

AVEI NEWSLETTER



Intensive AVD Course at the Institute

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Learn about our new research into the waterproofing properties of Prickly Pear Cactus Juice on page 2.

Read about the potential of Thermocrete as an insulating agent in vaulted structures and discover the series of tests we are performing, page 3 & 4.

Hear about our continued collaboration with World-Haus, both in our improvement of the D 250 Block (page 4) and our training sessions (page 5).

Keep tabs on our activities (training courses, seminars and outreach activities) and read the summary of the latest events.

Our team is growing! Meet our three new volunteers on page 6.

Check out our training dates on the last page.

Do not hesitate to disseminate this newsletter to your network and spread the knowledge on earth architecture.

Earthily yours.

Waterproofing with Cactus Juice

At the beginning of July, the Auroville Earth Institute initiated a series of experiments on the waterproofing properties of cactus juice, an additive long used in the adobe techniques in South America. The Institute took the basis of their recipe from Meskerem Assegued, a renowned Ethiopian anthropologist and curator, who had developed a recipe that did not include precise proportions. By measuring carefully the ingredients and preparation procedures, the Institute is researching to standardize this recipe for the cactus juice.

The viscous liquid additive is derived by slicing up and soaking prickly pear cactus pads in water for 3 days. This liquid can then be added directly to the adobe mixture, used as a coating on the bricks, or mixed with lime for a

plaster coating.

Under the guidance of T. Ayyappan and Satprem Maïni, the Auroville Earth Institute created eleven samples of lime plasters and paints, ranging from a control sample with no coating of any sort, a sample with the lime plaster typically used by the Institute, a paint from lime and cactus juice, solely cactus juice, and lime-stabilized earth plaster with varying levels of cactus juice and soil. Two samples additionally included marble powder.

Two types of adobe bricks were made: one composed with water and the other with cactus juice.

To test these samples, a liter of water was poured on each sample and a pane of glass was sealed over the top to minimize the evaporation of the water. The aim was to test the absorption and percolation of water in the context of the varying samples.



Preparation of the Adobe Bricks



Water Absorption Test on a Sample

Another test was performed upon a cup made of clay mixed with cactus juice, which was filled with water and analyzed for its ability to hold form and resist leaking. But after 1 h 17 minutes the cup totally desintegrated.



Clay Cup Exhibiting Leakage

A third test studied the water absorption in the frog of a brick, and the indentation was filled with water and observed.



Frogs of Two Bricks Filled with Water

We look forward to sharing more about these tests as they continue and we analyze and cross-reference our findings.

Consultancy with Good Earth, Bangalore

“Good Earth : Building sustainable communities” invited Satprem to evaluate their project “Malhar” and explore whether the quality of their block production could be improved. “Malhar” is a project of 500 residential homes covering 50 acres which is being built in phases on the Mysore road, at the outskirts of Bangalore.

During his visit, Satprem met



Block Production at Malhar

with Ms. Natasha Iype, Mr. Stanley George, Mr. Prashant Palanisamy, and Mr. Ravindra. He visited the construction sites in order to observe the block-making materials and process, done with the Mardini press from IISc Bangalore. He also collected data and gave recommendations for the experimentation on block and plaster compositions planned for the following day, and prepared for the rammed earth wall training course. The next day, experiments were conducted on the proportions of aggregate and cement used in the block composition and variations on the stabilized earth plaster mixture. A sample one-meter-long rammed earth wall was constructed to demonstrate best practices.



Rammed Earth Wall Training

Satprem concluded his visit by giving a presentation of the techniques and practices used in Auroville by the Auroville Earth Institute to the Good Earth staff and left them with additional informational materials.

Thermocrete for Vaulted Structures

With the participation of Satprem, Ayyappan, Lara Davis, and Jan Sebastian, the Auroville Earth Institute began research on the composition of insulation layers for earthen vaults using Thermocol (Polystyrene balls bound with soil and cement). This insulation layer, called Thermocrete, protects the masonry from cracking, brought on by the expansion and contraction caused by extreme temperature variation and thus its movement. The cracking can then lead to leaking and compromised structural performance of the masonry. Additionally, this insulation can improve the ambient comfort of the interior spaces of the vault.

During testing conducted in April, five mixtures of varying

ratios of cement, soil, polystyrene balls and water were composed. The mixtures were first dry-mixed and then combined with water in a bucket to create a workable paste. The mixture was then molded into panels 5 cm. thick to replicate a patch of insulation with equal dimensions and compaction.



