

Bamboo Application Technology Courses:

- We have started a one year course with an 8 weeks training on “Bamboo Application Technology” in **Distance Education mode** starting from July, 2011 from our Bangalore centre.
- The course is being run by **Center for Green Building Materials and Technology (CGBMT), Bangalore, in collaboration with the Distance Education Cell of Dayalbagh Educational Institute (Deemed University), Dayalbagh, Agra.** (Course affiliation in progress with the University since 2004).
- The Overall Vision of the course is - “Bamboo for Integrated Environment friendly development and generating employment opportunities for the masses”.
- The Distance education programme of Dayalbagh Educational Institute is perfectly suited to the overall vision of our course program as is evident from the following excerpts from their website.



Traditional Systems to Synergetic Structures- *with Bamboo!*

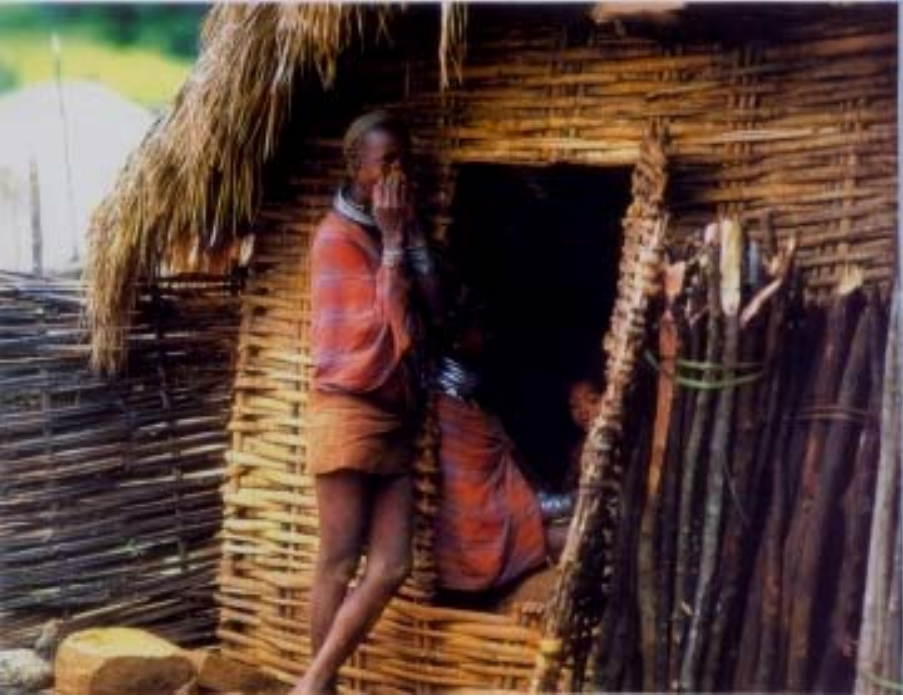
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Once upon a time, million of years ago, in prehistoric times, man discovered a giant grass in the wild forests-Bamboo! It became the ***Kalpavriksha*** for him. He built his house with it , protected it with Bamboo forts, used it as firewood, made weapons, cloths, musical instruments etc and after death was carried and buried with it. He developed a **Bamboo Civilization** with indigenous technologies for various uses, like transportation , handmade paper, water distribution pipes, medicines, housing etc.





Bamboo Civilization



Fast forward to 18th century, the Britishers colonized half of the world. The world went through Industrial Movement and modernization took everything by storm . Machines started being used for everything . Wood processing became easier and replaced Bamboo in many applications. Steel and cement was discovered. Man started using factory produced materials .The usage of Bamboo got reduced. Only poor people used it, since they could not afford the highly processed materials. As a result this ***Kalpavriksha*** got labeled as – **the Poor man's timber**.



Further forward to 21st century. The world is gripped by the fear of Human civilization being wiped out because of Environmental degradation and Global warming. Conferences, seminars, workshops ,rallies across the world are talking about the ill effects of Industrialization and urging the world to '**Return back to Nature**'. And in this call for return, the so called **Poor man's timber is being hailed as the WONDER MATERIAL** by the Global community, especially for the building construction sector – the largest polluter in any country.



Traditional Structures with Bamboo

In many parts of the world, particularly tropical climates where giant bamboos grow as forests, there is a tradition of using bamboos for constructing buildings and other structures such as the bridges, tents, scaffolding etc .

These traditional methods can be particularly informative to the industry in other parts of the world where these products are becoming more dependent on alternative and renewable materials.

The techniques can be used as a guide and our own methods of joinery adapted to suit the use of these materials in our climates.



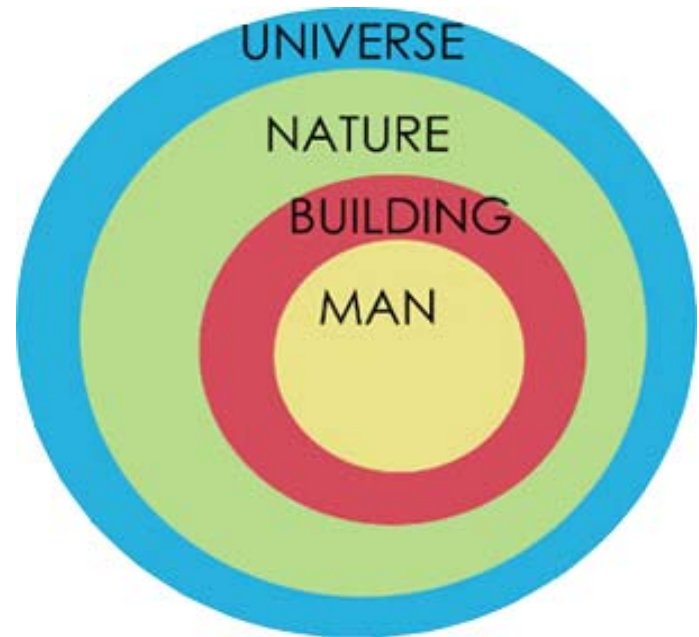
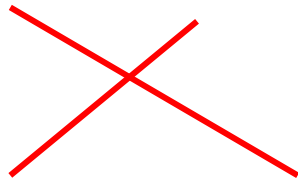
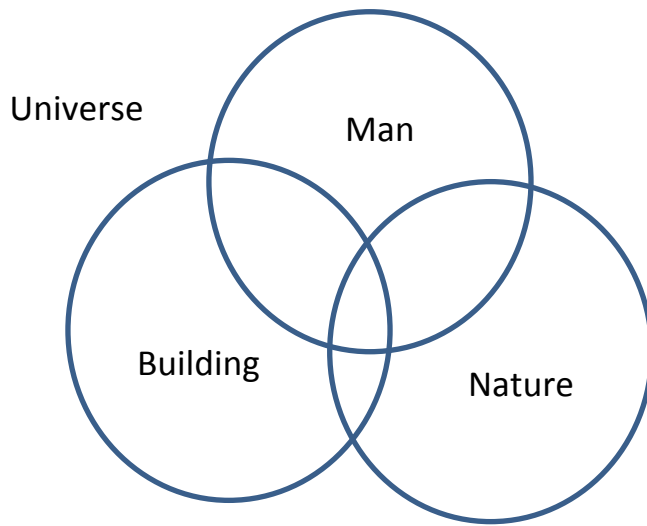


