



## Photo for the Month

Four months after bringing destruction to villages at its foot, Mayon Volcano stands majestic and still perfectly cone-shaped. Settlers have long been living with the hazards the mountain-volcano brings but the combined category 4-typhoon and mudflows last November 30 brought upon the province a continuing disaster, with hundreds still left homeless. Photo was taken from Lignon Hill in Legaspi City.

## Quote for the Month

*"There are some myths they say, and perhaps one of the myths is that **land is holy**...that land should have a market price. But I think the lives of so many people have no market price. I think we need to understand that the most important thing here is the people. There are **human rights** but in our society, little by little, it's not human rights... its **consumers' rights**. Only the people who are able to grasp the money have rights and it depends on how much money you have, that's how much rights you have...it's wrong and its happening."*

- **Fr. Jorge Anzorena**, during the open forum discussion of the SABMAT project at PUP-CAFA

Exploring options for alternative building materials that can be utilized for socialized housing has been one of TAO's ongoing initiatives in providing shelter design services for poor communities. We have been including this topic in our annual YP workshop lectures and establishing networks with other organizations that implement appropriate building technologies.

Last year, TAO conceptualized a research project named SABMAT (or Sourcebook of Alternative Building Materials and Technologies for Socialized Housing) that aimed to contribute to the organization's mission of "enhancing the technical knowledge and skills among stakeholders in the housing and urban development sector, especially in the marginalized groups." Although there are already several publications on alternative building materials like SKAT's Sustainable Building Technologies and DOST-PCIERD's Compendium of Indigenous Building Materials and Technologies, the objective of the project is to come up with a reference that can give poor communities access to information they can use in constructing sustainable houses. The main challenge is to look into building materials and technologies that are appropriate, affordable, and locally available for communities. The Polytechnic University of the Philippines' College of Architecture, through its dean, Archt. Ted Inocencio, entered into an agreement with TAO to involve his students as volunteer-researchers for the project. For a whole semester his research class took this on as an academic requirement (see SABMAT collaboration on pages 2 and 4). By March, the class was able to come up with a preliminary draft output which they presented to community representatives.

One of the TAO-assisted communities, SANAGMANA, has already opted to use an alternative roofing material for their self-built relocation housing in Tanza, Navotas. Through FDUP (Foundation for the Development of the Urban Poor), the community has undergone training to produce Micro-Concrete Roof tiles (see page 2).

More of these initiatives on alternative building materials are featured in this month's e-newsletter:

- **The SABMAT Project with PUP-CAFA**
- **Lecture presentations from Fr. Jorge Anzorena and Illac Diaz**
- **Community Training on MCR (Micro-Concrete Roof) Tile Production**
- **From the YP Workshop Lectures: Building Materials and Systems: An Evaluation on the Production and Use of Building Materials by Engr. Daniel Mostrales**

"It's time for us to go to the people rather than ask the people, especially the poor, to come to us."



Dean Ted Inocencio speaks during the MOA signing for the SABMAT research collaboration

## The SABMAT Project with PUP-CAFA

The SABMAT Project, a research activity conceptualized by TAO-Pilipinas, was undertaken in collaboration with PUP-CAFA (Polytechnic University of the Philippines – College of Architecture and Fine Arts) during the second semester of AY 2006-2007. The project required 4<sup>th</sup> year architecture students enrolled in the Research Methods subject to make an in-depth study in order to accomplish the following research objectives: (1) identify alternative, including indigenous building materials and technologies, for sustainable housing projects; (2) study and specify in detail the methodology employed in their processing and production; (3) study and specify in detail the method of construction or application when using the said materials or technologies; (4) evaluate their applicability given a set of established criteria; (5) determine their suitability for socialized housing depending on the physical and geographic condition of a locality; (6) identify the advantages and disadvantages involved in their use; and (7) make recommendations that would aid laymen in formulating educated decisions regarding the construction of their own houses.

Several alternative building materials were identified by the students who were each given a research assignment (see boxed item) and the results of the first stage of the research activity was compiled into a draft output. Following the submission of their first draft outputs, a short program was conducted last March 08 to give an opportunity for the class to present their research to a panel composed of representatives from TAO-assisted communities and partner NGOs --- DSOP (Dike-Side Organization of Punta), SANAGMANA (Samahan ng Nagkakaisang Maralita ng Navotas), COPE (Community Organizations of the Philippines Enterprise), COM (Community Organizers Multiversity), and FDUP (Foundation for the Development of the Urban Poor).