Thermocrete Panels

The test panels were analyzed for workability, a uniform consistency, and lack of air pockets. Due to the sloping form of a vault, the mixtures were also tested for slumping, and additionally for shrinkage.



Heating the Vault

In follow-up testing commenced in July, the Thermocrete was tested for its insulating properties. The best mixture, in terms of workability was found to be composed of 1 part cement, 0.5 part soil, 5 parts polystyrene, and 0.64 part water. It exhibited a good cohesion and was applied as an insulation layer on a 50 cm. wide vault.

The interior of the vault was heated to a target of 80-90°C using a double burner stove which was enclosed in the vault. After 10 hrs of heating, the temperature inside the vault was measured at 88°, the temperature outside the earth masonry vault was 60°, and the temperature outside the Thermocrete insulation was 48°. The air temperature was 36°.

The next step will be to inverse the test and to expose the vault to direct sunlight in order to measure the difference of the temperature inside the vault.

Follow-Up on the D 250 Block

Testing has continued on the grout mixture and form of the D 250 block in hopes that the WorldHaus project can benefit from the new developments.

The block has been modified to have larger cavities, allowing for more grout to fill the holes and seams of the blocks. Testing

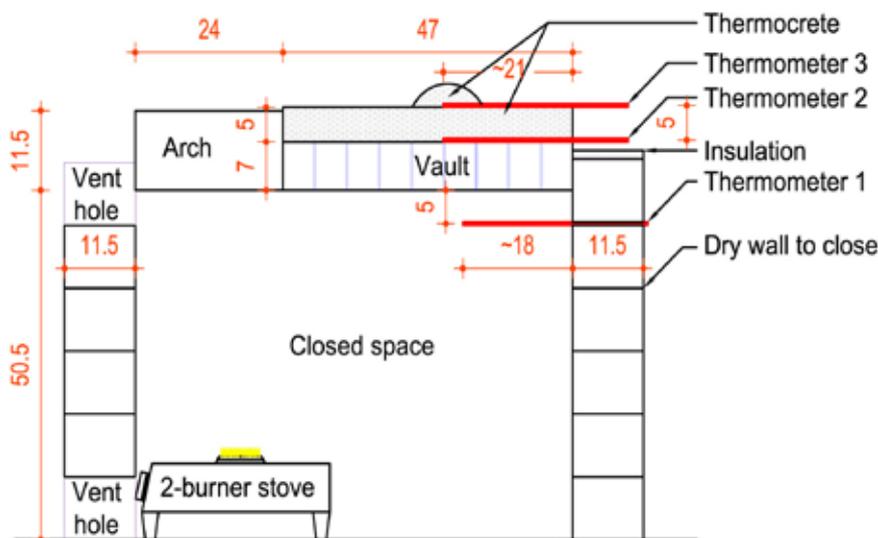


Diagram of Heating the Vault with a Stove

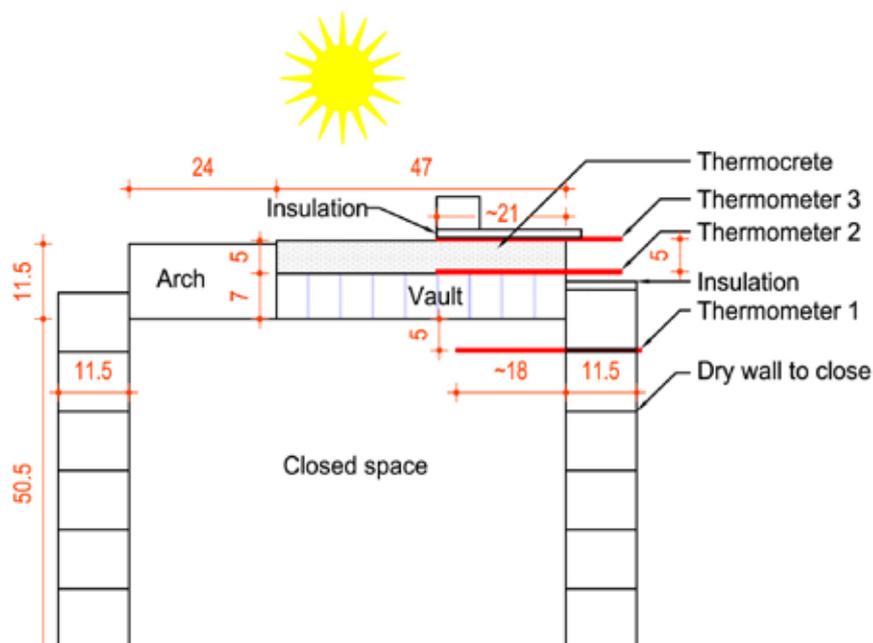


Diagram of Heating the Vault with the Sun



Mixing the Grout

has shown that this works much better and gives a stronger hold.

