at Enfants du Monde's headquarters where the prototype PermaTent was set up for inspection. Participants remarked on its generous dimensions and simplicity of erection. Some doubts were expressed as to whether redeployment 10 times would be practical on either sociological or technological grounds; nonetheless, all agreed in wishing the experiment well. The results would be awaited with great interest.



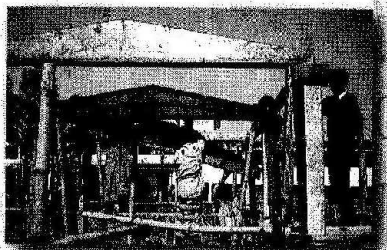
Fixing slab plates with beam side plates



Low cost house Model - 10C

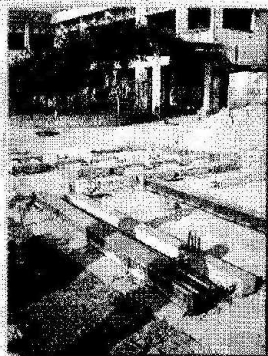


Fixing beam base plate with coupling



Fixing beam side plate to beam base plate

**LGED**



Precast RCC posts



Placing footing base to foundation trench



Fixing coupling at pillar top end

A PROMISE FOR NATION BUILDING

## DISCUSSION ON SECTION 2 (DISSEMINATION & IMPLEMENTATION) :

*This selection represents the discussion as recorded during sometimes lively debates. Many of the papers crossed the lines between technology and dissemination and therefore this Discussion includes some references to papers which are presented in Section 1.*

### Awareness raising

Andrew Maskrey thought there was a general need to raise awareness of disaster mitigation issues among NGOs. Ian Davis replied that this had been tried 20 years ago; perhaps it was now time to push it again. There is at present a funding problem in that most large donors currently spend almost all their funds on disaster relief. There is a need to create space within broader programmes for mitigation measures.

David Sorrill said that in his experience people in high risk areas would spend the minimum possible on their houses because they knew that it would soon be destroyed. They could not leave their home areas because limited land availability meant there was nowhere else to go. Therefore, low income was at the heart of the matter. He asked whether there was the same motivation for Building for Safety in a low-risk area such as North Bengal. Matt Carter thought that, in some ways, the motivation may be greater since there is more probability of a successful outcome within a foreseeable time frame.

Andrew Maskrey commented that it was as important to get the Building for Safety messages across to policy makers as to the vulnerable. Once politicians become involved, anything could happen! Ian Davis agreed : he thought that the patterns of vulnerability were probably more significant than the simple technical question of Kutcha vs. Pucca construction parameters.

### Dissemination :

Ian Davis summarised Andrew Maskrey's presentation as full of many subtle complexities. The problems were growing all the time. He suggested the following points to note :

- Housing is not just bricks and mortar. Your choice of house is often the biggest decision of your life
- Training has to involve those who build to increase their confidence. Our job is to go to them.
- Artisanal apprenticeships seem to be dying out - something must replace them
- Building for Safety solutions must offer choice to homeowners

- Above all, they must be realistic. Small, incremental change had more chance of long term success than large innovative leaps.
- Lastly, Ian wondered how the processes described by Andrew might be applied in Bangladesh?

The selection of beneficiaries often presents a difficult choice. In the case of the LGED programme, Nurul Islam said that the NGOs involved select their beneficiaries and provide the technicians and craftsmen for those programmes.

Accessibility to information is vital to progress. In response to a question, Ian Davis suggested that a request could come from this meeting for the Building for Safety books to be translated into Bangla as part of the dissemination/awareness process. It might be necessary to edit them for the specific Bangladesh context.

### AFTER ALL THIS DEBATE

*Participants felt that an Action Plan to promote Building For Safety in Bangladesh was needed. To start that process, two hours of further discussion produced the well-deliberated text given in pages 100 and 101.*