AVEI NEWSLETTER

Students building arches during the December training courses

IN THIS ISSUE

- Auram 4000 & 6000 and Motorized Mixer ..... Page 2
- AVD Manual Revision ..... Page 3
- MIT Students' Visit to the Earth Institute ..... Page 3
- Quarry Dust Substitution Research ..... Page 4
- BACE Expo in Assam ..... Page 4
- AVEI in the Press ..... Page 4
- Marrakesh Exhibition Hall in the Works ..... Page 5
- December Training Courses ..... Page 6
- Meet Our New or Returning Volunteers and Interns ..... Page 6

Auroville Earth Institute
UNESCO CHAIR EARTHEN ARCHITECTURE

UNESCO | UniTwin | CRAterre ENSAG

Learn about the technological advances AVEI is spearheading in block production with the Auram 4000 & 6000, page 2.

Read about Lara's work with AVD manual update, page 3.

Read about the visit of two MIT post-grad students at AVEI, page 3.

Find out about the recent research on the potential of quarry dust for CSEB production, page 4.

Read about Rosie's participation in the BACE Expo and the press response, page 4.

Learn about the 'Main de Fatma' exhibition hall that AVEI is designing, page 5.

Our team is growing! Meet our three new team members, page 6.

View the dates of upcoming courses, page 7.

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

Auram 4000 & 6000 and Motorized Mixer Development Update

Written by Richard Presley

In addition to the Auram 3000 manual press, which has produced CSEB throughout the world for decades, AVEI and partner Aureka (an Auroville design and manufacturing company, http://www.aureka.com/), have recognized the need for higher output machines with a reduced need for unskilled human labor. Blocks for a project will be available much quicker, and thus the demand for skilled masons will increase. With the same size crew as for the Auram 3000, plus a mason training program, the time to realize a project will be dramatically reduced, and at lower overall cost.

Currently under development, the Auram 4000 CSEB press is a semi-automatic machine utilizing a single hydraulic ram, and the same lever principle as the Auram 3000. CSEB compression and ejection is hydraulic, while filling the mold with earth, closing the lid, and initiating the hydraulic operation, is manual. Power for the hydraulic system is either a diesel engine or an electric motor.

Using the Auram 4000, it is possible to achieve the same daily output as the Auram 3000 with half the labor requirement; or, using the same number of workers the daily output can double. This gives site-management flexibility in the allocation of precious human resources during the overall construction process.

The Auram 4000 prototype in action

The Auram 6000 is a fully automatic machine, consisting of three hydraulic rams. Currently the machine is powered by a small Mitsubishi 3-cylinder diesel engine. Presently, during "proof-of-concept" testing, the machine output is over 400 CSEB per hour. We are presently working on refinements to the control system prior to conducting full pilot scale production during the first quarter of 2013.

In conjunction with the Auram 6000 we are developing a motorized mixer. This mixer meters soil, sand, cement, and water at user specified ratios (depending upon soil type), thoroughly mixes them, and delivers the uniform mix to the CSEB press at the required volume to meet the CSEB per hour output requirements. This mixer mixes as a continuous process, instead of a batch process, assuring that the moisture, mixing, and holding time is consistent throughout the manufacturing process.

Funding and design for this initiative was provided by Innotec (www.innotecgroup.com). Innotec's global mission is to be effective stewards of precious resources through the hard work of talented and committed staff, in order to improve the quality of life on Earth. Innotec's work is based on trust, humility, service, the courage to take on risks, to get their hands dirty, to have fun while working hard, to commit their talents, time, and money in the service of positive change, within an organization that is focused on delivering innovative solutions to their clients, and beneficial new products, not on narrow personal ambitions. Innotec is located in Zeeland, Michigan, USA, Arteaga, Mexico, Shanghai, China, and Budapest, Hungary.

