

# AVEI NEWSLETTER



*Finished round arch in Egypt - December 2011*

## IN THIS ISSUE

---

- Technology transfer to Egypt in December 2011 ..... Page 2
- Research Project: Arches, Vaults and Domes ..... Page 4
- Educational Activities - 2011 graphs ..... Page 5
- They are talking about us ..... Page 6
- Conference in Hyderabad ..... Page 6
- Training Courses at CRATerre ..... Page 6
- Meet our new volunteers ..... Page 7
- Training Courses in 2012 ..... Page 8
- Job opportunities ..... Page 8
- Contact Information..... Page 8

---

### Happy New Year!

The Auroville Earth Institute team wishes you a wonderful year filled with success and happiness.

We wish to share with you the last news of 2011 with an illustrated outcome of the technology transfer Satprem conducted in Egypt in December. Read also the summary of the research undertaken on arches, vaults and domes.

In 2011 we trained 883 people! Look at the graphs on the evolution and diversification of our training activities since 1999.

The Auroville Earth Institute is always looking for new people to enrich the team, from volunteering to long term job opportunities, contact us to be part of our vibrant international crew!

Earthily yours.



## Technology Transfer to Egypt in December 2011

Satprem Maini, director of the Auroville Earth Institute was invited to conduct the second part of a technology transfer to Egypt. The governmental organisation "Housing and Building National Research Centre" (HBRC) invited him to train a team to build an experimental building.

The Chairman of HBRC, Dr. Mostafa El Demirdash, wished to use compressed stabilised earth blocks (CSEB) for large-scale production of housing for rural areas and to reduce housing congestion in megalopolis like Cairo.

The housing deficit in Egypt amounts to hundreds of thousands of units and HBRC imagines that the use of CSEB will help solve this shortage.

The first part of this technology transfer occurred in January 2011 when Satprem and Engineer Amandine Haviez conducted two training courses on the production of CSEB, and on designing with arches, vaults and domes (AVD).



*Training course on designing CSEB*

These training courses happened just after the revolution and the second part of the training was postponed until autumn 2011.

The second part of the transfer – construction of an experimental building with CSEB walls, vaults and domes – was seven weeks long and was conducted from the 22<sup>nd</sup> October to 10<sup>th</sup> December.

The initial experimental project was to build a house, which could be used as a model for the Eco City, the "Productive Low Cost Environmentally Friendly Village", called PLEV, which had been planned by HBRC. The revolution has delayed PLEV start-up, to an as yet unknown date.

As a result of this PLEV delay, the second part of the technology transfer, building with appropriate technology and design, was changed to construction of an office and training centre, to be located on the premises of HBRC at Giza/Cairo.

This office/training centre of 107 m<sup>2</sup> was designed by the Auroville Earth Institute, with all floors and roofs utilizing vaults and domes. Dr. Mostafa El Demirdash

especially wanted to use the segmental cloister domes developed by the Auroville earth Institute for supporting the apartment floors of the PLEV project.

Satprem trained a team of about sixteen people for building the walls, vaults and domes of the ground floor: three architects, one technician, six local masons and six workers.



*Building a segmental vault*

The intention was to complete only the ground floor during the second part of the training, with HBRC to complete the first floor on their own with what they have learned from Satprem.

However, construction was delayed for various reasons and it was not possible to complete all the vaults and domes of the ground floor. Therefore, Satprem demonstrated the essential details of the vaulted structures, so that HBRC will be able to complete the project later on.

One of these essential features is how the flooring above vaults is created. Instead of filling the sides of the vaults with material, a cavity is created beneath a stone or ferrocement slab. The

top is then levelled with raw earth concrete.

Satprem also trained the local masons how to cast ferrocement slabs which are to be used for creating these cavities beneath the flooring.



*Casting ferrocement slabs*

As the construction of this wind-catcher will occur after Satprem's departure, he preferred to build a sample of this dome at ground level, so that no mistakes will happen later on.



*Cavities for the flooring of the vault*

The initial design was to use stone slabs, but it had been difficult to source inexpensive good quality stone slabs and the alternative was to cast ferrocement slabs.

The experimental building was designed to be cooled using natural ventilation, and thus incorporates a wind catcher and solar chimney.



*Sample dome for the wind catcher*

Towards the end of this training course two other events happened:

- On the 8<sup>th</sup> December HBRC conducted the "Conference on PLEV Project and Stabilised Earth Buildings"

- On the 10<sup>th</sup> December, The 4<sup>th</sup> International congress, "Urbenviron Cairo 2011" on Environmental Planning and Management: "Green Cities, A Path to Sustainability", was conducted. This event was organised jointly by Urbenviron/Brazil, HBRC, and UNCHS Habitat.



