

**SESSION V – SIGNIFICANCE OF MATERIALS FOR INDOOR
ENVIRONMENTAL QUALITY**

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Why Bamboo

Bamboo is not a tree. it's a grass, and it grows like one.

Many species of bamboo can grow three feet a day.

When it's harvested, it need not be replanted, because it will grow a new shoot from its extensive roots system.

Bamboo renews itself readily, unlike hardwood trees, which once cut, are gone forever.

Bamboo is an endlessly renewable resource.



Why Bamboo

Bamboo is a viable replacement for wood. It is one of the strongest building materials, with a tensile that rivals steel and weight-to-strength ratio surpassing that of graphite.

Bamboo is a critical element in the balance of oxygen and carbon dioxide in the atmosphere. It helps reduce the carbon dioxide gases blamed for global warming.

Some bamboo even sequesters up to 200 tons of carbon dioxide from the air per hectare, which makes it an extremely efficient replenisher of fresh air.



Why Bamboo

It is the fastest growing canopy for the regreening of degraded areas and generates up to 35% more oxygen than equivalent stand of trees

Bamboo is a natural control barrier. Because of its wide spread root system and large canopy, bamboo greatly reduces rain run off, prevents massive soil erosion and keeps twice as much water in the watershed.

Bamboo and its related industries already provide income, food and housing to over 2.2 billion people worldwide.



Material	Energy [MJ/kg]	Carbon [CO2/ kg]	Density [kg/m3]
Aluminum	155	8.24	2700
Stainless Steel	56.7	6.15	7850
Copper	42	2.6	8600
Iron	25	1.91	7870
Steel	20.1	1.37	7800
Plywood	15	1.07	540-700
Timber	10	0.72	480-720
Fiber Board	11	0.72	680-760
Bricks	3	0.24	1700
Cement Mortar (1:3)	11.33	0.208	-
Concrete (1:1.5:3)	11.11	0.159	2400
Concrete Block	10.67	0.073	1450
Aggregate	0.083	0.0048	2240
Bamboo	1.5 ^[3]	0.138 ^[4]	500-1100 ^[5]

Embodied energy and embodied Carbon values of some typical building materials (“Inventory of Carbon and Energy (ICE)” prepared by the University of Bath) :























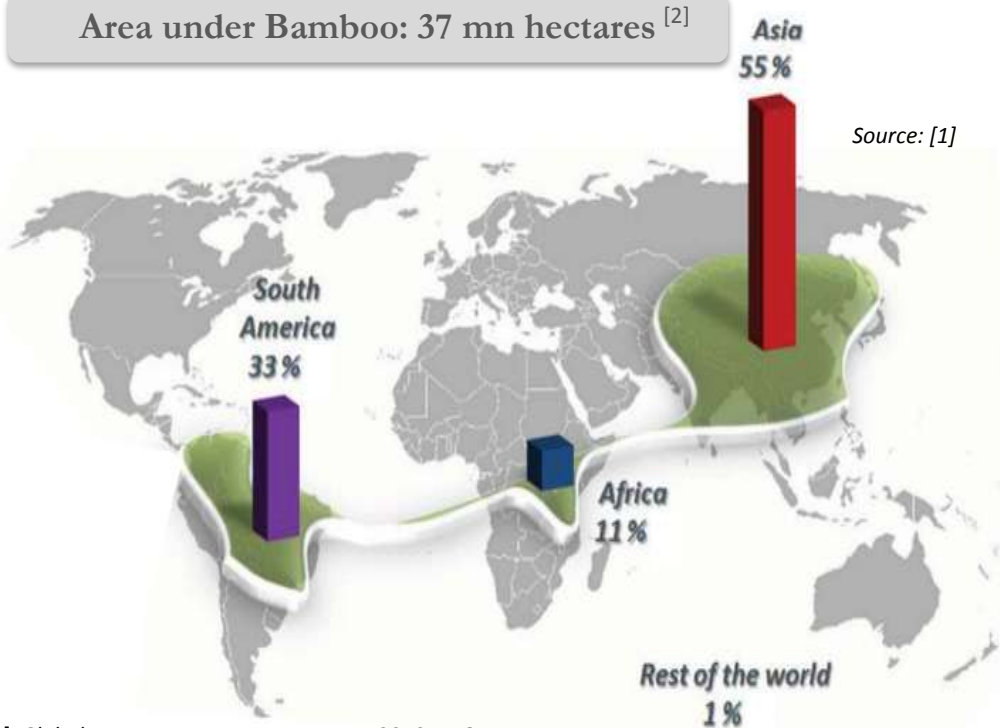
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The Global Bamboo Market is dominated by China. India, endowed with the largest natural bamboo cover, is yet to capitalize on the opportunity