The fully automated Auram 6000

AVEI and Aureka are very pleased that Innotec has backed this development project and looks forward to a continued relationship with Innotec. It is a great blessing to discover that throughout the world beneficial changes to organizational structures are occurring. Worldwide company values embracing

→

sustainability, fairness, appropriate technology, and environmental sensitivity are becoming more and more widespread: narrow self-interest, based upon exploitation and greed is being transcended, and we are all very happy to take part and witness this change.

The Auram 6000, in conjunction with the motorized mixer, reduces the amount of physically demanding heavy labor, and also creates a higher demand for more highly skilled workers, as trained masons, reducing the time-burden of sustainable community development and uplifting the wellbeing of those employed. Equally important, the quality of the blocks produced by the Auram 6000 and the new mixer will be consistently high, since the blocks are compressed under higher pressures, and since the continuous mixing process, with automatic metering of the materials, eliminates batch-to-batch variability which can occur during hand batch-mixing.

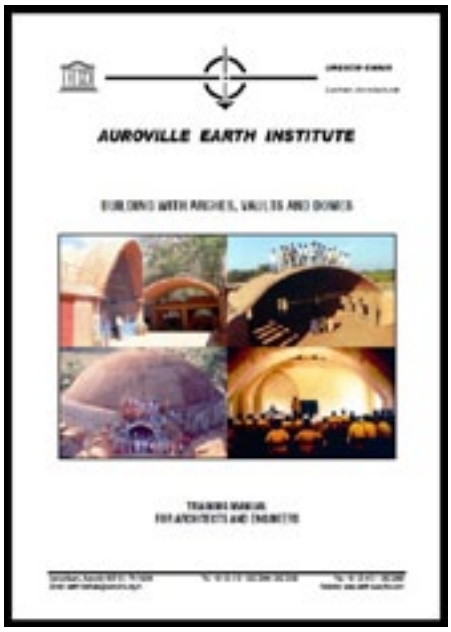
We are in the final stages of "proof of concept" testing for the Auram 6000 and Motorized Mixer. We anticipate a few changes will be made to the prototype machine, followed by additional prototype testing. Our goal is to have these machines available in 2013.

The Auram 4000 has undergone extensive testing, improvements have been made to the initial design, and we also anticipate that this model will also be available in 2013. ■

AVD Manual Revision

Lara Davis has begun an extensive project to update the Earth Institute's AVD manual, "Building with Arches, Vaults and Domes: Training manual for Architects and Engineers".

First published in 2003, this manual has served as the textbook for the Earth Institute's AVD courses, as well as an important resource for individually directed study. While the manual has been regularly updated over the years, this revision represents a significant change to provide a more extensive background on the history and structural principles of masonry systems. In particular, the Earth Institute's design and construction techniques will be better clarified within the framework of the Limit Analysis of masonry outlined by Jacques Heyman.



Cover of the current AVD Manual

Among the changes to be implemented are chapter additions and revisions, improved referencing for critical terminology in structural engineering and construction, and updated drawings, photographs, and formulas. ■

MIT Students' Visit to the Earth Institute

In January, two post-graduate students from the Department of Architecture of Massachussets Institute of Technology under the supervision of Professor Lawrence Sass came for a short visit and training programme at the Earth Institute. Their visit was in the framework of collaboration with Indian corporation Tata to elaborate on the Nano House project, a housing plan funded by Tata to provide rural communities with a sturdy house at the affordable price of 32.000 INR.

After this successful and fruitful visit of two of its students, Prof. Sass's team hopes to team with the Earth Institute in the future to take advantage of the training courses offered and research projects undertaken at the Earth Institute. ■

Quarry Dust Substitution Research

T. Ayyappan and Simon Dereymaeker have begun research in the Earth Institute's new laboratory facilities on the use of quarry dust as a replacement for sand in the composition of CSEB. This alternative could prove to be a viable and more readily-available alternative component for the CSEB mix.

To test how the use of varying levels of quarry dust impacts the quality of the block, they have conducted tests on the bulking ratio, to determine how much more volume must be added to the dry ingredients to get a particular wet volume.

