

AVEI NEWSLETTER



Work on the arches of the Sri Vast Ashram Entrance Building

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The Monsoon rains have arrived in Auroville, but the Earth Institute is still abuzz with design, research, block production, and construction.

Block production continues to advance on the Earth Institute campus, with loads of CSEB delivered to the Sri Vast Ashram for the construction of the Reception Building.

New connections are being made with universities and associations to further research and dissemination. But the Earth Institute has also paused to recognize the contributions of its founders, and the passing of great contributors to the field of architectural heritage.

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

**Sri Vast Ashram
Reception Building**

In September, the Earth Institute began working on the construction of the reception building for the Sri Vast Ashram, near Auroville. Block production was in full force at the Earth Institute to produce the required CSEB for the building. The Earth Institute team trained workers brought in by the Sri Vast Ashram to operate two Auram Press 3000, and about 40,000 blocks of various types and sizes were produced for the construction walls and domes. Simultaneously, about 25,000 blocks were produced by the Earth Institute team using the combined Auramix 5000 and the Auram Press 4000, which also provided the opportunity to fine-tune our new machinery.

The initial concept sketches for the reception building were designed by the Vastian team, then passed over to Satprem

and the Earth Institute to be fully developed into concept and working drawings. The design includes a large domed passage with an information and reception room to either side. The pointed dome has a span of 6.01 m and a rise of 4.25 m, topped by a lantern for ventilation and lighting purposes. The building is composed primarily of CSEB, with stone arches for the main central

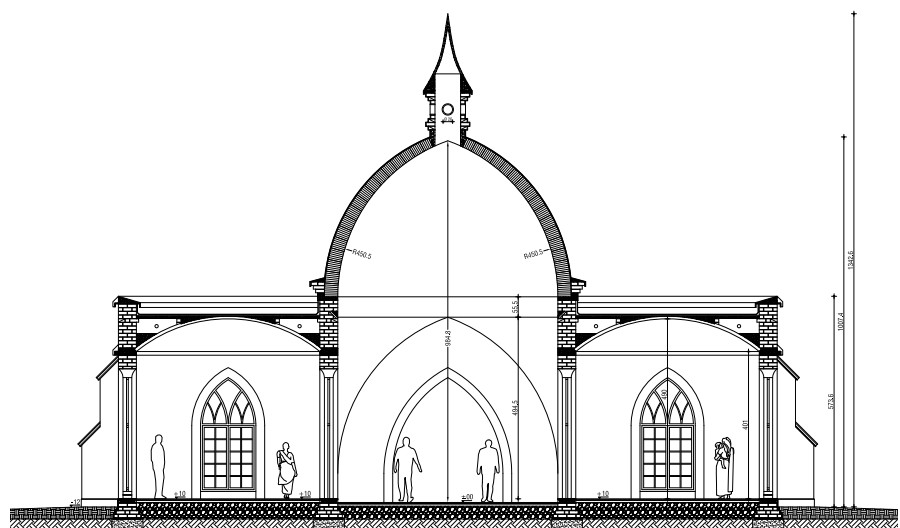
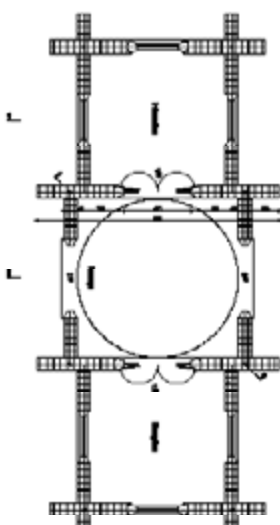
space under the dome. The dome will be covered with ceramic tiles.

Structural calculations of the dome were done by Lara with graphical analysis, using the optimization method developed by AVEI and Wolfe's method.