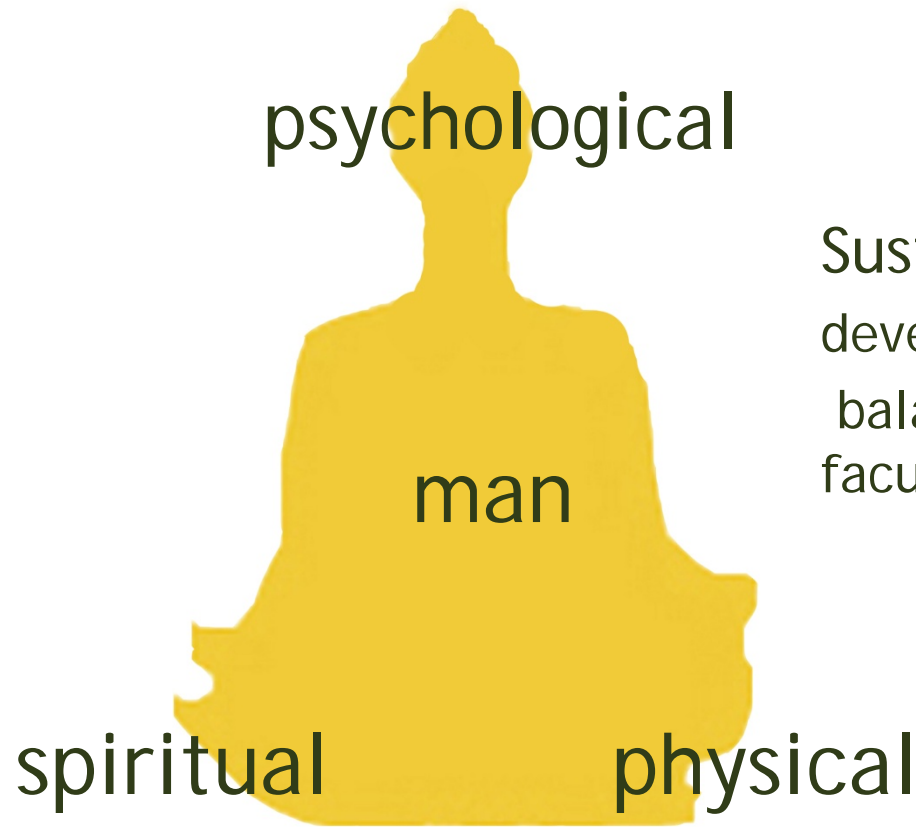
I will be presenting three of my projects which underline the RETURN OF THIS WONDER MATERIAL – BAMBOO as the most modern and fashionable material today which take our traditional technologies to the highest level , namely :

**HOUSE OF FIVE ELEMENTS, Bangalore;
POLICE BHAVAN, Bangalore, and
BAMBOO SYMPHONY, Bangalore .**

Sustainability is the Real Definition of Architecture as per **Vastushastras** , our most ancient treatise on Architecture ! I don't find anything new in there. Only that we have forgotten the true meaning of Culture, Civilization ,Architecture etc . !?

And Nature is reminding us of our true identity, that of its **Caretaker** and not its **Owner**.





Sustainable living is
developing &
balancing the 3
faculties...

Building with PHANCHMAHABHUTAS...
..the five elements of nature..

“I believe that a building is a living entity. It has to have a spirit and it should be felt like a living entity by the occupants ; for ever changing with the seasons, from spring to summer, to rainy season and so on.”

THE DESIGN STATEMENT

*“An architect is a Catalyst providing social and cultural stage sets for all human activities. Hence the magnitude of Responsibility on his/her shoulders is of staggering magnitude ! Hence a mix of **RESPONSIBLE Creativity** and **CREATIVE Responsibility** should determine the **ARCHITECTURAL Character of any Building...**”*

HOUSE OF FIVE ELEMENTS, Bangalore



This house is an improvised example of the traditional Karnataka home “Thotti Mane”, where local traditional building elements, styles and technologies have been used to revive them and add context to the Architecture of the Residence.

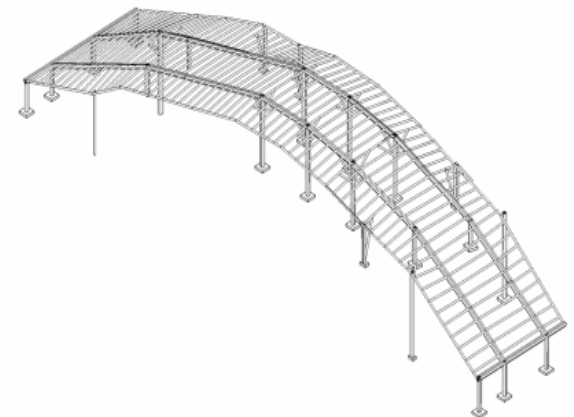
The house has been used for various experiments with natural building materials, low energy materials and Construction technologies etc. The entire construction was done by unskilled workers, with labor trainings given during construction.

In this building Bamboo has been used in combination with other natural building materials like Mud, Stone and the new age material ‘Waste’!

The Bamboo Roof is a 3500 sqft double curve concrete shell roof with a span of 8.5m-10m and length of over 45m, covers the core of the house from east to west

It has been designed as a 2" Ferrocement shell supported on two curved triangular Bamboo beams simply supported on bamboo columns of varying heights following the curve of the roof.

A grid matrix of 1" bamboo splits at 6" centre to centre hold the screed concrete in place. **It is based on the principle of a thin concrete shell roof.**















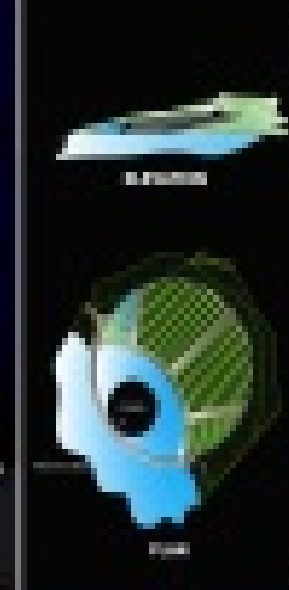
POLICE BHAVAN, Bangalore

This project was a competition project by Karnataka State Reserve Police Dept, Bangalore to create a landmark building for their Golden Jubilee celebrations.

In this project we used Bamboo extensively for various elements of building. All the Roofs except the reception is a double curve shell ferrocete or bamboo Crete roof with BIPV (Building integrated Photo voltaic cells) for bringing in natural light to the interiors. Other than the Roof we have used it for all the structural elements and bamboo railing, furnitures etc. as well.

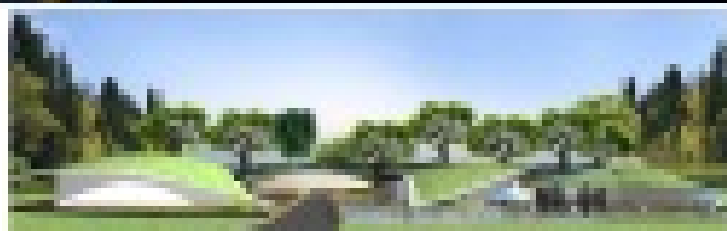
Police Bhavan

Koramangala, Bangalore, Karnataka, India



Complementary

Entrance



Front Elevation



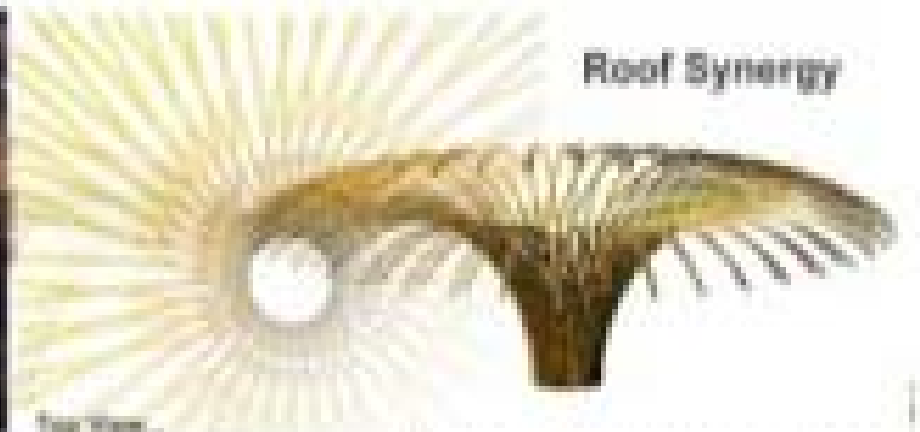
Bird's Eye View



View towards station



North View side



Merging with nature...