At the end of December 2012, they made a series of samples of both CSEB and PCC blocks that have cured for four weeks. Provided that these did not lose more than 0.5% of their water content, they will next be tested to ascertain their durability and breaking point. This will allow the team to determine whether the samples made with quarry dust are as durable as those made with sand. ■

Samples awaiting testing

BACE Expo in Assam

From November 27 - 28, 2012, Rosie Paul attended the seminar organized in conjunction with the Building Architectural Construction and Engineering Trade Show (BACE Expo) in Guwahati, Assam, representing the Auroville Earth Institute and its expertise in earth construction techniques. She gave a presentation during the seminar about the economic, ecological, and versatile aspects of CSEB as a building material, and its ability to be adapted to many regions and soil types, including areas impacted by seismic activity.

Samples curing

Rosie also emphasized the accessibility of earth as a building material, allowing for unskilled laborers to be quickly trained in its implementation and for individuals and communities to engage in auto-construction.

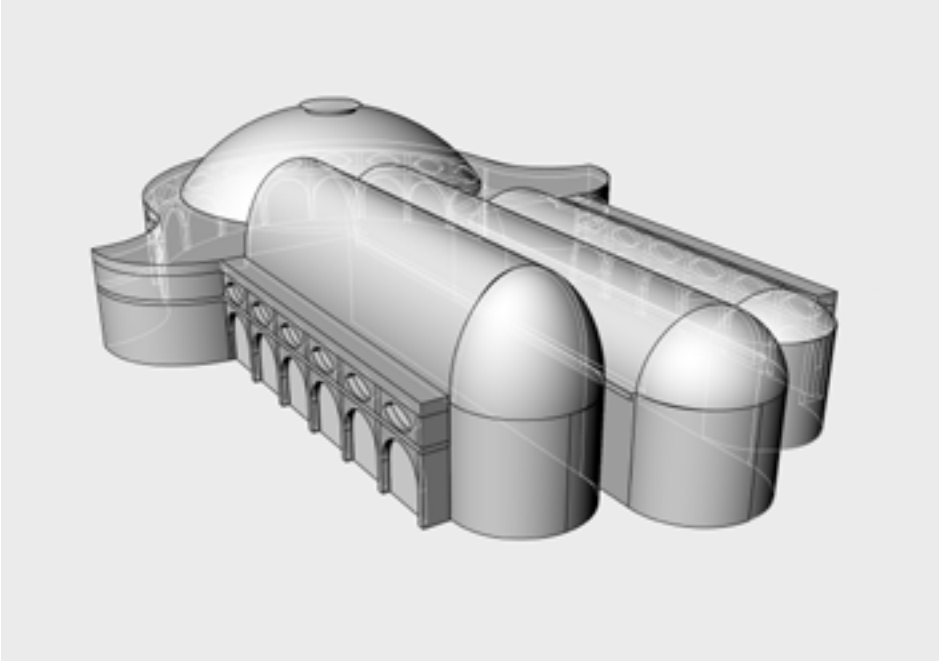
Other presenters at the conference included Gilles Boulicot from the neighboring Centre for Scientific Research who gave a talk on water management in the context of Auroville and Guwahati.

AVEI in the Press

The ***Seven Sister's Post***, an English language newspaper covering the North East region of India and based out of Guwahati attended the BACE Expo and conducted an interview with Rosie Paul following her presentation at the seminar. The resulting article discussed the activities of the Earth Institute, Rosie's presentation and her opinions on the potential of CSEB and the opportunity that it affords.

