

AVEI NEWSLETTER



Scaffoldings inside the dome at Sri Vast Ashram

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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

Pointed Dome for the Sri Vast Ashram

The Auroville Earth Institute was requested by the Sri Vast International Foundation to guide the construction of a dome for the Sri Vast Ashram located in Boomiyar-palayam, to the east of Auroville. The Sri Vast International Foundation is based upon the teachings of Guruji Sri Vast and the principles of 'eco-spirituality'. The Foundation's centers are located both in India and in Sweden, and courses and residencies are available in various locations around Europe and in India.



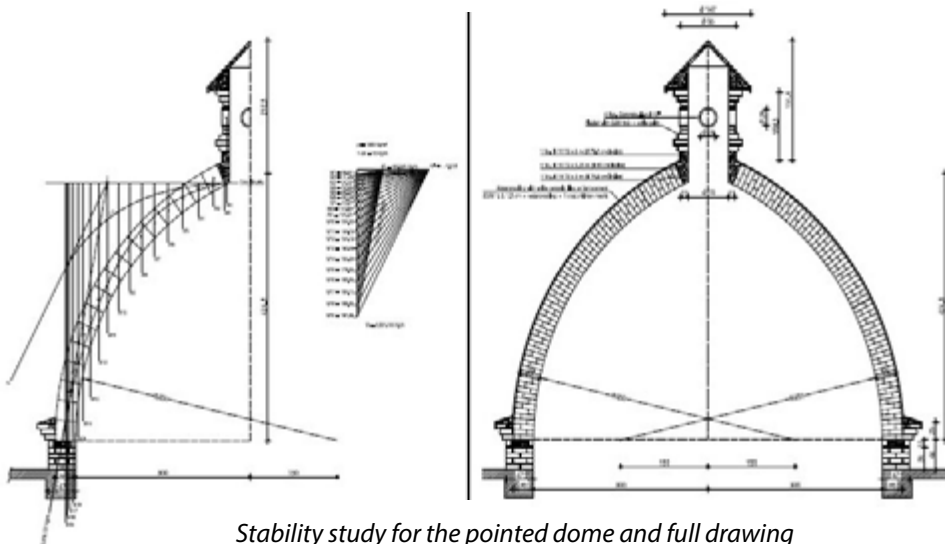
The dome in the final stage of construction

In keeping with the ecological values of the movement, the Earth Institute was chosen to plan and implement the construction of a dome for the ashram's "humonastery". The humonastery is meant as a museum space to display the work undertaken by the Foundation throughout the world. The dome tops the end of a two story building. The Earth Institute designed a pointed

dome with a 6 m. span and a 4.24 m. rise. Stability studies for pointed domes are rather challenging, however an adequate solution was still determined with funicular analysis of the forces in the dome.

Due to the scheduling constraints and the risk of monsoon rains disrupting block production, wire cut bricks were used with a rich

mortar composed of sand, soil, and cement. The construction took place in early December, under the supervision of Satprem Maïni. To lay the courses of bricks, an eccentric compass was used. The Earth Institute's head mason E. Manigandan laid each course of the bricks for the intrados of the dome.



Stability study for the pointed dome and full drawing



Mani working on the intrados of the dome

Poured Earth Research

Since July 2013, the Auroville Earth Institute's poured earth research has been in full swing under French engineering intern Clémentine Browne. With the heavy environmental impact of concrete production, the Auroville Earth Institute has conducted multiple research projects on the possibilities of Poured Earth. As a complementary building material for other earth-based technologies, Poured Earth can display very good performance with only 7.5% cement stabilization.

In 2011, Albéric Le Huédé contributed to the Earth Institute's poured earth research by studying alternative plasticizers such as washing powder and natural soapnut, superplasticizers, and flyash as an addi-

tive. Plasticizers are added to concrete to allow a reduced amount of water in the mixture and an improved workability. This results in reduced shrinkage and improved compressive strength. The resulting samples of this preliminary research were weak, indicating that the basic mix should be improved.

Under Jérôme Cochet later that same year, these mix ratios were improved. The research focused on compaction of the mix, optimization of density, and particle size distribution for the granules of the soil. This was done with sieving tests followed by compressive strength tests on the different mixes. Finally, three mix compositions were chosen to cast three walls on the Earth Institute premises.

Clémentine has continued this research by performing compressive strength tests,

measuring water absorption, and analyzing shrinkage on two sets of cylindrical Poured Earth samples. In the first set, she tested three compositions, in which samples were stabilized with both cement and lime, and the proportions of soil were maximized up to 50%. In the second set, she tried using linseed oil as a plasticizer and studied the effects of adding flyash.