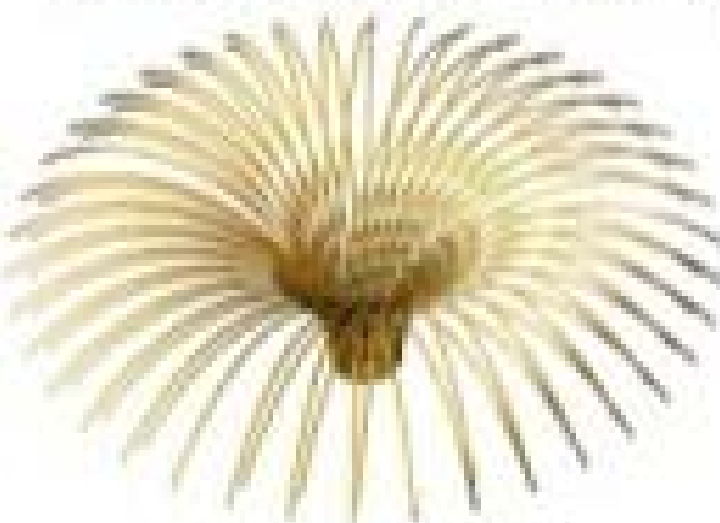


Roof

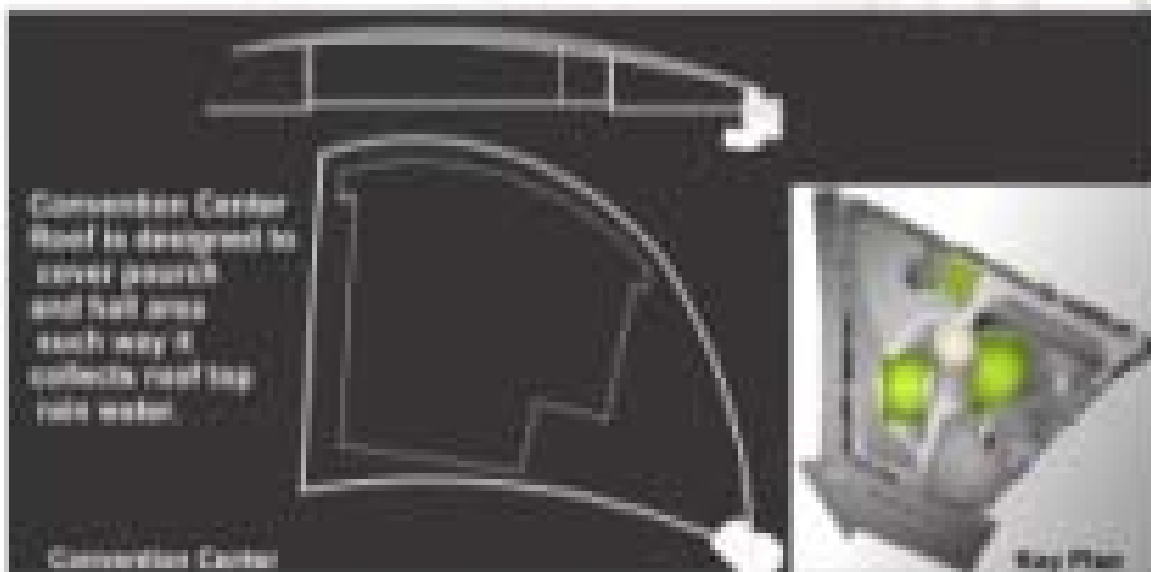


Roof is designed on basic principle of synergy and synergy structure with woven bamboo which supports central dome.

Reception : Synergistic Roof Structure with Woven Bamboo



Center Shaft view.



Conversion Center
Roof is designed to
cover porch
and hall area
such way it
collects roof top
rain water.

Conversion Center



Roof Plan

The project site is a filled up lakebed. We have designed the whole project as a cluster of Islands connected by Bamboo bridges with Modernistic buildings made with Bamboo shell roofs and a large Bamboo dome.

In the process we proposed rejuvenation of the lake with wetland development for water filtration.

The project won a design competition , and has not been constructed.



BAMBOO SYMPHONY- MY Office!

**My office had to represent all my Design Philosophies which
I have been Preaching and Practicing !**



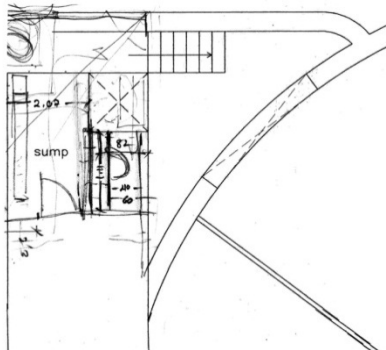
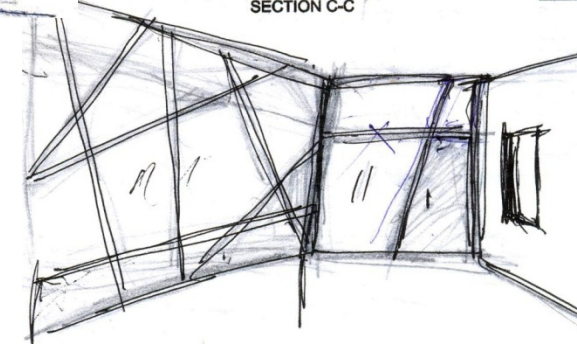
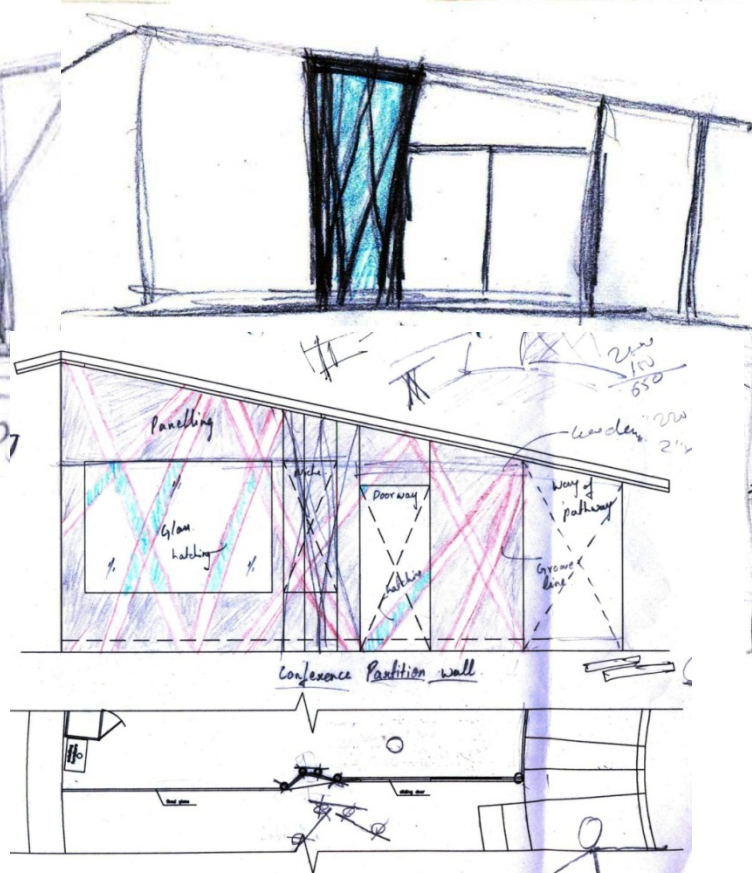
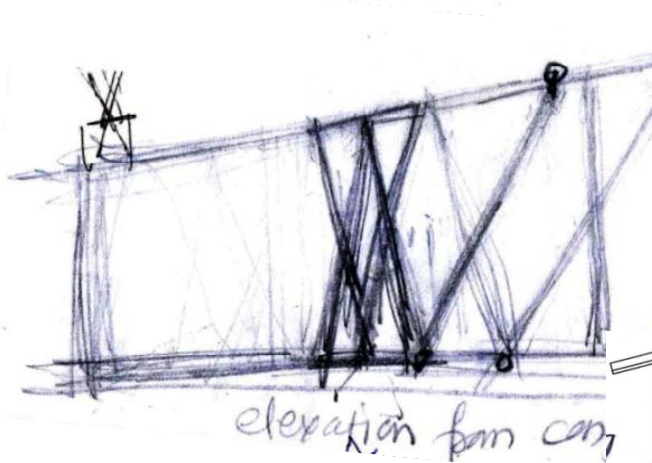
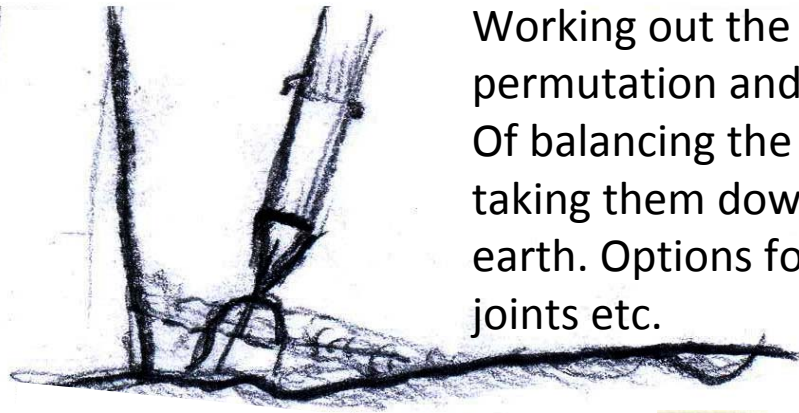
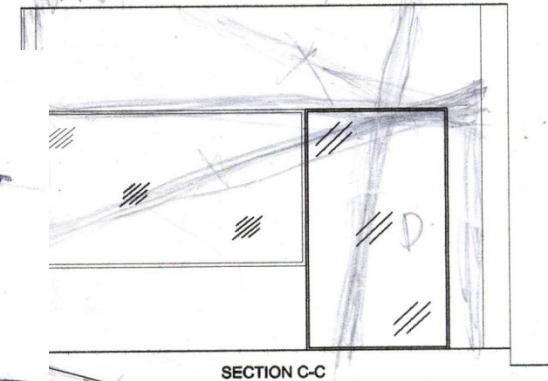
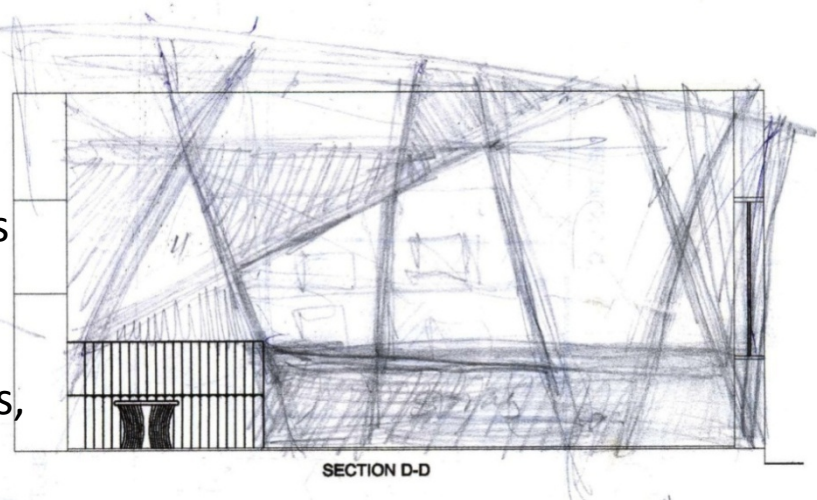
Ancient local wisdom