Construction has been somewhat hindered by the arrival of the monsoon rains, but the site



Laying CSEB over the stone arches of the Reception Building



Floor plan and section of the Sri Vast Ashram entrance building



Grinding the keystones for the arches

has continued to move forward under the leadership of Satprem, Lara, Ayyappan, project architect Isis, and master mason Mani from the Earth Institute team, with the assistance of Caroline, Pasupathy. and skilled masons from the Vastian team, and local stone carvers. The construction has advanced up to the 30th course of masonry on the west side of the building. All of the small pointed arches of CSEB in the two side rooms and the four large pointed arches of stone in the main central space have been built. Single-piece keystones in granite, weighing each approximately 90 kg, have been carved with large grinders and positioned at the top of each completed arch. In the main space, pendentives have been begun, which will loft between the square room and the round drum of the dome to be built in the coming weeks. Next, the race is on to cast the springer beams for the cloister domes to be built over the side rooms. ■

Reaching the Moon with Unfired Bricks

An editorial by Anna Muset

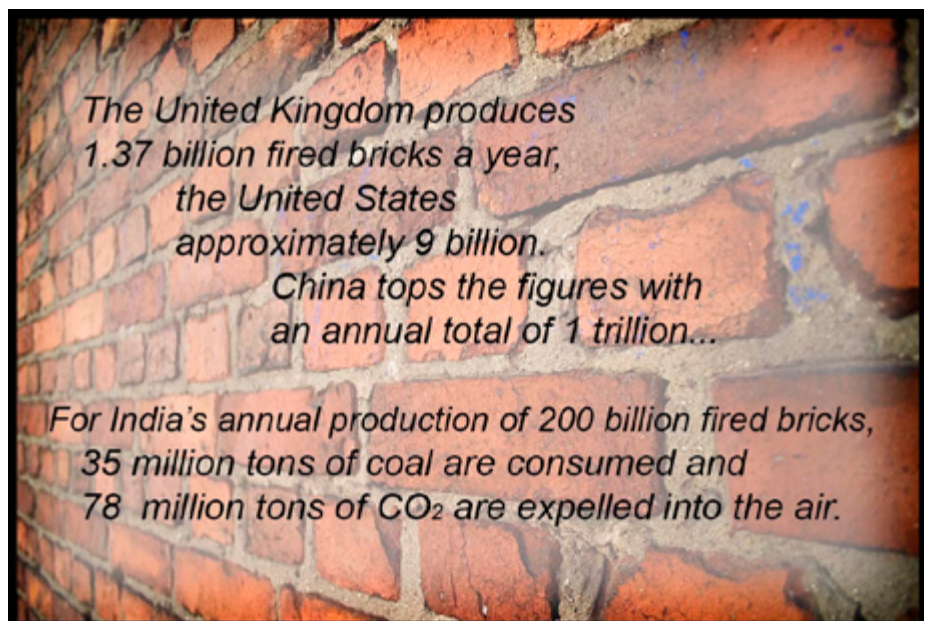
Toward the end of 2013, the United Kingdom's Housing Minister Kris Hopkins spoke about the British brick industry, saying, "Enough bricks will be made in 2013 to go 9 times round the earth (...), and I'm hoping next year we'll make enough to reach the moon."

Unfortunately, the term "brick" has become synonymous with only the kiln-fired clay brick, and its negative environmental impact is hidden behind its ubiquity. The full information is largely absent and confusing.

Fired clay bricks are made using clay, sand, and other additives, then fired in a kiln at a tempera-

ture of 900 to 1100° C . Kilns can be powered with very different types of energy: coal, wood, electrical, gas, and even tire scraps. Some of these energy sources are less polluting and the efficient manufacturing processes adopted in many nations have greatly reduced the embodied energy and emissions given off during production. However the firing process still inevitably produces emissions affecting the health of humans, animals and the environment.

Alternatively, unfired bricks can be produced with a diversity of materials or mixes of earth, cement, vinyl, polymers, paper pulp, fly ash, waste materials, etc. Such materials can be compressed or extruded into bricks, gaining strength and durability through components, cohesive properties, or curing processes. Five percent cement-stabilized CSEB have 12.5 less carbon emissions and 10.7 times less embodied energy →



ied energy than country fired brick in the Pondicherry and Tamil Nadu area.

Both fired and unfired bricks present the same overall characteristics for construction: strength, impermeability, weight, thermal insulation, and acidity resistance.