The compressive strength tests produced results of up to 11 MPa for samples in a dry state and 7 MPa in a wet state for cylinders containing 15% soil. She found that when using red soil, a mixture with 35% soil is suitable for construction. With soil taken from the Mangalam site in Auroville, the samples were very weak and require more study on the basic mixture, on account of its high clay content.

Next, Clémentine continued →



Preparing the cylindrical samples of Poured Earth



Compressive strength tests



A Poured Earth beam undergoing a flexural strength test

with flexural strength tests on Poured Earth concrete beams. Three types of beams were made: without structural reinforcement, with steel reinforcement, and with bamboo reinforcement. The beams were made both single height and double height. They were then load-tested with 25 and 50 kg sand bags to determine the maximum weight before failure.

Reinforced Poured Earth beams proved to be more ductile than Reinforced Concrete beams in these tests. Very good results were given by the double height beams reinforced with steel. They could take up to 3.75 tons without breaking. The beams reinforced with bamboo deflected greatly, but did not break. However the bond between the concrete and the bamboo requires further study.

This research has had very positive results. The next steps for the Poured Earth research will depend

on the improved knowledge of the properties of the Mangalam soil. Further follow up needs to be done to study the potential of plasticizers. The tests on bamboo reinforcement also require more study. Finally, wall-sized samples should be poured to study the behavior of the Poured Earth at a larger scale. ■

Satprem's travels to South Korea

Satprem Maini, director of the Auroville Earth Institute (AVEI) was invited from the 19th to 24th Dec. 2013 by Mr Kim Soonwung and Dr. Heyzoo Hwang, from TerraKorea, to attend the inauguration ceremony of the "School of UNESCO Chair Earthen Architecture in Korea" and to give a presentation during the International Symposium on Earth Archi-

itecture, held on the 21st Dec. after the inauguration ceremony.

Dr. Heyzoo Hwang is the Director of TerraKorea, the "Institute of Earthen Architecture in Korea", and a lecturer at the "Department of Architecture, Mokpo National University". He has done extensive research on lime stabilisation for soils and CSEB in particular. Kim Soonwung is a member of TerraKorea and director of the "School of UNESCO Chair Earthen Architecture in Korea". Kim Soonwung and Dr. Heyzoo Hwang are also partners of the UNESCO Chair "Earth Architecture, Constructive Cultures and Sustainable Development".

Kim started the "School of UNESCO Chair Earthen Architecture in Korea" in Wanju Jeonbuk in the spring of 2013 by conducting classes to adults of various skills who were interested to learn how to build with earth, either to build their homes one day or to have more knowledge about this wonderful building material. Kim and his team conducted monthly classes from May 2013 on various earth techniques, such as adobe, cob, compressed earth blocks, poured earth, rammed earth, plasters, etc.

The ceremony on the 21st Dec. began by presenting the diplomas to the first six students who followed all the modules given at the school and who built a small demonstration building at their premises in Wanju Jeonbuk. Kim Soonwung, Dr. Heyzoo Hwang and Satprem gave short speeches to introduce the event



and they presented the diplomas to these students. Hubert Guillaud, founding member of CRATerre and Chairman of the UNESCO Chair Earth Architecture sent a video to deliver a speech and to congratulate the students.

It was a wonderful event attended by the families and friends of students as well as professionals and officials from the township. These six students were all adults above 40 years old and they were from different backgrounds, such as farmers, journalists, lay people. It was amazing to see how these people learned a new skill and were so proud of it. They had been very enthusiastic during their studies. Kim and his team did wonderful work during this first year of the school and they laid very good and promising bases for the future of this School of UNESCO Chair Earthen Architecture in Korea.

After the presentation of diplomas, Satprem started the International Symposium on Earth Architecture by presenting the work of the Auroville Earth Institute, including the various fields of research and activi-



Kim Soonwung and Dr. Heyzoo Hwang in front of the demonstration building built by the students

ties, the education conducted at Auroville and the development project of the AVEI School of Earth Architecture which will be built in Auroville in the coming years. About 120 students and professional enjoyed this two hour presentation. Dr. Heyzoo Hwang presented the research and practice of earthen architecture in Korea.