## Lecture presentations by Fr. Jorge Anzorena and Ilac Diaz

On the same occasion as the SABMAT presentations, lectures were also given by two distinguished persons in social housing and social entrepreneurship. Fr. Jorge Anzorena, TAO Advisory Board member and Ramon Magsaysay Awardee for International Understanding in 1994, presented a global perspective of social housing by relating the experiences of Latin American countries in the struggle for security of tenure and shelter rights of poor people. He commended the efforts of PUP-CAFA students as a good way of starting architects to work with the poor. Fr. Jorge also advised the students that in their research for alternative building materials, those that local people themselves could produce or manufacture should be prioritized.

Mr. Ilac Diaz, a recipient of the Ten Outstanding Young Men Award for Social Entrepreneurship, presented the initiatives of his organization, My Shelter Foundation. The projects he presented, such as the Pier One Seafarer's Dormitory, First Step Coral Project, and the Earth Classroom Project, showed how business can address pressing social needs especially low-cost housing.

### Outputs by PUP-CAFA students for the SABMAT Project:

#### Group A: Walls, Ceilings, Fenestrations

01. **Lightweight Concrete Panel** - Ryan L. Javines, Kurt C. Sabate
02. **Concrete Interlocking Blocks** - Jann E. Leyba
03. **Compressed Earth Blocks** - Corazon C. Pura, Melanie F. Napigkit
04. **Composite Building Panels** - Jett Kevin D. Reguine
05. **Cement-Bonded Boards** - Andrea M. Roberto, Nikka P. Zaragoza
06. **Composite Wall Panels** - Jose Marie C. Uy
07. **Straw Bale Wall Construction** - Nikka P. Zaragoza

#### Group B: Foundation, Flooring Materials, Special Construction

08. **Web-type Steel Deck** - Rose Anne P. Evangelista
09. **Composite Floor Panels** - Paulo Nico S. Noble
10. **Earthbag Construction** - Paul C. Punzalan, Alfredo L. Sorja
11. **Bamboo Reinforced Concrete and Bamboo-based Cement-Bonded Boards** - Garry P. Deang, Arnel O. Samson
12. **Lahar Paving Blocks and Lahar Panels** - Elenita G. Hidalgo
13. **Broken Glass as Floor Tile Aggregate** - Marvin M. Delos Reyes
14. **Structural Bamboo Composite** - Edward T. Armada

#### Group C: Roofing Materials, Architectural Finishes/Treatments

15. **Micro Concrete Roof Tiles** - Mary Rose B. Pascual
16. **Bituminous Corrugated Roof** - Gerald G. Delos Santos
17. **Plastic Roofing** - Christian S. Torno
18. **Metal Alloy Steel Roofing** - Liel Christine G. Jualayba
19. **Coconut Fiber Cement Board** - Jojo Don A. Agdeppa
20. **Coco-coir Binderless Board** - Jasmine M. Soriano

## Community Training on MCR (Micro-Concrete Roof) Tile Production



Micro-Concrete Roof (MCR) tiles are considered to be an inexpensive and durable alternative to conventional GI sheet roofing. MCR tiles are made of sand, cement and water and are produced using special equipment (a screeding machine and moulds). Its main advantages are that the tiles can be produced locally where cement is available, easily installed with good training of even unskilled workers, and unlike galvanized sheets, they are more rust and fire resistant. The technology has been applied in several low-cost housing projects of Pagtambayong Foundation in Cebu City and Foundation for the Development of the Urban Poor (FDUP) in Metro Manila.

For the self-build housing project of SANAGMANA community in the reclaimed fishponds of Tanza, Navotas, MCR provides a viable roofing alternative for their houses and a livelihood opportunity for the community as a small scale producer. This March, FDUP gave a training course in MCR production for members of SANAGMANA's Technical Committee. The training included hand-on sample production, quality control and maintenance of the machine and production facility. After the required curing cycle, actual tile laying was recently done on one of the houses now serving as a model roof installation for MCR tiles in the community.



**From the YP Workshop Lectures**

The YP Workshop lecture presentations in .pdf format are available on-line for download at [www.ypws.tao-pilipinas.org](http://www.ypws.tao-pilipinas.org)

Notes on **"Building Materials and Systems: An Evaluation on the Production and Use of Building Materials,"** a lecture presented by Engr. Daniel S. Mostrales during the 2006 YP Workshop on Social Housing, 17 October 2006 , Antipolo City



Engr. Daniel S. Mostrales, professor at the College of Engineering of Mindanao State University – Iligan Institute of Technology, presented his study on the production and use of different building materials and systems employed for low-cost housing. The objective of his study was to document local building materials and systems that demonstrate the following qualities: (1) cost-efficient, affordable, durable and compliant to building standards; (2) environment-friendly, consumes less energy and provides healthy living spaces; and (3) promotes the local economy, develops skill and enterprise.