*Pointed cloister dome in progress*

The top of the wind catcher is to be covered by a quarter pointed cloister dome, which will rise above the first floor, oriented to catch the prevailing wind.

Satprem presented respectively these papers:

- "CSEB and Stabilised Earth Techniques for cost effective buildings"
- "Earthen Architecture for Green Buildings – Case study of Auroville"

The collaboration with HBRC will proceed, as the Auroville Earth Institute and HBRC plan to set up a sub-centre of the Auroville Earth Institute in Cairo, which would conduct research on stabilised earth technologies, and train people from Africa, the Middle East and the Arab world.

We would like to warmly thank Ar. Dr. Hend Farouh, who was in charge of the project, and who was so determined to make this project happen; Architects Ahmed Abd Elgawad, Sara El Ariane, and Sarah Defrawy were also very helpful throughout the project.

We also especially extend our thanks to the Chairman, Dr. Mostafa El Demirdash, the Vice Chairmen, Dr. Khalid El Zahaby and Dr. Khalid Yosry, and the Secretary General Dr. Tarek Bahaa, for their continued support.

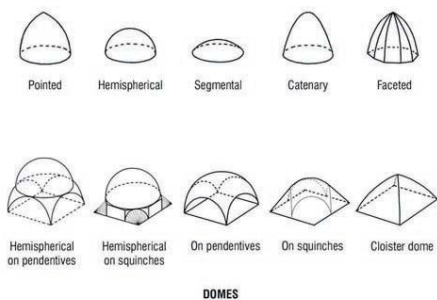


**Research Project  
Arches, vaults and domes**

From July to December 2011, Blandine, a French mechanical engineer student worked on defining a new method for the stability of domes.

After testing several existing methods, she decided to study them theoretically and experiment on small scale domes to measure deformations and obtain stress and strain data.

Here is a short excerpt of the work she did during her intership.



*Different types of dome*

**Test**

On October 12, a test on a hemispherical dome was conducted at the Auroville Earth Institute. This trial test was designed to measure the failure load of the dome, to improve the loading and testing procedure for the instrumented test, and to observe the opening shape of the dome and its behavior.

We decided to make a special cylindrical bag with a conical

bottom that could hold 500 kg of sand. The bag was standing centered on top of the dome and filled from the top using a large funnel.

The funnel ensured a slow and approximately constant flow of sand into the bag. A tap was added on the funnel to control the flow of sand when the dome would start to collapse.



*Equipment setting for the test*

**Results**

The first crack appeared at 46'41" and at 47'00" the dome collapsed. It opened on a horizontal circle about 43° from the top. We can see in the pictures below the vertical cracks all around the dome due to the tensional hoop forces. The dome collapsed very shortly after the first crack was noticed.

The interval between the first

crack and the collapse of the dome was much shorter than we expected.

Immediately after the dome collapsed, the ropes holding the bag broke. The sand was collected and weighted for a total load of 400 kg.



*Dome opening at 46'59"00*



*Dome opening at 46'59"30*

**Conclusions**

It is important to repeat the test a few times in order to evaluate the error margin of this failure test. For future tests with strain gauges we decided not to load the dome above 350 kg.

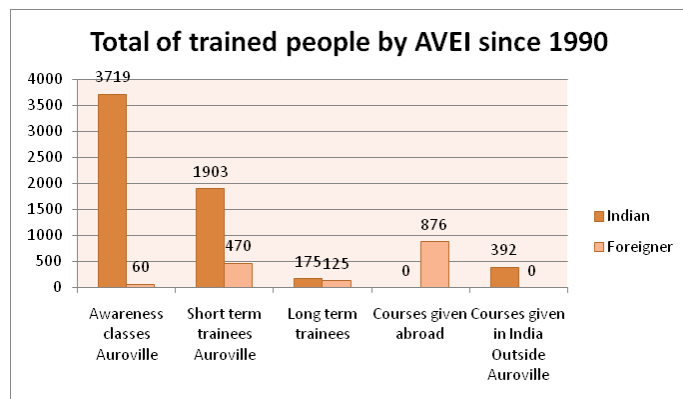
Moreover, further research must be conducted to study the thrust line according to the position of the opening of the dome when it collapsed.