However, the negative effects of fired clay bricks largely outnumber those of unfired bricks, especially in contexts such as India, where topsoil, the nutritive layer necessary for plant life, is the material used to produce clay fired bricks. Its removal leads to land degradation and a decline in agricultural land. Firing processes using coal contribute to climate change. Alternatively, the more traditional firewood-fed stack kilns contribute to deforestation. The entire production procedure emits dangerous pollutants such as particulates and sulfur dioxide, which contribute to high mortality rates among laborers from cardiopulmonary diseases. Dust deposition and acid on plant leaves can hinder photosynthesis. This is detrimental to regional fauna and can lead to a decline in agricultural yields. Transportation of bricks from centralized manufacturing units to construction sites consumes fuel and emits CO₂.

Many organizations work in the brick sector to improve these conditions. In general, the goals focus on reducing emissions by modifying kiln technology. But despite the efforts of countless NGO's, the majority of Asian, Lat-

in American and African manufacturers still use inefficient kilns, which have a significant environmental impact. And even in North America and Europe, fired clay bricks are produced with thermal, coal, and electrical power, which still emit significant levels of CO₂.

In 2010, I read an article in *Tap Chí Xanh*, a Vietnamese magazine, stating that progress is not complete if we don't also supplement this with the promotion of unfired bricks. That year, the Vietnamese Government issued Decision 567/QĐ-TTg, approving an ambitious program to convert 30-40% of the brick market to unfired bricks by 2020. Vietnam produces approximately 41 billion bricks per year, so this represents a significant change.

On the global scale, studies agree that the world brick sector will increase by 150,000 more brick manufacturing plants every year, in response to demand. For example, in that time India would build 900 million m² of residential projects alone. Fired brick are only an incomplete solution for building requirements, and the long-term consequences from their production cannot be denied. More programs similar to the Vietnamese initiative must be implemented, not just programs to improve kiln efficiency.

So what will it take to reach the moon with **unfired** bricks? First, information and publicity about the advantages must be read-

ily available in order to foster a new mindset that encourages the transformation of the brick industry. Change can come from the consumer, and individuals who are conscientious can make the market evolve through their own choices. Governments and policy-making organization need to come alongside to create incentives and guidelines, with deadlines for implementation. Regulations need to guide manufacturers and encourage conversation about unfired brick. Government-funded projects showcasing unfired brick technologies should be planned to give a tangible example and a standard to emulate. And finally tax cuts and awards programs can give the extra economic incentive to adopt unfired brick technologies for both the manufacturer and the consumer. ■

To read more, we suggest:

Vietnam's legislation
(in translation):
www.chinhphu.vn

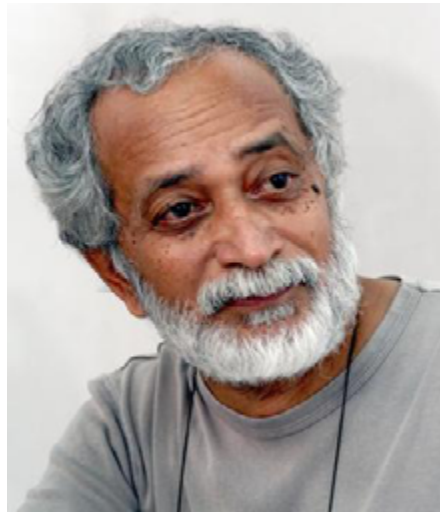
Brick Production in India:
UNEP brick kilns performance assessment.pdf

Carbon WarRoom's Report:
Pathways to Efficiency in the South Asia Brickmaking Industry.pdf

In Remembrance of Ajit Koujalgi

The profession of preservation in India has suffered an irrecoverable loss with the recent death of Ajit Koujalgi. Ajit passed away in October after a tragic accident, leaving an emptiness in our hearts and perhaps in the urban fabric of Pondicherry itself.