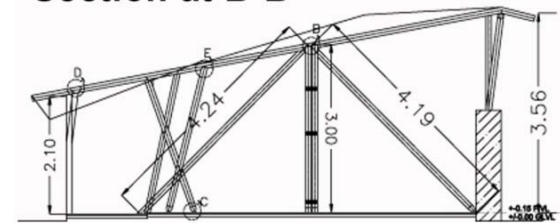
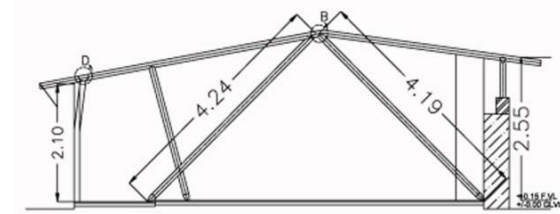
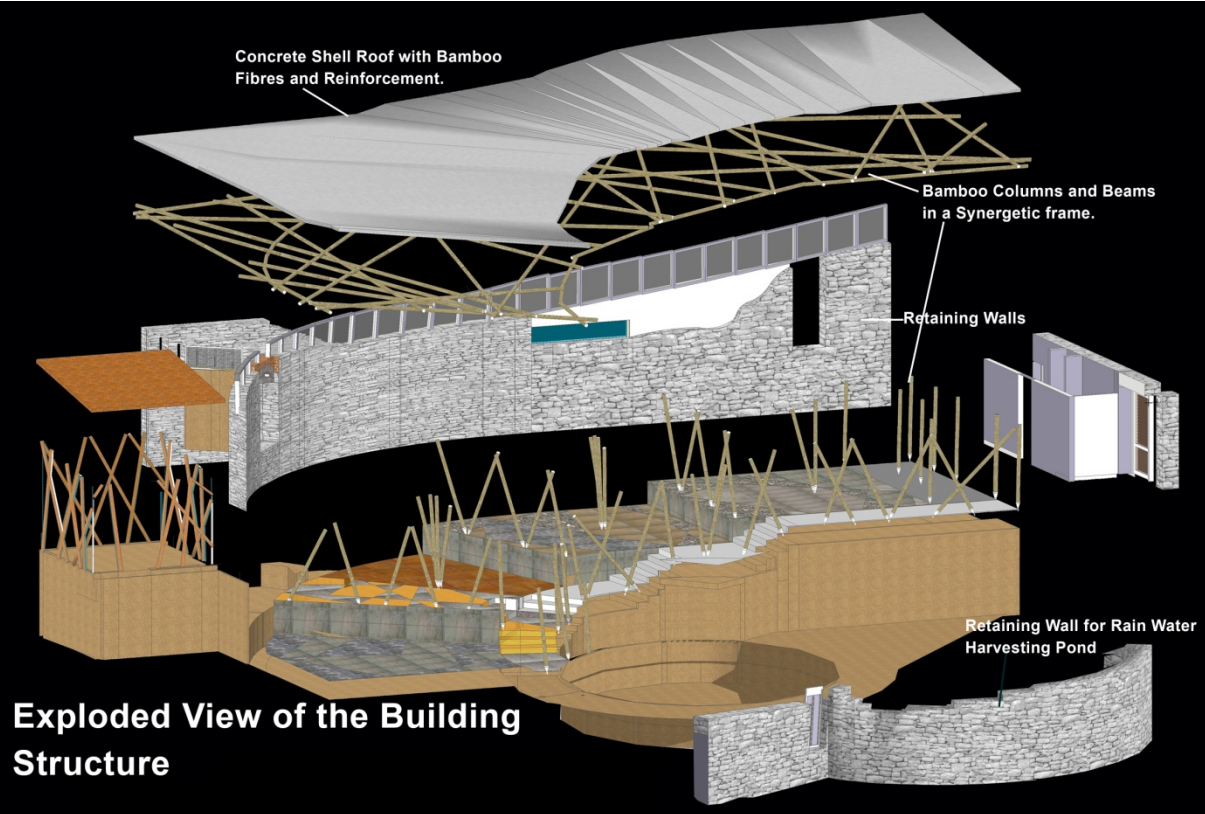
Our traditional fishing Platforms and Bridges are excellent examples of Synergetic structural systems— simple technology, high science

In nature we find several example , like cobweb etc. The reason for their efficiency is homogenous load distribution, which efficiently leads to **global Synchronization**. Interestingly, the tensile strength of spider silk is greater than the same weight of steel and has much greater elasticity , just like Bamboo.