Area under Bamboo: 37 mn hectares ^[2]



International Trade in Bamboo ^[2]



[1]: Global Forest Resources Assessment 2010, FAO

Global Market Size ^[2]
~ \$36 bn

No. 15 globally

India

Market Leader

China

10 mn hectares

Indian area under bamboo – largest in the world

\$4.35 bn

Estimated size of Indian bamboo industry

5.4 mn hectares

Chinese area under bamboo – about half that of India

\$19.5 bn !!

size of Chinese Bamboo industry

[2]: International Trade of Bamboo & Rattan 2012, INBAR



















Jindal's Bamboo structure, Bellary





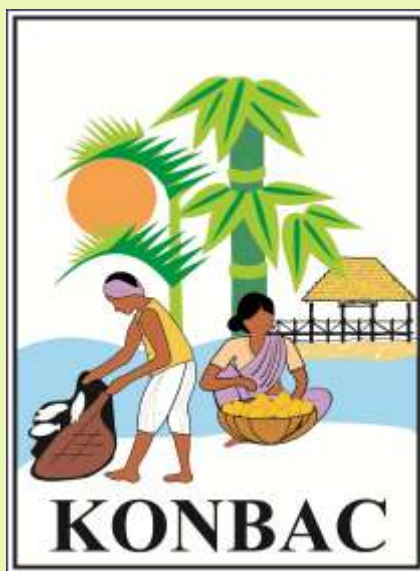


- **International Network for Bamboo & Rattan
(INBAR)**



- **Inter governmental international organisation having 40 member countries, established in 1997 as multi disciplinary network related to development of bamboo & cane.**

Headquarters based in Beijing, China.



Konkan Bamboo & Cane Development Centre (KONBAC)

- A not for profit organization, established in June 2004. Registered under Sect. 25 of Companies Act , setup by CIBART & technically supported by INBAR.