© AVEI and Blandine Revaud

## Educational Activities Training Courses

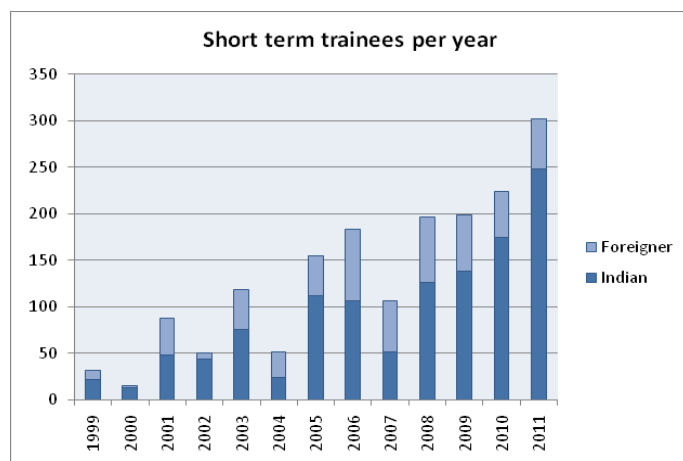
The Auroville Earth Institute disseminates earth based technologies through training courses, seminars, workshops, publications and consultancies worldwide.

One of the goals of AVEI is to give everyone the possibility to build their habitat themselves using earth techniques. Since 1990, 7720 persons have been trained.



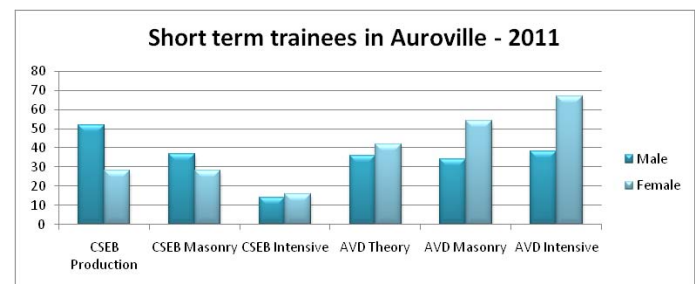
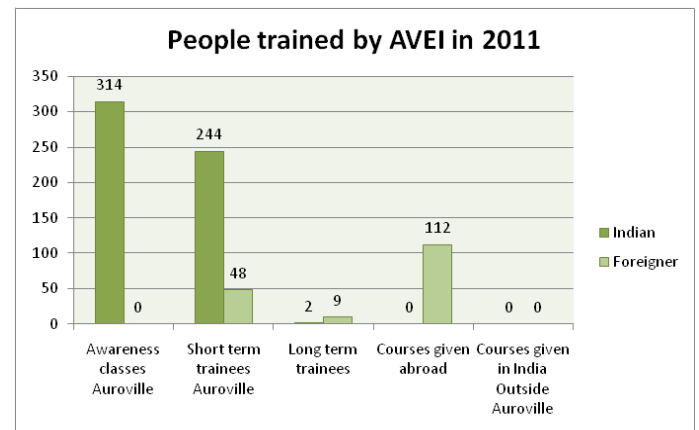
Along with awareness classes (from half a day to four days), AVEI mostly welcomes short term trainees who follow the regular one week programme.

Unfortunately, our data on the courses conducted before 1999 are not detailed enough to be used in relevant graphs. However, you can assess the progression from 32 short term trainees in 1999 to 302 in 2011 with 20% of foreigners.



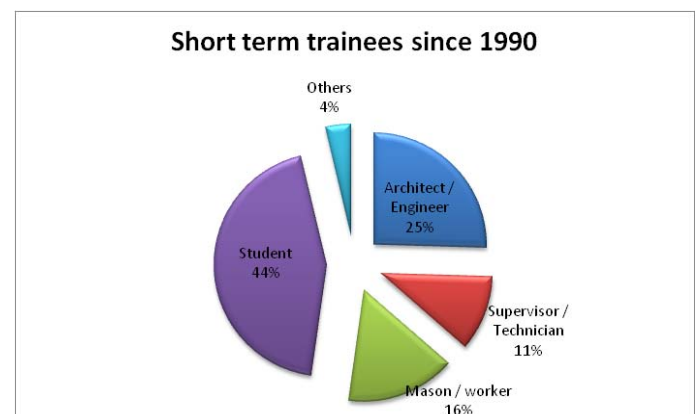
In 2011, AVEI trained 883 persons.

In addition to the training courses, AVEI welcomes interns throughout the year. They are considered long term trainees if they work at the institute more than 10 weeks.



Our training courses are open to all people wishing to learn about earth architecture.

In Auroville, most of the short term trainees are students but since 1990, 27% of the people trained were masons, workers, technicians and supervisors.