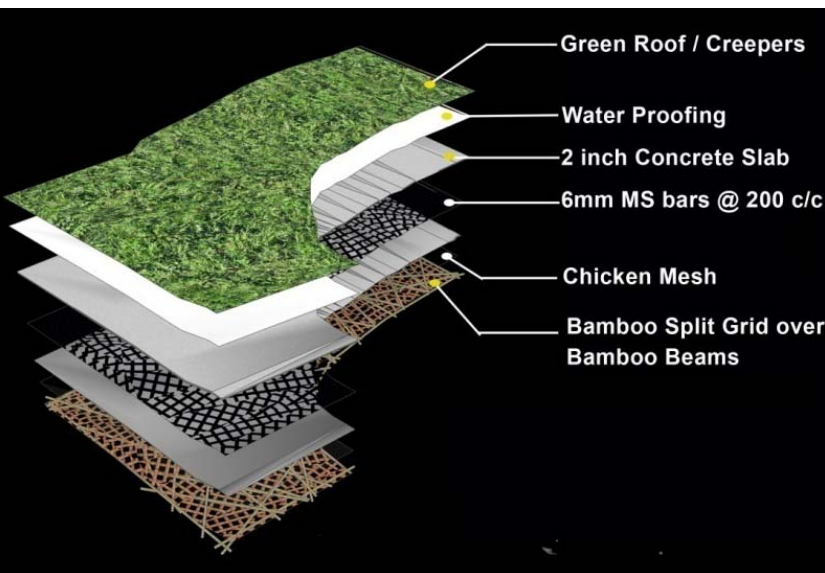
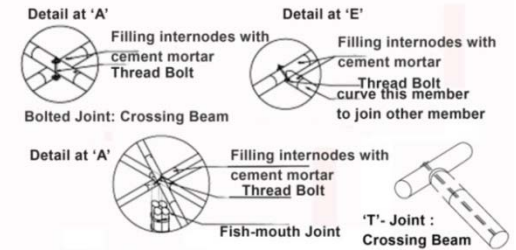
Trying out our ancestor's technology...

Working out the various permutation and combinations Of balancing the forces and taking them down to Mother earth. Options for various walls, joints etc.



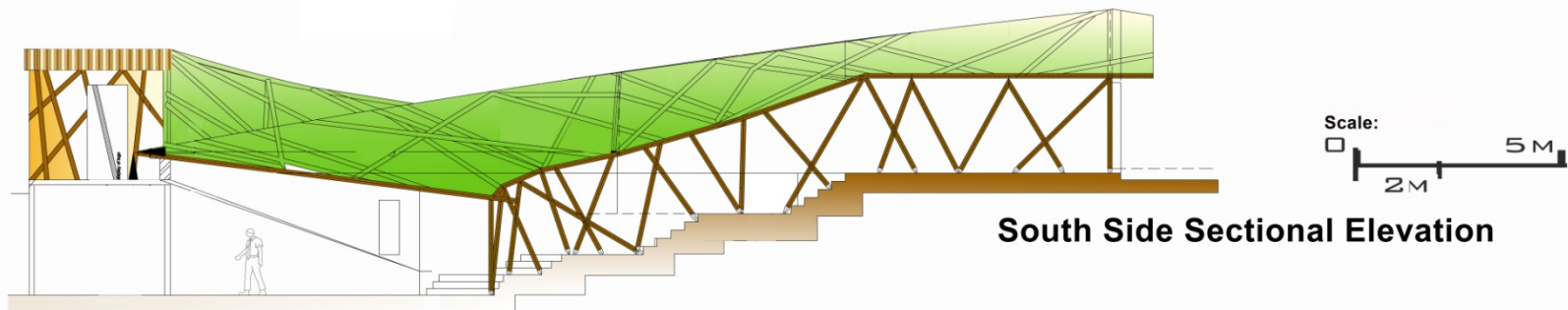
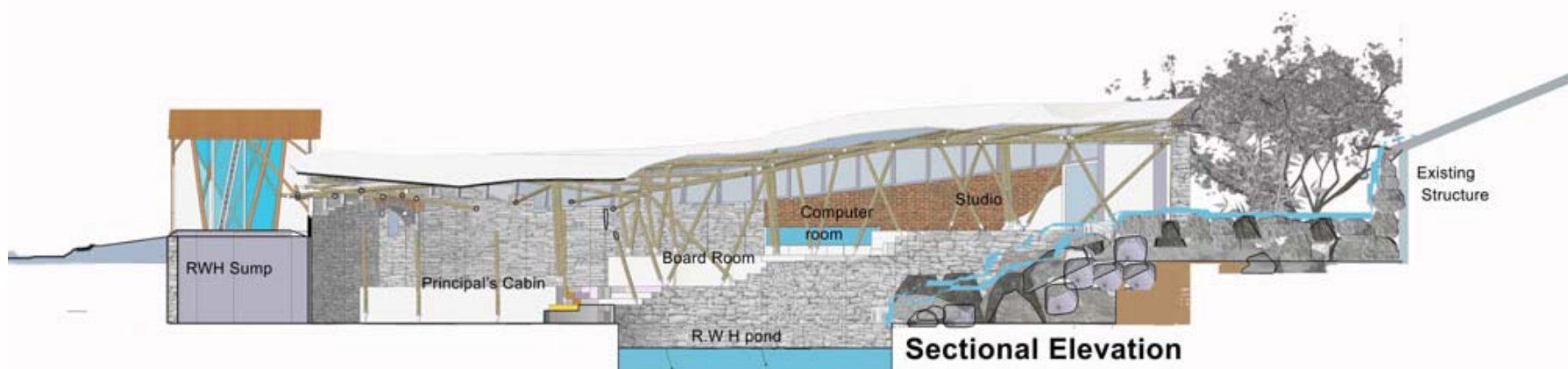


Joinery Details



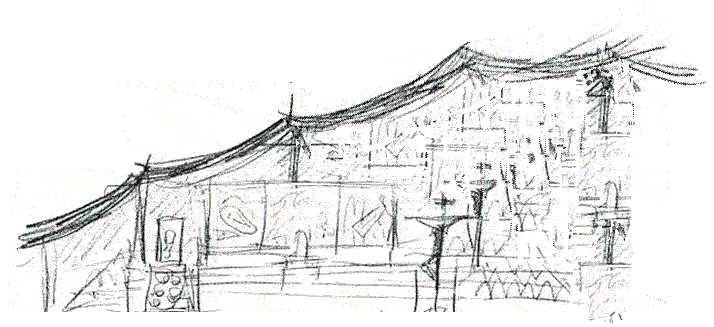
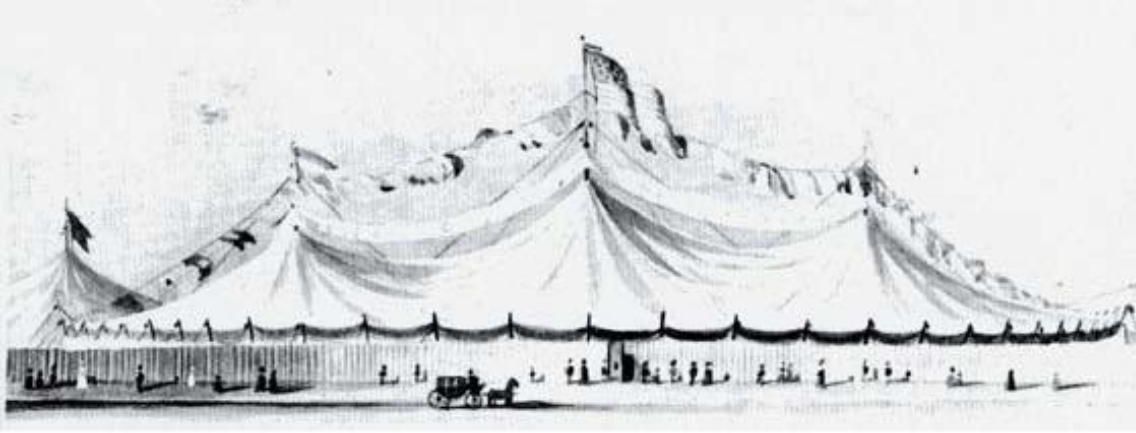
The STRUCTURE of the building is its most unique feature. It is based on the model of SYNERGETIC structures. It was physically tested before concreting the roof. These types of structures are being made across the world with modern materials with high energy balance. Bamboo is the only Natural building material with lowest energy balance that can be used for these structures. The columns in

BAMBOO SYMPHONY THOUGH LOOK HAPHAZARDLY PLACED HAVE DEFINITE POSITION, SIZE AND INCLINATIONS, i.e. are STRUCTURALLY RELEVANT, just like the highly evolved TECHNOLOGICAL LOGIC WE FIND IN NATURE!!!



