

AVEI NEWSLETTER



A demonstration of stabilized earth-building techniques to flood-affected villagers

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Mild winter weather has brought a welcome respite to Auroville after the exceptionally heavy monsoon in November and early December. Fortunately, earthen buildings have performed well despite the extreme conditions. Construction at Sharanam has continued slightly ahead of schedule. And well-executed modern earthen buildings in Auroville as well as vernacular buildings in villages have demonstrated the strength of earth as a building material in spite of heavy rains and extensive flooding.

Multiple universities have taken advantage of the winter holidays to attend special courses at the Earth Institute and a French engineering professor has lent his expertise to the Poured Earth Concrete research.

Please feel free to share this newsletter with your friends and colleagues as we spread the knowledge of earth architecture to the world!

Earthily yours,
The AVEI Team





Steady progress on the single-story buildings in January

Construction Underway at Sharanam

Work has been progressing steadily on Sharanam Phase II, a rural development center project of the Sri Aurobindo Society on the outskirts of Pondicherry (see Newsletter **Issue 24** for an introduction to this project).

Lara is the AVEI project manager for Sharanam Phase II. Currently, a set of 8 single-story dormitories designed by Lara and Satprem

are under construction.

By the time that the monsoon began in November, substructure construction was well under way and block production was in full swing. Despite a record-breaking monsoon – with rainfall exceeding 1.3 m in three weeks (the heaviest rains in 100 years) – the Earth Institute’s team augmented by Sri Aurobindo Society workers and temporary laborers managed to push on with the construction schedule under the guidance of Satprem, Lara,

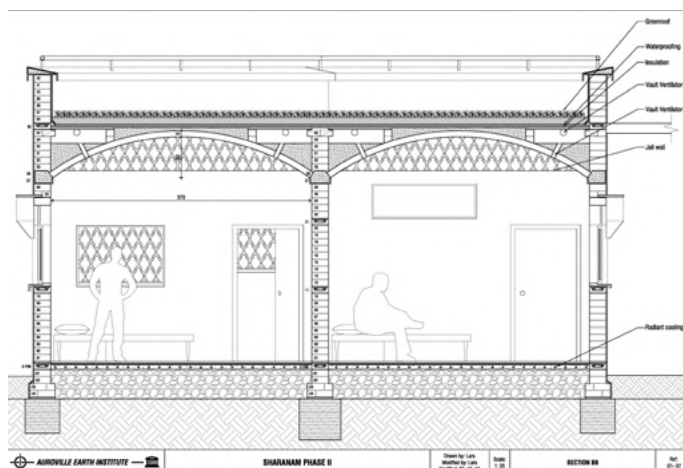
Ayyappan, and site supervisor Rajesh.

Delays during the monsoon primarily impacted the substructure construction, soil crushing, and block production. The stabilization in the CSEB and Poured Earth Concrete (PEC) foundations allows these earthen techniques to resist heavy rains. Yet the raw soil material, excavation areas and production equipment are vulnerable areas which needed careful attention; proper planning and protection with tarpaulins prevented the rains from unduly delaying the construction. In periods of fairer weather, the team redoubled their efforts, allowing the construction of single-story buildings to continue even ahead of schedule – up to the sill level by year’s end.

With fair weather in the latter half of December and January, the masonry of the walls has been progressing swiftly and vault construction will soon begin. In the coming weeks, foundations will soon begin for the double-story dormitories.



Monsoon rain collecting in the excavation pit



A section of one of the single-story dormitories

ActionAid Flood Relief in Cuddalore District

Mme. Sehjo Singh, Director of policy and programmes for ActionAid India (AAI), and Mr. Sathish Tarnas, Regional program officer, visited the Earth Institute on the 9th January to share about their work in the flood-affected areas in Tamil Nadu after the severe monsoon of November and December 2015. Satprem and Lara were invited for an exposure visit to Cuddalore District (~40 km south of Auroville), to assess the flood damage to traditional buildings. According to ActionAid, an estimated 29,000 households were affected in this district, with the tragic losses ranging from 28 perished family members, 189 losses of cattle, and 4,804 houses structurally damaged to varying degrees. Dalit and other "untouchable" communities have been badly affected and have received much less assistance than people in urban centres such as Chennai.

The following week, Satprem, Lara, and Mr. Tarnas visited Theerthanagiri, Kulathumattu Colony. The monsoon caused particularly severe flooding in this low-lying area, as the heavy onslaught of rain caused the Lake Perumal dam to break and flash flood into adjacent villages. Theerthanagiri colony remained submerged in water for more than one month. Village residents and local community leaders of the Integrated Rural Development Society gave us a tour of the village, telling



A woman and child in front of their cob house in Theerthanagiri colony

their stories and showing the damage to their homes. The majority of the houses in Theerthanagiri were made of either "keet", a woven palm-leaf material used for thatch roofing and walls, or "cob", the traditional village mud construction technique.