The text can be found at http://sevensisterspost.com/eco-friendly-and-affordable-designs/ ■

Marrakesh Exhibition Hall in the Works



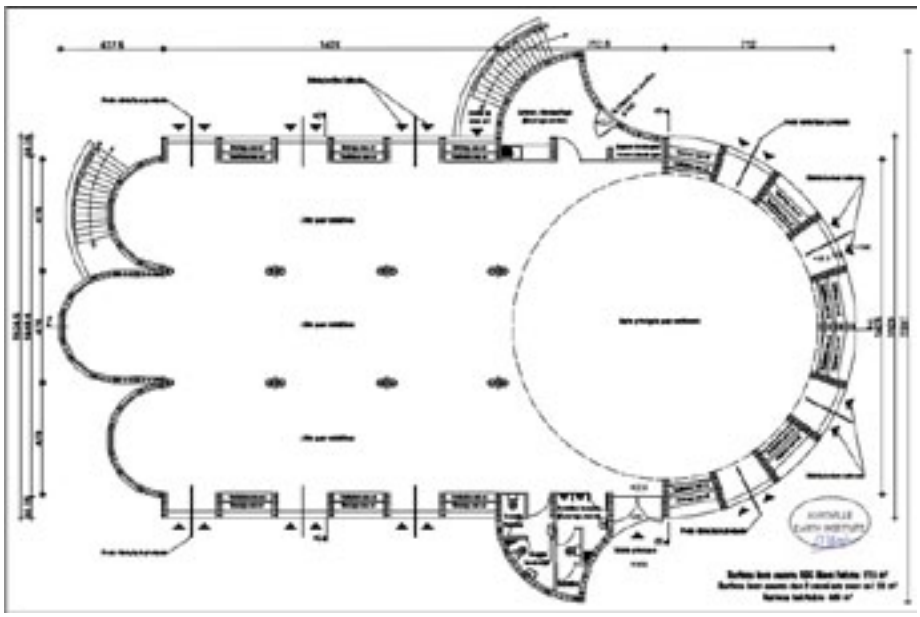
An aerial perspective of the conceived building

In the summer of 2012, Satprem Maïni was approached by members of the IMRP to design an events and exhibition hall on the outskirts of Marrakesh. The goals of this project are to show that earth construction techniques can be used to build structures that are equally elaborate and spectacular as structures built with convention building materials such as concrete, and that they are not more costly to implement than conventional building techniques either. The building design was conceived by Salem Benabdeljalil as a structure in the shape of the "Main de Fatma" (Hand of Fatma), an important symbol of protection from the evil eye in Moroccan culture. The structure would incorporate vaults of varying height so as to allow the shape of the building to be visible from ground level.

In November 2012, Satprem met with the project holders, visited the chosen construction site, and discussed the required local staff, training courses, and planning necessary to construct the building using compressed stabilized earth blocks.

The architecture team is now working on the working drawings for the concept developed by Satprem during his November visit to the site. The building will have 480m^2 of carpet area on the ground floor (comprising exhibition halls and a small conference hall), in addition to a basement of the same area.

Over the spring and summer of 2013, Satprem will conduct special training courses for the production of CSEB, for the masonry of the walls, for its earthquake resistance, and for vaulted structures. He will be evaluating the block production and construction process to assure quality.



Main floor layout

December Training Courses

In December 2012, the Earth Institute offered a one week AVD Theory course and a one week AVD Masonry course, covering the design principles for arches, vaults, and domes and finishing with applied practice during which the students building small domed structures. Forty one students attended, primarily coming from around India, but also including one student from the US, one from Mexico, and two from Belgium. The great majority of the students taking the courses were still in school, taking the courses as a supplement to their studies, but thirteen were already professionals in the field, primarily as architects.

December AVD Class

Meet Our New or Returning Volunteers and Interns!

In December and January, the Earth Institute welcomed three new and returning members to the office.

Richard

Richard Presley has returned to AVEI to continue his role as Sr. Associate for Research & Development. During the period November 2011 through March 2012, Managing the Auram 6000 CSEB Press Research and Development Project was Richard's primary role at AVEI, but he also participated in continuous improvement of the AVEI laboratory, for testing soils, CSEB blocks, and masonry constructions.