Finally we are able to get all the stresses balanced out... Hurrah...
Last minute checking in a physical model.

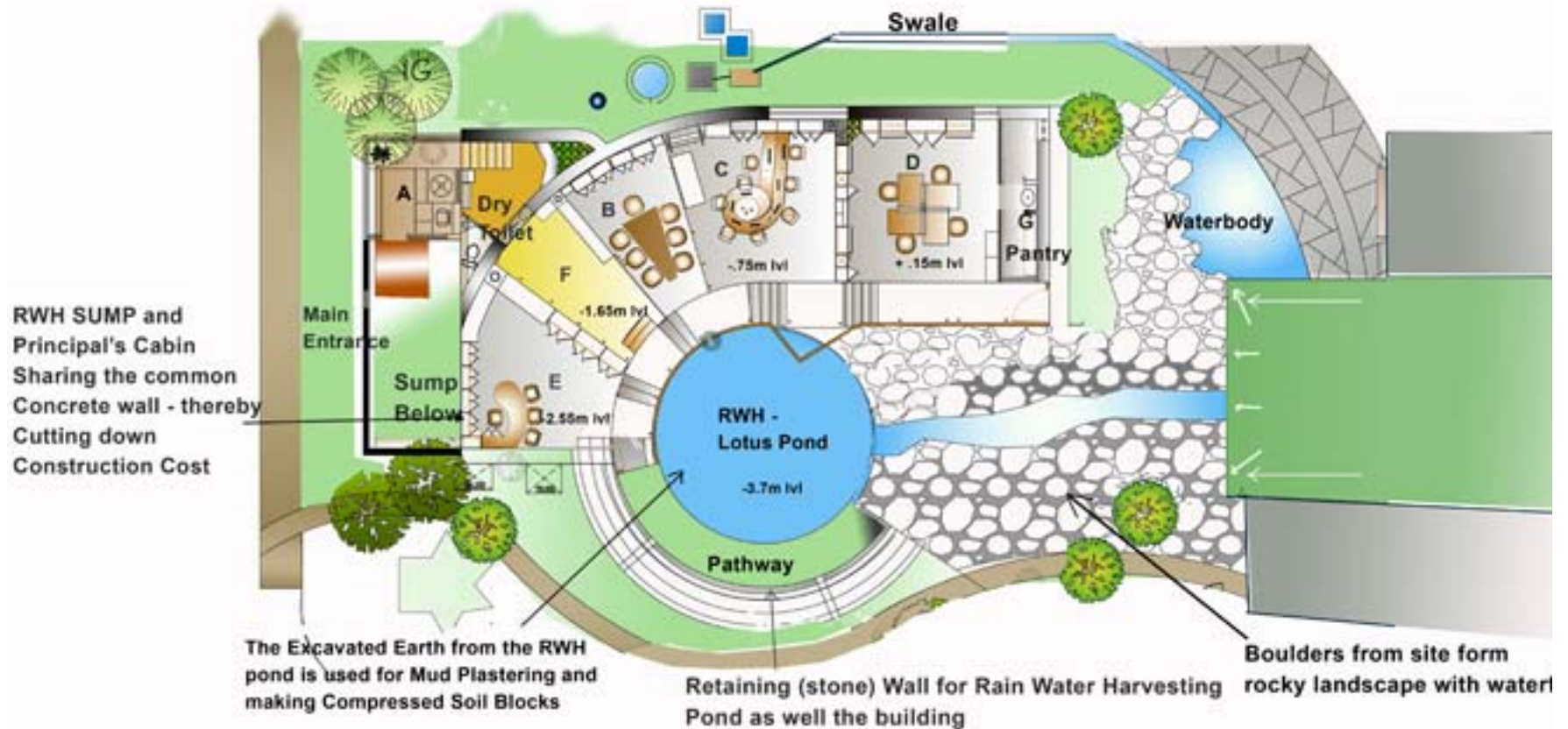




Traditional Tension Structures

The ROOF WAS ALLOWED TO DEFINE ITS OWN SHAPE AS PER THE FLOW OF THE FORCES -- NATURALLY LIKE A FABRIC ASSUMING IT'S SHAPE. **THESE STRUCTURES ARE HIGHLY EFFICIENT WITH MINIMAL MATERIAL USAGE.**





Interior Layout Plan





The 75,000 lts Rain Water Sump

An aerial photograph showing a large-scale construction project in a rural setting. The central feature is a large, rectangular, stone-lined sump or reservoir, partially filled with muddy water. The walls are constructed from rough-hewn stones. To the left, a curved stone wall forms a smaller, circular pond. The surrounding area is a mix of red soil, construction materials, and some vegetation. In the background, there are several small buildings, including one with a corrugated metal roof and another with a white wall. A red tractor and a motorcycle are parked nearby. The overall scene depicts a water management infrastructure project in a developing area.

Level change for demarketing spaces

Rain Water fed Water Garden

Assembling the roof, first with old bamboos for a full scale testing...



Marking the roof lines...

In progress...





Traditional Style testing for the roof by the Workers...

The Final roof assembly starts...





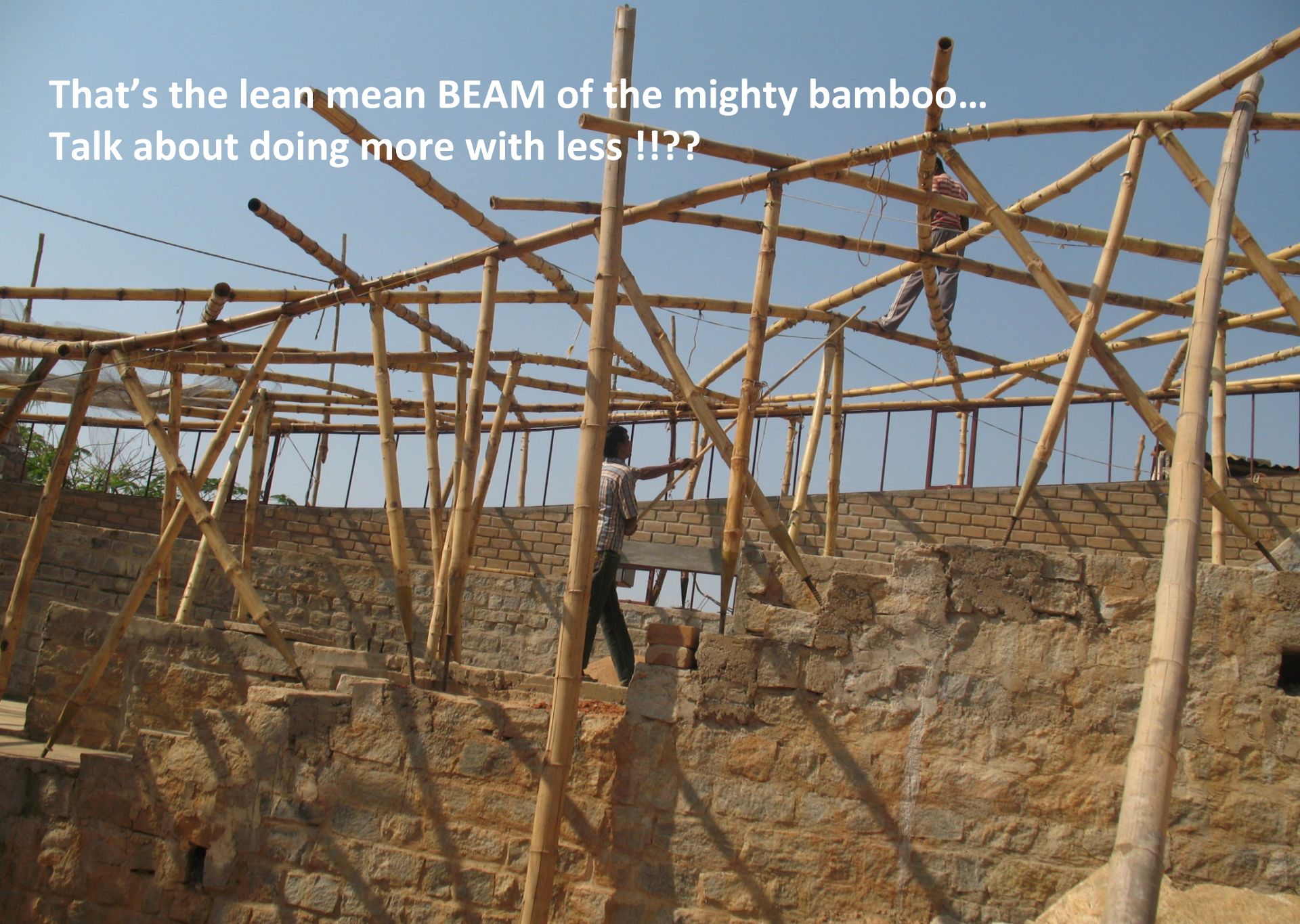
The dancing columns...in Synergy, almost off balance!!