Despite all expectations, these simple, vernacular building methods behaved exceedingly well, with many houses resisting flood waters up to 1.2 meters for one week, and lower levels of inundation for another four weeks. Among keet, cob, and fired-brick structures, there were few instances of severe structural damage or collapse, and many buildings withstood the inundation with little to no structural damage. Only three cob houses had severe damage.

The keet houses provided little protection against the extreme storm conditions. The cob houses showed a variety of pathologies.

A government ban on collecting soil from the lake, in place for the past seven years, has limited the villagers' access to raw earth, forcing them to modify their constructions with weaker mix ratios. Houses predating this ban showed far better tolerance against the rains and flooding. In fact, the soil from the lake exhibited induration properties, making

act:onaid

ActionAid is an international NGO, which has had extensive activities in India since 1972. In the aim of alleviating poverty, the organization takes an interactive approach to empower local stakeholders in the process and respond to the needs and desires of the actual members of the communities it works in.

www.actionaid.org/india/



A fully keet house



Capillary erosion and wall tilting



A well-built cob house with a keet roof

it more resistant to water. Houses were generally well built, but they did not have an adequate elevation to avoid flooding, nor foundations or basement. As a result, some walls exhibited capillary water intrusion from ground humidity. Other problems derived from the roofing – either leaking which eroded walls, or outward thrust which caused the walls to tilt when saturated.

A village discussion ensued, so that members of the community could express the concerns and needs for their homes. A number of villagers expressed that the material used for buildings didn't

matter, and that they are not against rebuilding their houses with earth. Yet they wanted safer homes which could better protect them from rain and flooding. No one in the community could afford to build with cement.

Satprem and Lara gave a demonstration, showing the comparative water resistance of raw and stabilized earth techniques. By pouring water on various samples – raw cob, cement-stabilized cob and adobe, lime stabilized cob and adobe, and CSEB stabilized with 5% cement – villagers could observe the difference in water resistance between different

types of earthen construction. Later, Satprem gave a presentation to the villagers, showing the potential of earth construction with photos of earthen buildings in the Auroville area. The villagers were very positively surprised and asked many questions.

What is so interesting about ActionAid's approach is that it is committed to village stakeholders driving their own re-construction efforts. Counter to the common mistake – to replace village constructions with modern materials without village input – ActionAid engages the skills, intelligence and aspirations present within village communities. The local cob system is one of the most sustainable and affordable self-build options available to villagers, and it performed incredibly well against these floods. How many development agencies think to re-build within the vernacular language, to preserve the local constructive culture for broad community participation, while assisting only to make only modest improvements for better safety, longevity and comfort of buildings? We hope that ActionAid's sensitive approach becomes status quo for other aid and development organizations.



Satprem demonstrating erosion and lack thereof in raw and stabilized earth samples

Reviewing the PEC Research

At the beginning of January, the Earth Institute had a short visit from Philippe Devillers, a professor of Civil Engineering and Mechanics of Structural Materials at the Ecole Nationale Supérieure d'Architecture de Montpellier in Southern France. His areas of research include recycled aggregate concretes, stone, and other construction materials, and this speciality allowed him to give an expert analysis of AVEI's Poured Earth Concrete (PEC) research conducted over the years by engineering interns Albéric Le-Huédé, Jérôme Cochet, Clémentine Browne, Léo Boulicot, Théo Vincelas, and Ioan Lévi. During Prof. Devillers' week-long visit, he reviewed the PEC reports and testing protocols, and produced some initial PEC samples.

The Earth Institute hopes to be able to coordinate further collaboration with Prof. Devillers in order to further its research on Poured Earth Concrete. ■



PEC samples still in the mold



Global Vipassana Pagoda, the world's largest dome

Visit from Mahesh & Pallavi Varma

The Earth Institute received structural engineer Dr. Mahesh Varma and architect Pallavi Varma for a three-day visit at the end of December. Key members of Nandadeep Building Centre, they are responsible for the structural design and construction of the Global Vipassana Pagoda on the outskirts of Bombay, which is the world's largest and most impressive dome – with a span of 85.15 meters (twice the span of St. Peter's of Rome!).

The Earth Institute's website includes a **case study** of the Global Pagoda, with information and photographs from Dr. Varma.