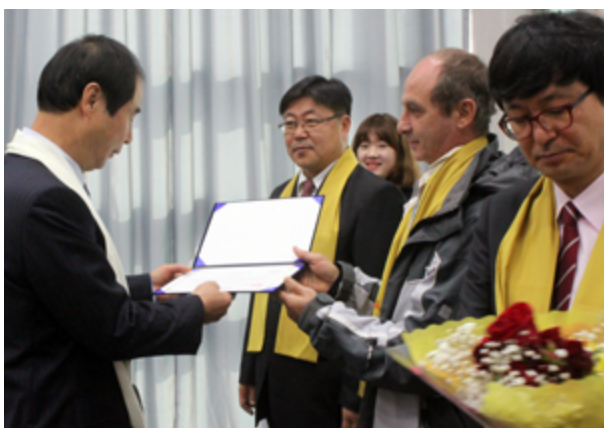
During this event, Satprem and Dr. Heyzoo Hwang signed a MoU between the Auroville Earth Institute and TerraKorea, which intend to promote learning, academic exchange and cooperation based on the following points:

- Mutual exchange of educational materials and research on Earth architecture.
- Conducting scientific councils

and seminars on Earth architecture, and supporting mutual friendly visits of each field specialist.

- Exchange of skilled manpower and education for advanced technology in Earth architecture.
- Other exchanges related to Earth architecture.

As a first exchange within the framework of this MoU, Satprem gave about 110 GB of data on earth architecture that he has collected over the years, which included photos on earth architecture in the world and in Auroville, research papers, standards, publications by AVEI and other authors, videos, etc. TerraKorea and gave in return about 20 GB of data on their work. ■



Satprem giving the diploma to a student



Satprem and Dr. Heyzoo Hwang shaking hands after signing the MoU

Dieter Mai from ClayTec visits

During the month of December, ClayTec's Social Media manager, Dieter Mai, visited the Auroville Earth Institute. ClayTec is a German company that promotes and distributes clay-based building materials in the commercial market. The company was founded by German architect Peter Breidenbach who had a great appreciation for vernacular architecture that employs earth as a building material. Since 1984, ClayTec has been offering a whole array of products and services for the building community based upon its expertise in the area of earth-based building techniques. It was a founding member in 1992 of the German organization Dachverband Lehm e.V., an association that promotes the culture of building with earth and represents those interested or already working in the field. The Auroville Earth Institute is a listed member.

Dieter Mai came to Auroville during a personal trip, but he took great interest in the activities of the Earth Institute. After his visit, the annual ClayTec Christmas donation was gifted to the Auroville Earth Institute to support the development of the new school project. The activities of the Earth Institute were covered in the Christmas card, which can be viewed here (in German):

<http://goo.gl/z9QCav>

The Auroville Earth Institute greatly appreciates ClayTec's generosity! ■

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Anand Sthapathy comes to AVEI

In mid December, the well-known temple architect S. Anand Sthapathy, head architect of the firm M.S. Sivaprakasam Sthapathyiyar & Sons, visited the Auroville Earth Institute and took part in a two-week theory and practical course on Arches, Vaults, & Domes. The Sthapathy surname indicates a temple architect and mason and this work has been passed down through Anand's family for many generations. His father, M.S. Sivaprakasam designed and built the Rajagopuram of the Sri Ranganathaswamy Temple in Srirangam. At a height of 236 ft. (72 m.), it is the tallest temple tower in Tamil Nadu.

The Earth Institute has been working with Anand in the context of the International Society for Krishna Consciousness (ISKCON)'s temple in Salem, Tamil Nadu. While traditional Southern Indian temple construction employs post and beam systems made from stone, this temple includes a system of arches and vaults. Anand is working on the design of this temple and the

Earth Institute was called in as a consultant to execute stability studies, construction sequencing, and on-site training for the arches and vaults. Anand attended the Earth Institute's December AVD training course additionally in order to achieve a more in-depth knowledge of the structural calculation for arches, vaults and domes. ■

Meet Our New team Members!

The office has gained four new members. Meet the two architects, researcher, and intern who arrived in December and January.

Anna

I was born and raised in Barcelona in 1976, between the bricks and workshops of my father's company. Growing up walking with my Mother along the paths of Gaudi's Park Guell, the Sagrada Familia, I thus discovered the Catalane architecture that was reinvented at every step.

In this environment, I learned to love architecture and began technical draftsmanship by pursuing studies in Technical Architecture at Elisava - Pompeu Fabra in the Barcelona city center, once again breathing in the modern development of architecture contrasted with tradition, days in Barcelona cafes and nights in the Borne.



Still working in this field with the ambitious desire to reach the top during the great economic boom in Barcelona, a story on the radio and some social and cultural questions led me to drop everything and go to Cambodia as a volunteer for 1.5 years. Then Thailand, Malaysia, Singapore, India, Laos.

I completed a graduate degree in International Humanitarian Development at the University of Bali where I could deepen my theses of the essence of creativity and spirituality.