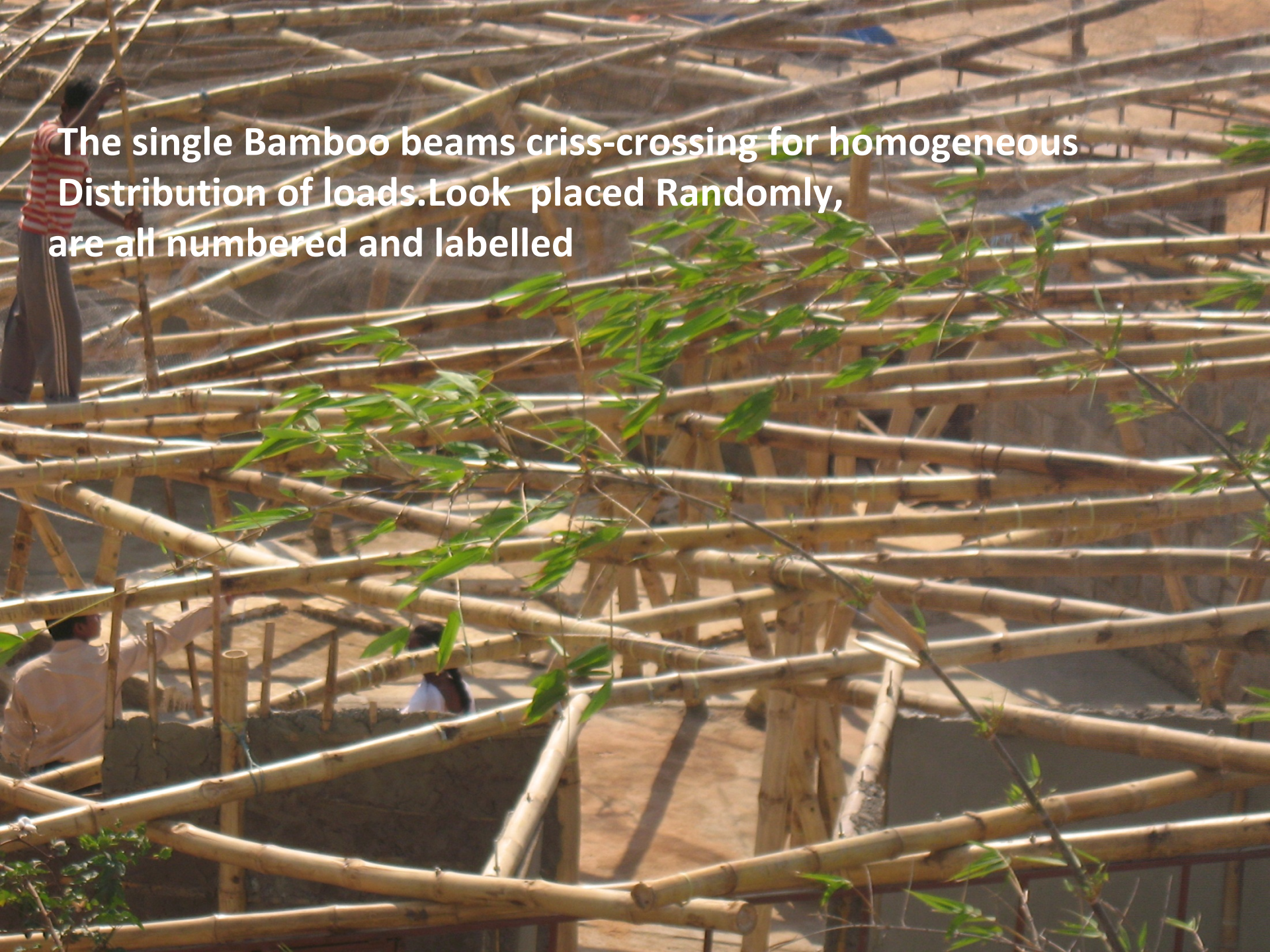


All set to take the loads...

That's the lean mean BEAM of the mighty bamboo...
Talk about doing more with less !!??



The single Bamboo beams criss-crossing for homogeneous
Distribution of loads. Look placed Randomly,
are all numbered and labelled





Bamboo splits for reinforcement, Big risk to take...



thin plastering over Bamboo splits for holding the concrete

Concreting over, time to wait and pray !





Flooring pattern -
Reflection of the Bamboo Beams Overhead
to create a Dynamic three dimensional
feeling in the space.

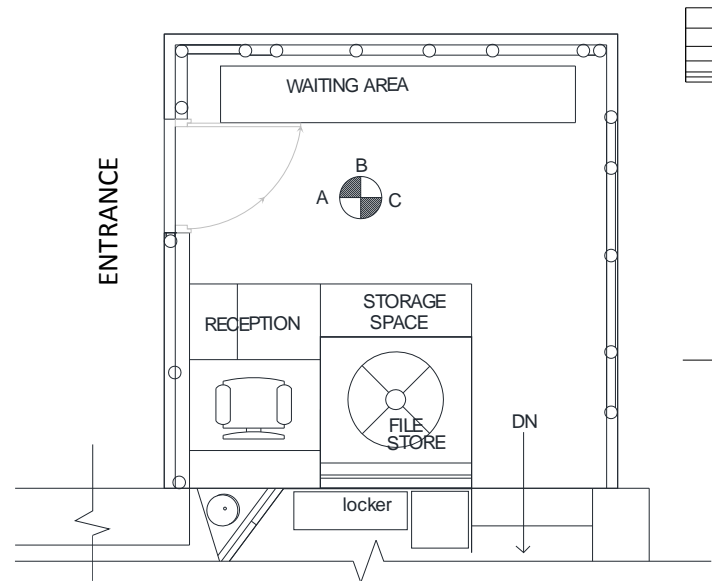
Flooring from my MATERIAL Waste !