During the summer months, Richard retreated to a small remote cabin in southwest Colorado, in La Plata Canyon, at an elevation of 9300' (2835 meters) near the town of Durango, living off the grid, enjoying the Rocky Mountains, and working on a small restoration project: transforming a 100-year old dilapidated bunkhouse into a meditation and yoga space.

Richard also presented an informative CSEB talk at the 2012 International Straw Builder's Conference (ISBC), in Estes Park, Colorado, during September (http://www.strawbaleconference.com/, hosted by the Colorado Straw Bale Association. The ISBC conference presenters and attendees arrived from 17 countries around the globe, to present and attend talks and host workshops. Topics included straw building, earth plasters, CSEB and cob building, natural finishes, sustainable community development, solar power, projects by NGOs in developing nations, etc. It was a very inspiring conference! Copies of the presentations, contact information for the presenters and attendees, plus a wealth of information and useful links can be found in the above site.

Richard was very happy to have been instrumental in securing the donation of a Portable Environmental Testing Laboratory, worth $3k (USD), from Hach Company. The instruments, methods, and reagents in this kit further expand the capability of the AVEI laboratory.

Richard plans to work at AVEI full time this year until mid-May, focused on the completion of the Auram 6000 CSEB block press, the

new Motorized Mixer, and to continue with refinements to the on-site testing laboratory. During the month of March however, Richard will be working to obtain his CELTA certificate, in Chennai, India. Upon successful completion of the CELTA training course, Richard will have the credentials and have developed expertise in teaching English to speakers of other languages.

Indians cannot pursue higher education without mastering English, and presently there is an insufficient number of qualified teachers in rural India. Richard plans to host evening English classes for adults in Auroville, in addition to his service at AVEI when he returns to AVEI in April, until his mid-May departure, and to resume this activity when he next returns.

Shiva

I was always fascinated by the creative process that is involved in the art of creating spaces. After Completing my Thesis I came to Auroville Earth Institute to do my four months internship. Coming from M.S.Ramaiah Institute of Technology, Bangalore all aspects of life and Building technologies are refreshingly new and full of contrast in Auroville.I learned to adapt myself to live here amidst nature. I got to learn the designing, production & masonry of CSEB which was a fun which improved my perspective about Earth Architecture. In Auroville I met many people from different parts of the world and got to know about their country and shared knowledge with them. I finally hope and feel that at the end of it I will have an in-depth knowledge of earth architecture and I will carry back memories which I will cherish.

Tulika

RETURN, was a dream come true for me, after my first trip to Auroville on my college excursion trip in December 2011. But, as the time passed, this dream was somewhere kept aside and some other priorities showed up.

I have done my summer internships with Ar. Hafeez Contractor, Mumbai and Stantec, Burt Hill, Ahmadabad. In terms of exposure it was a great experience, but, something lacked. By the end of my college, I realized that Architecture in India is mostly limited to use of materials like RCC and bricks.

During my thesis in 9th semester I was browsing through net for companies which explore non-conventional materials and found that Auroville tops that list in India.

Auroville Earth Institute gave me this opportunity to go out of league and work on energy efficient and cost effective techniques for building design, at the same time. Working here is so much fun; I never realized that it has already been a month since my joining on 2nd January 2013. I am sure that my internship here will be very fruitful and will teach me the correct way to use these techniques in my designs.

To give back Mother Earth, the beautiful things she gifted us; through our practice of sustainable architecture. ■

Training Course Schedule for Early 2013

February
4th to 9th - CSEB Design
11th to 16th - CSEB Production
18th to 23rd - CSEB Masonry

April
1st to 6th - CSEB Production
8th to 13th - CSEB Masonry

June
3rd to 8th - Ferrocement
10th to 15th - AVD Theory
17th to 22nd - AVD Masonry

July
1st to 6th - CSEB Design

AVEI Newsletter
Issue 8 - January 2013

Editor-in-Chief:
Hilary D. Smith

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

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

www.earth-auroville.com

info@earth-auroville.com
training@earth-auroville.com