Stay tuned for the next AVEI Newsletter for more information on this incredible project!

www.earth-auroville.com/global_pagoda_en.php ■

Special Intensive Course at AVEI

At the end of January, a group of 33 students and 1 faculty from the MAM School of Architecture, Trichy came for a week-long special intensive course called "Introduction to Earthen Architecture". It covered CSEB and adobe production, masonry with CSEB, adobe, cob and rammed earth, and an initiation to arches, vaults, and domes. ■

Awareness Program for RISD

At the beginning of January, the Earth Institute conducted a four-day awareness course for a group of 14 students from the Rhode Island School of Design (RISD), Providence, USA, led by Professor Elizabeth Dean Hermann. According to the academic diversity of the students and the aims of the group's work in Sri Lanka, the course offered a broad, hands-on introduction to earthen architecture with a special focus on theory of AVD and technical aspects of CSEB construction.

The group was joined for two days by three students from the New School of Architecture & Design (San Diego, USA) accompanied by Sandra Plaza, founder of the non-profit organization Rebuild Global. ■



Students learning about the operation of the Auram 3000 and AVD theory

RISD | DESINE LAB

Rhode Island School of Design
A Laboratory for Design Innovation & Entrepreneurship

Dr. Lili Hermann is a co-founder of Desine Lab, described as a "transdisciplinary research lab run by faculty and students of RISD and its neighbor Brown University [...] for the purpose of applying design-based approaches to social and economic development issues in socially, economically and/or environmentally vulnerable, traumatized or conflicted regions of the world."

Since an invitation in 2011 to assist in post-war reconstruction in Sri Lanka, Dr. Hermann has been leading student groups to work with communities on the ground in Sri Lanka. Currently, the research lab is involved in a program in Batticaloa, Sri Lanka, to create a collaborative center for the development of skills and critical thinking, which is necessary for community rebuilding and reconstruction in the post-war setting.



risdhealthplus.org/profile-elizabeth-dean-hermann/



AVEI team members on a recent office trip to the stone temples in Mahabalipuram

New Team Members

The Earth Institute has welcomed two new team members!

Marine Roubaud

I'm a French architect recently graduated from the Ecole Nationale Supérieure de Toulouse. I arrived in India three months ago with the aim to improve my architectural culture and to discover new way of living more related with my values and my life philosophy.

I had the luck to grow up in a small town in South of France where you can admire everyday natural wonder. And, unfortunately, I could also observe how human behaviors could destroy this environment. That's why I decided to specialise my architectural exercise in Preservation and Restoration of the Architectural Heritage and Sustainable Construction.

I truly believe that architects could have a key role in this context. In fact, by our specific skills such as creativity, ingenuity, organization and control of different scales issues we can find and broadcast different ways of living in harmony with Nature. So, when I joined the Architecture School, I started to be interested by other types of construction as troglodytic architecture (Final Year Thesis) and rammed earth buildings.

For all these reasons, I'm really grateful to Auroville Earth Institute for giving me my first employment as an architect. It's a wonderful opportunity for me to learn with people who share the same passions and architectural ethics but also to discover this incredible structural and philosophical laboratory which is Auroville Foundation.

Sarth Khare

Cities offer a variety of chaos. A string of images and a never

ending buzz of existence. With blatant advertisement there is a meander in the essential ways of seeing and perceiving. Our visual sense gets preference over all the rest and we forget to touch and to feel.

Sunlight takes us back to being alive. It teaches us to feel warmth and to feel wrath. We aren't Gods and our habitat molds us into who we are. We are humans and hence we are sculptors, architects, dreamers and engineers of our world. It's the knowledge of playing with and respecting our world which has made us evolve as a species.

Being at the Earth Institute offers such a space, a place where one interacts holistically with the nature, understanding earth and playing with light to architect the space in ways which seem accurate and veritable.

In the quest of such an institution for my training semester, of undergraduate course in architecture at the School of Planning and Architecture, New Delhi, I brought myself to the Earth Institute. Being here earlier for a training course in CSEB design, I had a fair idea on what I wished to learn in the semester. But joining the Institute as an intern has already expanded my perception in architecture, details, organizations and Earth as a material in itself. I sincerely hope that the rest of my days here are utilized to their full potential too. ■

**AVEI Training Course
Schedule for 2016**

February

1st to 6th: CSEB Design
8th to 13th: CSEB Intensive
15th to 20th: AVD Intensive

April

11th to 16th: CSEB Production
18th to 23rd: CSEB Masonry

June

6th to 11th: Ferrocement
13th to 18th: AVD Theory
20th to 25th: AVD Masonry
27th to 2nd (July): CSEB Design

August

1st to 6th: CSEB Intensive
8th to 13th: AVD Intensive

September

5th to 10th: CSEB Production
12th to 17th: CSEB Masonry
19th to 24th: AVD Theory
26th to 1st (Oct): AVD Masonry

December

5th to 10th: CSEB Intensive
12th to 17th: AVD Theory
19th to 24th: AVD Masonry

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Masons working on the basement of the single-story buildings at Sharanam