## They are talking about us

### *Center for Science and Environment*

The Center for Science and Environment (CSE) is a public interest research and advocacy organization based in New Delhi. In their effort to list green buildings, they featured 2 of the Auroville Earth Institute's projects: Vikas and Realization communities.

To read more: <http://csein-dia.org/content/green-building-projects>

### *Inspired to be Green*

Inspired to be green aims to connect stakeholders of India's green building industry. They publish a magazine to share information on innovations and new products with builders, architects, consultants.

In their 11th issue, they published an article on CSEB title "E'Blocks, a green building material".

To read more: <http://www.inspiredgreen.in/volume11.html>

## Conference in Hyderabad

On December 19<sup>th</sup>, the National Institute for Rural Development, Hyderabad, (NIRD) hosted a one day national workshop on "Indira Awaas Yojana (IAY) for Project Directors of DRDAS". IAY is a Government of India social welfare programme to provide housing for the rural poor in India. The workshop aimed at bringing together all the key players in the execution of IAY, sharing success stories and discussing alternative technology available to achieve the targets of IAY.

The workshop was chaired by Dr. MV Rao, Director General, NIRD with a keynote address from Shri. Sanjay Kumar Rakesh, Joint Secretary (RH) of the Ministry of Rural Development (MoRD). Among those attending the workshop were Project Directors of DRDA of various states of India, Center of Science for Villages, Wadha, (CSV), Indian Institute of Technology, Delhi (IIT) and Auroville Earth Institute (AVEI).

AVEI was invited to present the low cost and sustainable technologies developed at the institute and look into possible collaboration with MoRD for the implementation of IAY. We explained the Auram Press 3000 and the earth block production along with techniques for making arches, vaults and domes. Ferrocement elements and composite building elements were also presented

and the audience was impressed by the strength of the blocks and the beauty of vaults and domes.

CSV presented the guna tile technique of making vaults along with a low cost method for filtering water and waterless sanitation. Prof. V.V. Chariyar and Jyoti Kumar, IIT, Delhi presented a proposal to collaborate and prepare a database of alternative low cost resources and make the training and information easily available to all key players.

## Training course in Grenoble, France

Satprem is presently in France conducting a course on arches, vaults and domes at the Grenoble School of Architecture (ENSAG). This 10 day workshop is a condensed version of two training courses taught in Auroville. This course is organized by the Laboratory CRATerre which is a department of ENSAG, conducted for post-graduate students in the "DSA Terre" program, who are working towards specialized postgraduate diplomas in earthen architecture.

This course is supposed to get accreditation for the training courses given in Auroville. After Satprem successfully completes this training workshop in Grenoble, CRATerre, as authorized by the French government, will grant Auroville Earth Institute accreditation for its curriculum in Auroville.

## Meet our new volunteers!

The Earth Institute welcomes volunteers all through the year. Coming from all over the world, they make our team creative, diverse and dynamic.

Meet Angelica, Sadique and Richard!

### *Angelica*

Angelica is an architecture student from *Pontificia Universidad Javeriana* in Bogota, Colombia, completing her final year with a 6 month internship in the office.

After a three week college project in a rural area of Colombia where she built composting toilets, Angelica became increasingly interested in sustainable architecture. She came to know about the institute through a teacher and architects who traveled to India.

While in the office, Angelica will be working on our next construction project, Green Casbah. When working on a new project, she enjoys in-depth research before starting designing and reads and writes a lot.

One of her favorite architects is the Columbian Rogelio Salmona who extensively worked with red brick and used natural shapes like spiral and curves in his designs. Angelica also likes the work of Spanish architect Santiago Calatrava whose buildings are

inspired by studies of the human body and the natural world.

During her stay in Auroville, Angelica is looking forward to continue practicing yoga and wishes to travel and explore India.

### *Sadique*

Sadique is a 5<sup>th</sup> year architect student who will be interning with us for 4 months. He studied in Birla Institute of Technology, Mesra, Ranchi.

Sadique has been working on 3D modeling as a part time job and has designed several buildings in India including a housing complex and a shopping complex in Ranchi as well as the main entrance of Rangoli, a housing complex in Orissa. His personal motto is: "I believe in work rather than words".

Sadique decided to come to Auroville because he feels that every building here has its own identity. He enjoys the fact that they are different from all the buildings you find elsewhere.

He will be working in the office on views and details for Green Casbah. Quoting the German architect Ludwig Mies van der Rohe, he says "God is in the details".

Since he joined in December, Sadique has been enjoying the work atmosphere of the institute and finds his co-workers more helpful than in other offices he has worked in.