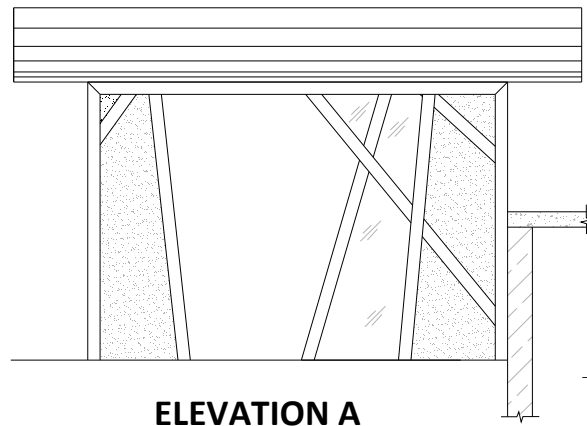
A network of bamboo poles is shown against a light-colored, textured wall. The poles are arranged in a complex, overlapping pattern, some running horizontally and others diagonally. They appear to be part of a structural framework, possibly for a roof or a large container. The bamboo has a natural, slightly weathered appearance with visible nodes. A small, simple red line drawing is visible on the wall to the left of the center. A single light bulb is visible on the right side of the wall.

Behaving all right !
Finishing with Lime wash

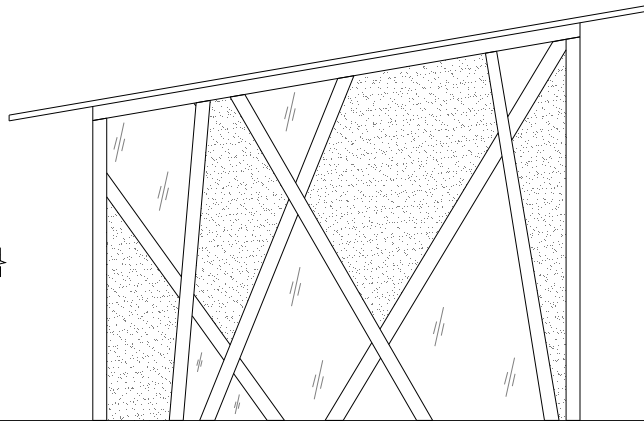
The Entrance... Reception



PLAN



ELEVATION A



ELEVATION B



WESTSIDE VIEW



ENTRANCE



Continuous lines in the Interiors



**HAND CRAFTED
INTERIORS ...**



**... by unskilled
laborers!**



Light pipe is created with sanitary pvc pipes.

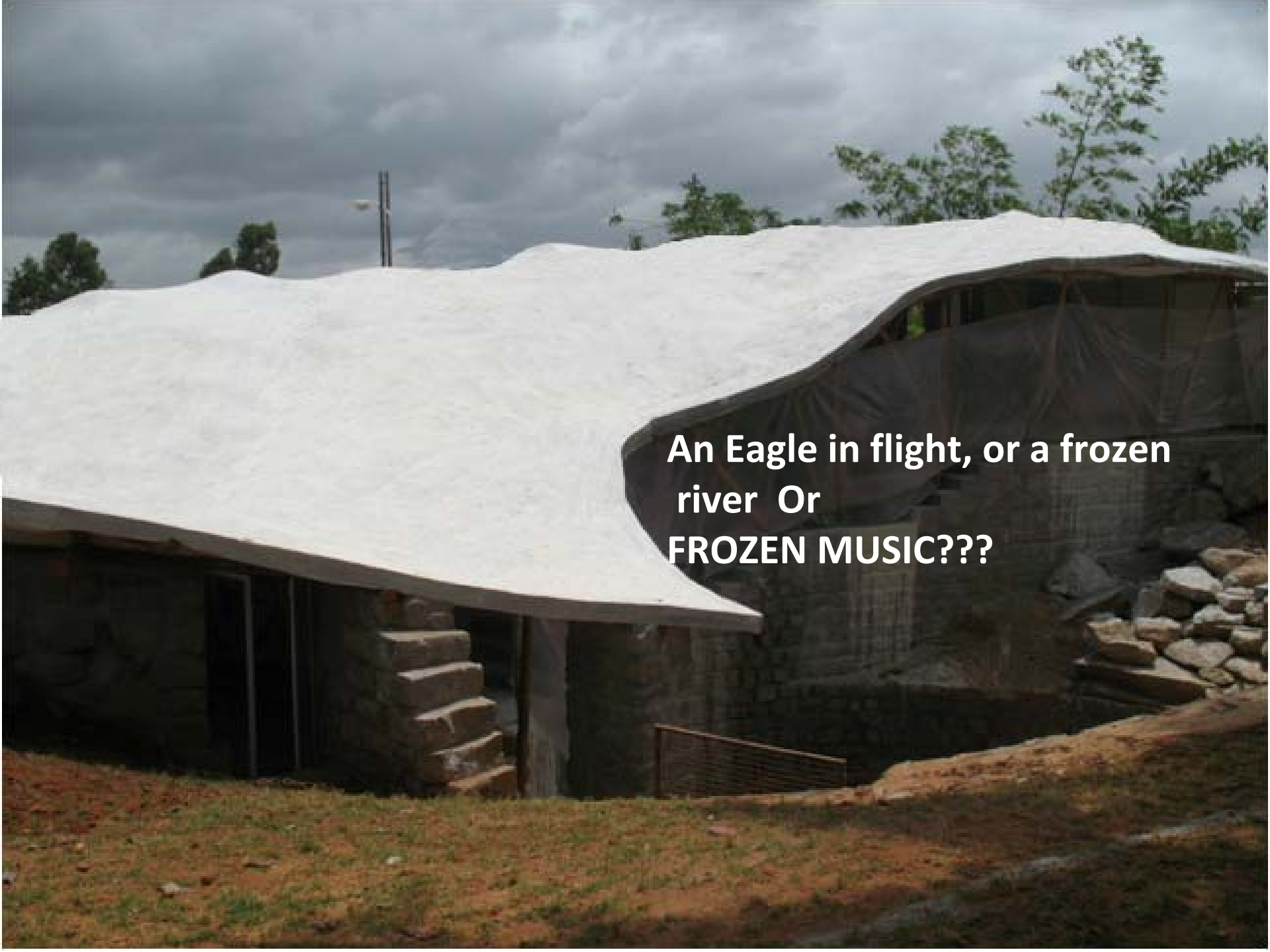


Garden Lamp-post is made with pet-bottles & bamboo



**Variety of grass available on site
which is used for landscaping...**



A photograph of a modern building with a white, undulating roof that resembles a frozen river or a wing in flight. The building has stone walls and a set of stone steps leading to an entrance. The sky is overcast with grey clouds, and there are some trees in the background.

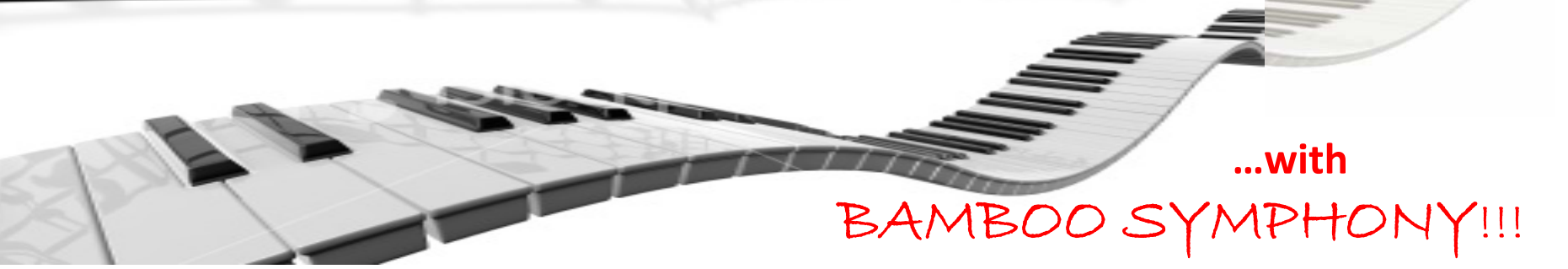
**An Eagle in flight, or a frozen
river Or
FROZEN MUSIC???**



...We are all The Team for Bamboo Symphony



**And now is the time for
Celebration ...**



...with
BAMBOO SYMPHONY!!!







Zero Energy Home
... nourished by

ADITI group presents.

Aditi Greens





