Working toward a fusion between creativity, usage, culture, economic efficiency, ecology, sustainability, art, development, comfort and recycling, I have landed in the Auroville Earth Institute, a definitive paradise.

Samuel

The main interest that has guided my work and personal research lies in appropriate and sustainable building technologies. For its technical, social, ecological and economical idiosyncrasies, earth architecture became, early on, the main focus of my attention.

In the search for experience and knowledge I spent one year in Brazil at Tibá, a research center created by Johan van Lengen (author of the book "Barefoot Architect") and I worked in different building jobs with Gernot Minke which gave me the opportuni-

ty to deepen my knowledge in earth building and compression structures as well as building site management and working team coordination.

Along with this experiences I co-created a cooperative (Sítio) in 2011, dedicated to produce, investigate, document and disseminate solutions in Appropriate Technologies, Agro-ecology and Sustainable Architecture.

My main motivation to join AVEI is the will to join an experienced team with an extensive body of knowledge in earth architecture and compression structures so I can put in use and further develop my own capabilities.

Omar

Omar Rabie is an architect, a holder of the SMArchS from MIT, and the MSc in Sustainable Environmental Design from the AA. During the last decade, he has accumulated experiences in different regions around the world, from Egypt (Dar el-Memar), to the United States (MIT), India (Auroville Earth Institute), Japan (Takenaka Corp. & Kengo Kuma and Assoc.), and the UK (AA). While practicing design in different regions, Omar has specially gained an extensive experience in the field of design competitions, winning several international competitions, and serving as a Juror in multiple UIA competitions, most recently the Velux Award "Day light for Tomorrow."

In 2007, Omar spent eight months at the Earth Institute—learning the principles of earth architecture—leading to his MIT thesis, "Revealing Potential of Compressed Earth Blocks: A Visual Narration", in which he has explored the possibilities of pushing the design capabilities of this sustainable material through a group of experimental mockups. Omar is returning to Auroville to conduct a second phase of his ongoing experimental research—in collaboration with the Earth Institute—focusing on thin masonry shells.

Liju

Liju George joined the Auroville Earth Institute as an intern to the architecture department in December. Originally from Thrissur, he is attending college at R.V.S. School of Architecture in Madurai. During his studies, he developed a great interest in vernacular architecture.

Although he sees his arrival in Auroville as fate-led, he originally came to learn about low cost construction techniques and sustainable architecture.

His first intern experience in Auroville was in the office Metamorphosis, which he enjoyed greatly. Looking for a new experience and to broaden his knowledge, he came to the Earth Institute, where he is helping with drawings for the Spiti Community Centre. ■

Overview of Training Courses at AVEI

In December, the Auroville Earth Institute conducted two weeks of training courses on Arches, Vaults, & Domes (AVD). The first week comprised AVD Theory and the second week covered AVD Masonry. Thirty-five students were in attendance, including an American engineer and a French architect.

Two Indian architecture schools also sent classes to take part in AVD classes. From the 23rd to the 28th of December, one architecture class took part in an intensive AVD course.

From the 6th to the 11th of January, a class of architecture students from SJB School of Architecture & Planning in Bangalore came to the Earth Institute for a week-long intensive AVD course. Twenty-five students attended with their professors, including the school dean, M.N. Chandrashekar.

Newborn Additions to the AVEI Family

December was a happy month for births in the families of our Earth Institute team members! One of the Earth Institute's masons, Venkatesh, welcomed a son named Harish Kumar. Sudha, the Earth Institute's accountant, gave birth to a daughter, Banu Sri. Congratulations to the parents!

Statistics from AVEI's Website

According to Google Analytics, the Auroville Earth Institute's website, www.earth-auroville.com, received 76,847 unique visits over the course of 2013. The majority of website visitors came from India, but not too far behind were visitors from the United States, and then the United Kingdom and France.

With the average number of pages viewed on the website during a visit being 6.27 and a 72.5% rate of new visitors, the Earth Institute is pleased to see that its website is helping to disseminate and promote knowledge about Earth Architecture so well.



Anand Sthapathy and students visiting the Sri Vast Ashram dome

AVEI Training Course Schedule for Early 2014

February

3rd to 8th - CSEB Design
10th to 15th - CSEB Production
17th to 22nd - CSEB Masonry

April

7th to 12th - CSEB Production
14th to 19th - CSEB Masonry

June

2nd to 7th - Ferrocement
9th to 14th - AVD Theory
16th to 21st - AVD Masonry

July

7th to 12th - CSEB Design Studio
14th to 19th - CSEB Intensive
21st to 26th - AVD Intensive
28th to 2nd Aug - CSEB Intensive

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