The proportions of the grout have also been changed to 1 part cement, 3 parts sand, and 1.2 parts water.



Pouring the Grout

Training Session for WorldHaus in Bangalore

Ayyappan traveled to Bangalore on July 17th at the invitation of the organization WorldHaus to participate in training efforts for their project to provide cost-effective, disaster-resistant houses. This organization, which aims to create a house that can be afforded at a monthly payment of \$10/day, employs hollow CSEB to reduce costs and withstand earthquakes. In the afternoon, Ayyappan provided a short training course showing how to create bond patterns for the laying of the CSEB bricks.

UVA Architecture Students Visit the Institute

Fifteen students and two faculty members from the well-known University of Virginia's School of Architecture visited the Auroville Earth Institute on July 26th. They were given a presentation of the Institute's past projects and activities and a demonstration of the CSEB block manufacturing process. The accompanying professors Phoebe Crisman and Peter Waldman expressed the School of Architecture's enthusiasm to start regularly sending students to participate in training courses at the Auroville Earth Institute.

They are talking about us

Article in Indian Periodical Architecture Update

Architecture Update devoted a feature story to the Realization project in Auroville in its May 2012 issue, entitled "Saving da planet".

In a five-page article replete with color photos of the construction process and final product, the article, written by Satprem himself, discussed the environmental factors that informed the design process, the CSEB created by local skilled labor made from soil dug on-site, and the innovative Earth Cooling Tunnel that cools the building without high energy consumption.

Case study in Vernacular Traditions

In her 2012 book *Vernacular traditions: contemporary architecture*, Aishwarya Tipnis highlights Satprem Maini and the Auroville Earth Institute's Realization project. The project was described in detail in the case studies section of her book that examines notable examples of contemporary architecture in India that incorporate vernacular and ecological building techniques. The case study emphasized the community- and environment-responsive design of the apartment structure and the

use of soil dug from the rainwater harvesting tank for the CSEB and on-site trees for the wood of window frames and doors.

Training courses' summary

During the months of June and July, the Institute held seven weeks of training courses, covering theory and practical for the techniques of ferrocement, Compressed Stabilized Earth Blocks (CSEB), and Arches, Vaults, & Domes (AVD). A total of 138 trainees participated, including architects; engineers, enthusiastic self-builders and a large amount of students. The trainees came from 7 countries (124 from India, 6 from France, 4 from the USA, and 1 from Nepal, Italy, Spain, and the UK).

June 4th to 9th, the Institute taught a special class on ferrocement, covering the basics of ferrocement channels and pieces, both casting and applications.

From the 11th to the 23rd, the Institute taught a two-week AVD series. The first week was AVD Theory, reserved for architects, engineers, and students. The second week was open to all interested individuals of any background. The trainees constructed their own vaulted structures with guidance and feedback from the Institute staff.

June 2nd to 7th saw the arrival of new students for the "Designing

with CSEB" course. This class catered to students and professional in the architecture field, allowing them to get training and practice on the actual design process using CSEB.

For the rest of the month, the Institute held intensive week-long courses, with CSEB intensive from the 9th to the 14th and again from the 23rd to the 28th. This course covered CSEB production and masonry with both lectures and practical experience. Sandwiched between these two sessions was an AVD intensive course as well, covering the theory and practical masonry of earthen arches, vaults, and domes.

'The chance to participate in both the CSEB and AVD intensive training courses was the highlight of my internship. The workshops offered in-depth theoretical and practical knowledge which is proving highly beneficial to my understanding of architecture and construction. It was also a fantastic networking and group learning experience and I am sure many exciting projects and ideas are conceived as a result of the AVEI training courses.'

Jonathan R. Evans, Volunteer.

Meet our new Volunteers and Interns!

The Institute is happy to announce three new and returning members of the office!