### *Richard*

"I first came to Auroville during the summer of 1972: it was a hot, dusty, dry, barren environment, sparsely populated with Auroville Pioneers, and as a youth of 23, not in the best of health from three months journeying in India, I was unable to connect at that time and stay.

Thirty eight years elapsed, until in January 2010 I returned to find Auroville transformed: it was now a forested zone, with many small communities, and a vibrant population.

I attended the two-week training class in CSEB, stayed in Auroville for six weeks, and then continued on a tour of India, traveling as far as the Spiti region in Eastern Himachal Pradesh. That following winter I lived in Mexico, where I was able to purchase a used Auram 3000 block press and a few molds. I gave presentations to several groups, and conducted introductory training classes in block production. Today, two groups are making blocks, both in small coastal communities on the Pacific Coast.

I realized however that I had a lot more to learn about CSEB, masonry, and design, and that my skills as a researcher and project manager might be useful to AVEI, so I applied to become an AVEI volunteer. I arrived in November 2011 and plan to work until the end of March 2012. I am working on continuous improvement

in several areas, including the testing laboratory, office and site management, and communications. Additionally, I am active in research projects.

I have had a lifelong interest in sustainable community development, and enjoy living in Auroville and working at AVEI. I plan to return to Mexico in April, to assist my friends there in blockmaking and building with CSEB, and then to spend the summer months in Colorado, USA, and to visit my family. I plan to return in the late summer or early fall of 2012, perhaps still on my tourist visa, but perhaps on an entry visa, in which case I could stay longer than 6-months.

John Lennon is quoted as saying, "Life is what happens when you are busy making other plans." Mahatma Gandhi said, "Be the change you want to see in the world." All I can say now is that every day I awaken and do what I see needs to be done, as fully centered in the heart as possible, relating with openness and kindness. It seems to me that this is enough."

## Job Opportunities

### *Structural Engineer*

We are looking for an experienced structural engineer to review the current body of knowledge in order to determine practicable test methods that can be conducted with limited technical resource availability.

### *Mechanical Engineer*

The institute is currently developing a hydraulic press and is looking for a mechanical engineer to develop the press prototype and finalize it. The engineer would be the coordinator between the workshop Aureka and the institute.

### *R&D - Poured Earth Project*

The aim of the study is to obtain a better knowledge of poured earth techniques for our next construction project. We are looking for a student or graduated engineer with knowledge in different construction materials, in civil or material engineer department.

For more information, please visit our website at: [http://www.earth-auroville.com/job\\_opportunities\\_en.php](http://www.earth-auroville.com/job_opportunities_en.php)

## Training Courses in 2012

### *February*

6<sup>th</sup> to 11<sup>th</sup> - CSEB Production  
13<sup>th</sup> to 18<sup>th</sup> - CSEB Masonry  
20<sup>th</sup> to 25<sup>th</sup> - Ferrocement

### *April*

2<sup>nd</sup> to 7<sup>th</sup> - CSEB Production  
9<sup>th</sup> to 14<sup>th</sup> - CSEB Masonry  
16<sup>th</sup> to 21<sup>st</sup> - Designing with CSEB

### *June*

4<sup>th</sup> to 9<sup>th</sup> - Ferrocement  
11<sup>th</sup> to 16<sup>th</sup> - AVD Theory  
18<sup>th</sup> to 23<sup>rd</sup> - AVD Masonry

### *July*

2<sup>nd</sup> to 7<sup>th</sup> - Designing with CSEB

9<sup>th</sup> to 14<sup>th</sup> - CSEB Intensive  
16<sup>th</sup> to 21<sup>st</sup> - AVD Intensive  
23<sup>rd</sup> to 28<sup>th</sup> - CSEB Intensive

### *September*

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

### *December*

10<sup>th</sup> to 15<sup>th</sup> - AVD Theory  
17<sup>th</sup> to 22<sup>nd</sup> - AVD Masonry

Extra training courses can be organized upon request. In addition to those listed above we also offer training in earthquake resistant construction and applications of ferrocement.

For more details on the content of the training courses, please visit our website.

### **AVEI Newsletter**

Issue 2 - January 2012  
© Auroville Earth Institute

Editor in Chief: Alizée Michau-Bauchard

Auroville Earth Institute  
Auroshilpam  
Auroville 605 101 T.N.  
India

Tel.: +91 (0) 413 - 262 3330  
/ 262 3064  
Fax: +91 (0) 413 - 262 2886

[info@earth-auroville.com](mailto:info@earth-auroville.com)  
[training@earth-auroville.com](mailto:training@earth-auroville.com)