Engr. Mostrales based his evaluation on several factors, among them: (a) materials used for processing and local availability; (b) type of building structure – frame structure or box structure; (c) construction method and requirements for manpower and equipment/tools; and (d) tropical climate-responsive features like provisions for daylighting and heat control. He showed examples of alternative building systems that have been used for low-cost housing such as the compressed earth blocks (CEB), concrete interlocking blocks (CIB), and interlocking compressed earth blocks (ICEB). He stressed that these maximize the use of local materials and have volunteer-friendly construction or installation methods that do not require complicated tools and highly-skilled labor. Engr. Mostrales also showed a housing relocation site in Leyte where steel frames and concrete panels were all imported from Cebu and explained that residents would still have to go to Cebu just to buy the materials if they need to repair houses because these were unavailable in the local hardware stores.

**Energy Consumption for Processing**

Building Material	kWh/m <sup>3</sup>	kWh/kg
Cement		1
Aluminum (sheets)	195 000	72.5
PVC	12 800	9.5
Steel (plates)	6 100	7.7
Solid Bricks	1 140	
Timber	600	
Concrete	500	
Earth Blocks	0 - 250	

(SOURCE: MORALES, 1986)

Engr. Mostrales emphasized that in assessing energy consumption, each type of building material involves different energy requirement in processing (see figure, left), production, and transportation. He also stressed that non-importation and decentralized production of building materials encourages enterprise development in the locality.

**Critical Indicators Determining Sustainability of Building Technologies**

Ecological	Social	Technological	Financial
Energy	Employment	Cost	Investment per job
Fuel consumption	Skills	Strength	Investment per energy unit
Material movement	Local economy component	Productivity of labor	Productivity of capital
Local resources	Community participation	Maintenance	Investment per unit
Resources imported			Maintenance cost

Factors in determining the sustainability of building technologies, according to Engr. Mostrales, includes ecological, social, technological and financial indicators (see figure, left). He concluded his presentation by encouraging more research on appropriate building technologies and the documentation of best practices so that experiences can be shared to other communities.

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**IN PICS: Project SABMAT Presentation at PUP-CAFA**

Project SABMAT Presentation, March 08, 2007  
College of Architecture, PUP Campus  
Sta. Mesa, Manila



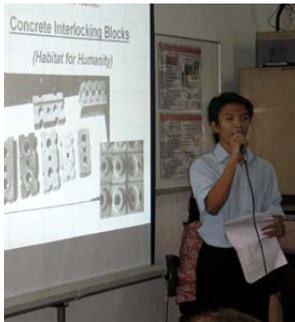
The research class of Dean Ted Inocencio with TAO staff and resource persons.



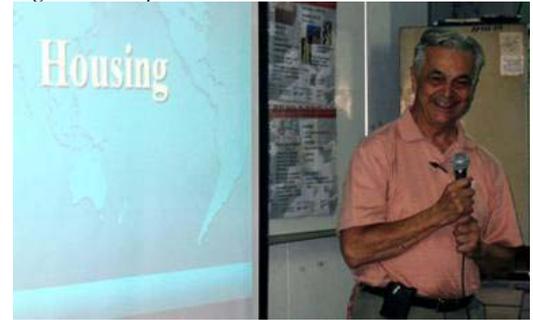
PUP 4<sup>th</sup>-year architecture students who took part in the research project.



Community representatives from DSOP look at the sample materials presented by students.



Student presentations by Jann Leyba on concrete interlocking blocks; Ryan Javines and Kurt Sabate on lightweight concrete panels; Maryrose Pascual on micro-concrete roofing; and Elenita Hidalgo on lahar paving blocks and panels.

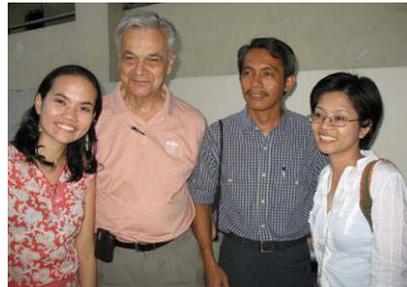


Student presentations by Jasmine Soriano and Jojo Agdeppa on coconut fiber boards and panels; and Paulo Noble and Jose Uy on composite building panels.

Fr. Jorge Anzorena of SELAVIP gives a presentation on the urban housing situation in Latin American countries.



Mr. Mariano DeVeyra of SANAGMANA views the students' presentation boards.



TAO staff Edra Belga and Ge Matabang with Fr. Jorge and Arch. Cesar Aris of FDUP



Mr. Illac Diaz gives a presentation on his My Shelter Foundation's projects.