As Chief Architect and Co-convenor of INTACH Pondicherry (the Indian National Trust For Art and Cultural Heritage), Ajit worked devotedly to keep its building heritage and traditions alive. Under Ajit's leadership, INTACH has been responsible for the restoration of countless vernacular and colonial heritage buildings in



Pondicherry, many of them built with earth. Stacks upon stacks of "before-and-after" photographs of restored buildings can be found at the INTACH office as testaments to his work, showing historic buildings resurrected from the most advanced stages of decay, histories restored which appeared to have been beyond recovery. Ajit and his team had

faith for and fought for each one of these recoveries, against the current climate of "concrete urban jungle" development in India and the prevalent thinking that historical buildings are outdated or expendable. His work has fundamentally changed the climate of preservation in India, emphasizing a culture of sensitive restoration and a reverence for Indian vernacular building materials and techniques.

For those of us who had the privilege to work with Ajit, his loss is profound. With his mischievous grin and sparkling eyes, his love of his work was contagious to all who worked with him. His tenacious yet benevolent commitment to heritage preservation, his love of vernacular building materials and methods, his enthusiasm for raw earth as a building material went beyond the call of what one would call "work". It was his life calling.

For all of his dedication to keep the spirit of traditional building culture alive, Ajit will live on in the practice of every traditional technique, every earth mortar, lime plaster and "Madras terrace". Ajit deeply touched the soul of Pondicherry. He has become a part of these buildings, just as he has become a fixed link between traditions past and present.

Our love and prayers go to Ajit's family, especially Ratna, his colleagues and friends at INTACH, and all of those who have loved him. ■



Ajit, with Prof. Arun Menon, Prof. C.V.R. Murty, and the Earth Institute team

Tribute to Roland Besenval

The Earth Institute was sad to learn of the passing of French archaeologist Roland Besenval at the end September. Mr. Besenval's contributions to the field of archaeology in the Middle East and Asia have been invaluable to the earthen architecture community, particularly as his work has provided tremendous insight into the history of construction with earthen arches, vaults and domes. Heartfelt condolences to the family, friends, and colleagues of Mr. Besenval. ■

Engineers Without Borders

On October 4th, Satprem was invited as a keynote speaker for the All India Chapter meet of 'Engineers Without Borders – India', held at IIT-Madras, Chennai. Entitled "Earthen Architecture to Empower People", his lecture introduced the work of the Earth Institute and basic principles of sustainable earthen building, further addressing the potential impact of earthen construction for rural India.

The 'All India Meet' is an annual gathering of student and professional member engineers of the organization from all over India. It functions as a forum for knowledge-sharing, to inspire young members about sustain-

able practice to give them an opportunity to publicly present their work initiatives related to engineering and development.

Engineers without Borders-India (EWB-INDIA) is a nonprofit organization run by volunteers both engineering students and working professionals all over India with an aim of implementing innovative engineering solutions to benefit the society.

This follows on a visit to the Earth Institute by Aruna Venkatachalam, Country Coordinator for India, Nepal and Sri Lanka of "Engineers Without Borders Australia". AVEI and EWB hope to establish a collaborative framework for future work. ■



Gandhigram Rural Institute Visit

On October 7th and 8th, Satprem and Lara visited Gandhigram Rural Institute to discuss the possibility of collaborative research. They were invited by Haris Parenagal, Phd research scholar, and advising professor, Dr. A. David Ravindran, at the Dept. of Biology, Gandhigram Rural University. The aim of this collaborative research is to bridge the fields of biochemistry and earthen construction by investigating the effect of termite gut flora on engineered soils used for construction.

Founded in 1956 with the principles of Mahatma Gandhi's 'Nai Talim' educational system and his '18-point Constructive Programme' for rural development, Gandhigram as an institution aims at research which can be developed and applied to meet the needs for rural development in India. ■

"Municipalika" Conference

Satprem was invited to present two lectures at the 12th International conference "Municipalika, Building Vibrant Cities", which was held in Gandhinagar, Gujarat from the 13th to 15th November. The theme of this year was "Emerging trends in Sustainable Habitat and Integrated Cities".

This conference was attended by 1,200 delegates from 7 countries. 140 speakers presented papers on all subjects that cities are challenged with today. Some of the topics addressed were: town planning for sustainable cities, community participation, village urbanisation and integration, decentralised wastewater and solid waste management, renewable energy sources, water and resource management, pedestrian- and cyclist-oriented city traffic, materials and technologies, etc.