Sourabh Gupta

RESIDE DEEP WITHIN MY HEART
AND FEEL HOW ABLAZED I AM;
THE FLAKES ARE NO MORE WHITE,
THE APPLES ARE NO MORE GREEN.

Inundating the world with concrete was never my dream; we as "Architects" owe a responsibility to the world.

I may rise high, soaring the heights of the sky, resting my feet on the best of concrete pedestals, but remember that one day I shall come back to mud for it is my final abode. I will lose my existence to this mighty ash. I would be another smear like the million more.

So it was a wise decision to drape the earth and prosper in her hem. And this was the plunge in the Conscious that dragged me here, in Auroville, to strengthen this endeavor. This place is amazingly a Global town where every person is reinforcing the world with a green armature. "This zeal, the spirit in the people is ubiquitous."

LIVING was never merely the name for a house to live in. But it is an approach and your response to your surroundings. It's the level of Conscious with which you fit yourself in this 'Divine Order of Nature'. You may be easily swayed by these flashy concrete jungles but they are far weak in their spines.

I am now a student of Architecture for three years pursuing my course from S.M.V.D. University

(J&K). And with every year I have witnessed myself getting more close to the reality. I appreciate being an architect for it gives you an opportunity to touch the lives more closely.

I am really grateful to my teachers who found that my spirit would resonate with this place and suggested me to be a part of this undivided growth. I am really grateful to them.

Appreciating the endeavor of Hassan Fathy, Nader Khalili, Laurie Baker. . . who have really paid hard to pave these directions for us. I am very influenced by their farsighted vision and their understanding of the materials.

I am really looking forward to learn under Mr. Satprem, who was recently addressed at the symposium of Moroccan Ecological Architecture by the comments such as "breath-taking, impressive, Hassan Fathy spirit".

These people have proved that the Architecture was never a commodity of the rich but it's far beyond these economical distinctions.

"I rose from this earth and one day I shall return to it."

But I have decided to clad earth and discover the unchallenged potential in it. Its consciousness is yet to be deciphered and I am ready to spare my time.

Hilary D Smith

In June, Hilary returned to the Auroville Earth Institute as the librarian to continue work on the physical library collection and to commence work on the digital resources of the Institute. After an inspiring six-month internship in 2011, during which she cataloged the physical library collection using the PMB integrated library system, Hilary decided to return following her May 2012 graduation with an MS in Library & Information Science.

With her particular interest in the management of digital resources and their accessibility, Hilary hopes to improve and enrich the Institute's diverse text, image, and video resources through digital repository software which will allow for standardized metadata, an intuitive search interface, and easy depositing of new digital resources. She hopes that this will allow the Institute to more broadly disseminate its knowledge to others, both in the earth architecture community and beyond. She looks forward to the way that this digital repository will be able to grow in response to user needs and growing resources.

In addition to her work in the library, Hilary is enjoying reconnecting with the community of Auroville and its environs. She appreciates the opportunity to participate in activities around Auroville, most particularly horseback riding, and hopes to expand her experiences and engage

more with the Tamil language and culture.

Arun Raj M.

I was a student of Udhavi School, Auroville, now pursuing my degree in architecture at Periyar Maniammai University, Thanjavur. Since I have been brought up in the Auroville surroundings, it has been a great opportunity for me to explore Auroville as much as possible and has also inspired me in many aspects of architecture. This has been a key reason for me to choose a course of study in Architecture.

After starting my journey as a student of architecture, I luckily had these great opportunities of attending the workshops on CSEB (production and design) and AVD at Auroville Earth Institute. These made me believe in the importance of materials. This increased my interest in doing my internship program at the Earth Institute as its many works which used rammed earth and CSEB inspired me a lot.

I also believe that nothing is waste, as a thing appearing as waste for someone may be of need to someone else. Hence I am very much interested in making innovative products out of scrap. I have also made furniture products out of scrap materials during my college days. Also I am contributing myself as a cricketer for the Auroville team, Everest.

I hope that during this learning

period I will gain good knowledge and that it will be a great experience of exploring myself in the practical work environment rather than that of a student.

Remaining Training Courses in 2012

September

3rd to 8th - CSEB Production
10th to 15th - CSEB Masonry
17th to 22nd - AVD Theory
24th to 29th - AVD Masonry

December

10th to 15th - AVD Theory
17th to 22nd - AVD Masonry

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