Satprem presented first "Compressed Stabilized Earth Blocks to build a Sustainable Future" in



the technologies sessions and then “Earthen Architecture for Affordable Housing and People’s Empowerment”. ■

AVEI Celebrates 25 Years

In late August, the Auroville Earth Institute quietly celebrated its 25th anniversary. And in November, AVEI staff celebrated co-director Ayyappan’s 25th anniversary at the Earth Institute. Satprem and Ayyappan have been working together for 25 years, since shortly after Satprem founded the centre in 1989. Together, they have built the Auroville Earth Institute up from a tiny building centre to a global leader in modern earthen construction technologies. ■

AVEI in the Press

Architectural Review showcased a project built with Auram 3000 CSEB in its June 2014 issue. The Butaro Doctors’ Housing in Rwanda, a set of three houses which won third place in the AR House 2014 competition, was designed and built by MASS Design Group. In 2011, Satprem trained the MASS staff in CSEB production during a technology transfer in Port-au-Prince, Haiti during the construction of the GHESKIO Cholera Treatment Center.

To read the full article, see <http://www.architectural-review.com/buildings/ar-house-2014-third-prize-doctors-housing-in-rwanda-by-mass-design-group/8664475>. article ■

New Team Members

The Earth Institute has welcomed a new employee and two new interns to the team.

Ioan

I wanted to include an internship at the Auroville Earth Institute during my engineering degree but it was not possible in terms of length. After three years at the Ecole des Mines in Nancy (France), my education was ending, academically speaking at least, and I still wished to come to the AVEI as a volunteer. And after a six-month introduction to monsoon precipitation in the north of France (Lille) where I did an internship in façade engineering, I was ready to spend half a year in Auroville.

Indeed, the appropriate approach to architecture from design to building carried out at the AVEI is really attractive. As research and production are also carried out on site, I saw a real opportunity to learn a lot without only sitting in front of a computer. Then, the human values and ideas surrounding the work at the Institute suit me well and lead to a better understanding of the meaning of responsible architecture, the kind of catch phrases sometimes excessively used in our countries.

Finally, in light of the amount of commonly-heard, contradictory



Ayyappan greets His Holiness the Drikung Kyabgön Chetsang Rimpoche during his 25 year celebration

ideas about Auroville in France, I wanted to experience it by myself, building my own point of view while discovering new cultures, peoples and ways of life.

Radhika

“Make it in a way that when I am gone, it itself is just going to melt back into the earth and not going to be a gashed out of forest.”

These words from the documentary ‘First Earth – Uncompromising Ecological Architecture’ by David Sheen, have inspired me to look at life and architecture in a sustainable way.

Auroville has always fascinated me with the experiments in materials and design. After graduating from Sir J.J. College of Architecture my urge towards Vernacular Architecture brought me here. Auroville has been giving me opportunities to face various challenges that make me grow towards my aspirations.

Auroville Earth Institute is one of the best blends for research, design and training. I am looking forward to being a part of conscientious environment.

Lukas

In Austria there is something called compulsory military service, when a guy reaches 18 he has to go to the army for half a year or do voluntary work for 1 year. While searching through my options for my voluntary work I found Auroville and even if I was deemed “unfit” for military service and therefore didn’t have to go, Auroville still spiked my curiosity. Before I came to Auroville I was working as a trainee at Österreichischer Rundfunk, the Austrian national public service broadcaster, after I did my 1 year course in video production at the SAE Institute in Vienna. Since there were no open spots for trainees anymore and since I found that they needed someone for video production, I thought: Perfect. ■

AVEI Training Course Schedule for Early 2015

February

2nd to 7th: CSEB Design
9th to 14th: CSEB Intensive
16th to 21st: AVD Intensive

April

13th to 18th: CSEB Production
20th to 25th: CSEB Masonry

June

1st to 6th: Ferrocement
8th to 13th: AVD Theory
15th to 20th: AVD Masonry

July

6th to 11th: CSEB Design
13th to 18th: CSEB Intensive
20th to 25th: AVD Intensive

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Sieving soil under tarps to protect from the monsoon rains