Wild Bamboo in India



Bamboo poles in INDIA



Improvement in quality of raw material



Plantation in Sindhudurg District



Improvement Achieved



Age Grading



Pressure Treatment



Treated and Graded Bamboo



Straightening



Straightening



Primary processing



Bamboo Furniture













Prefabrication of Construction component



Bending



Pre-fabricated components





Seat-out



Seat-out



Gazebo



Hotel Lemon Tree, Goa



Cidade De Goa









Meditation Center, Infosys, Hyderabad







Cottages





Cottage



Cottage





Cottage





**Roof for Farm
house**

Bamboo Boathouse





Boathouse





Boathouse - Interiors





Pavilion, Sesa Goa





Pavilion, Sesa Goa



Interiors & Details



India's largest bamboo structure at Hyderabad







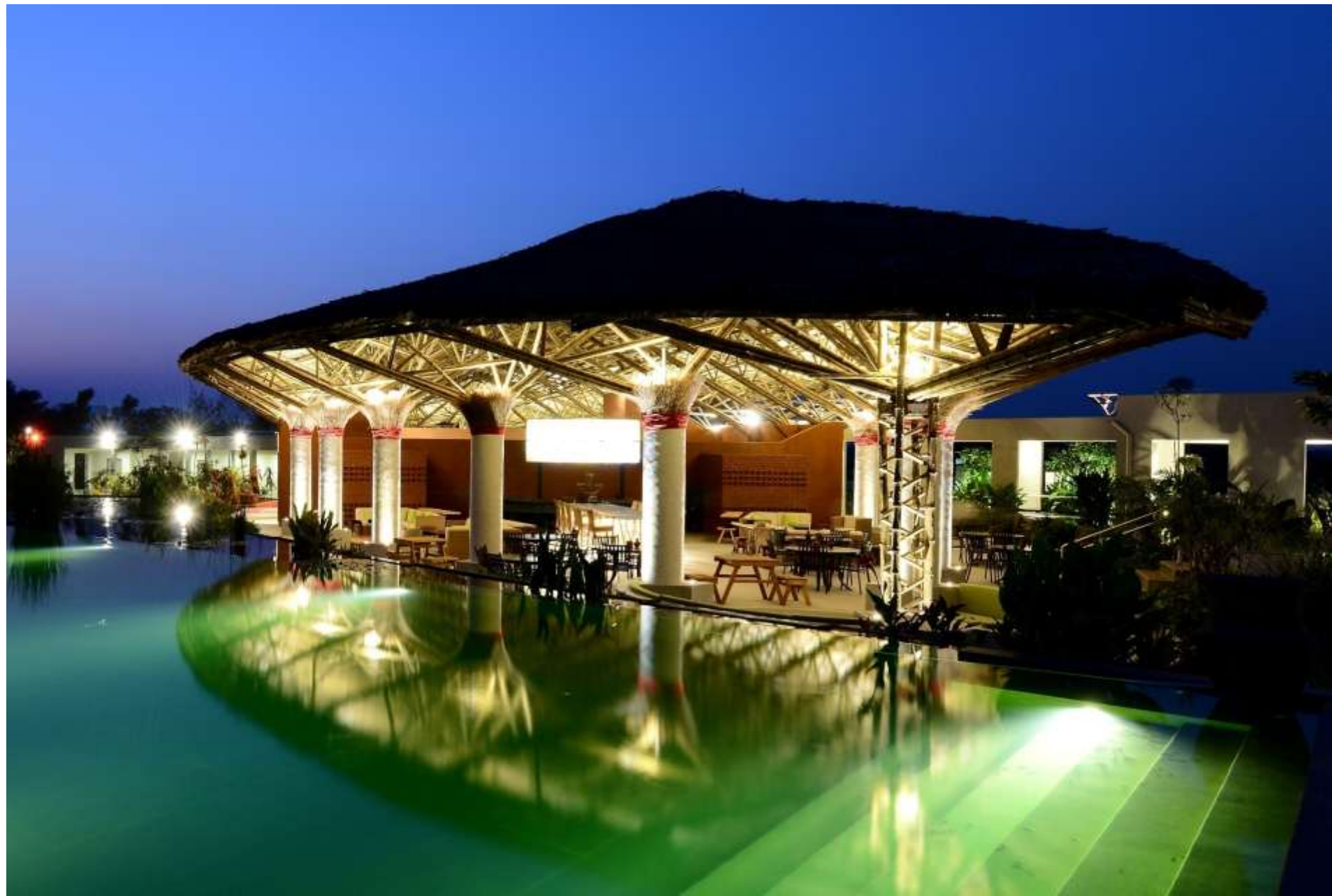












Restaurant building at Itafushi, Maldives







Nature Interpretation Center, Palava







VIEW FROM ENTRANCE POND



VIEW FROM SPILL-OUT GARDEN



MANDAP INTERIOR



WAY TO DINING



BAMBOO DINING AREA



OVERALL AERIAL VIEW

Bamboo strip board

Bamboo to splits



Splits to board



Bamboo Board



















VVIP Guest house for Infosys at Hyderabad

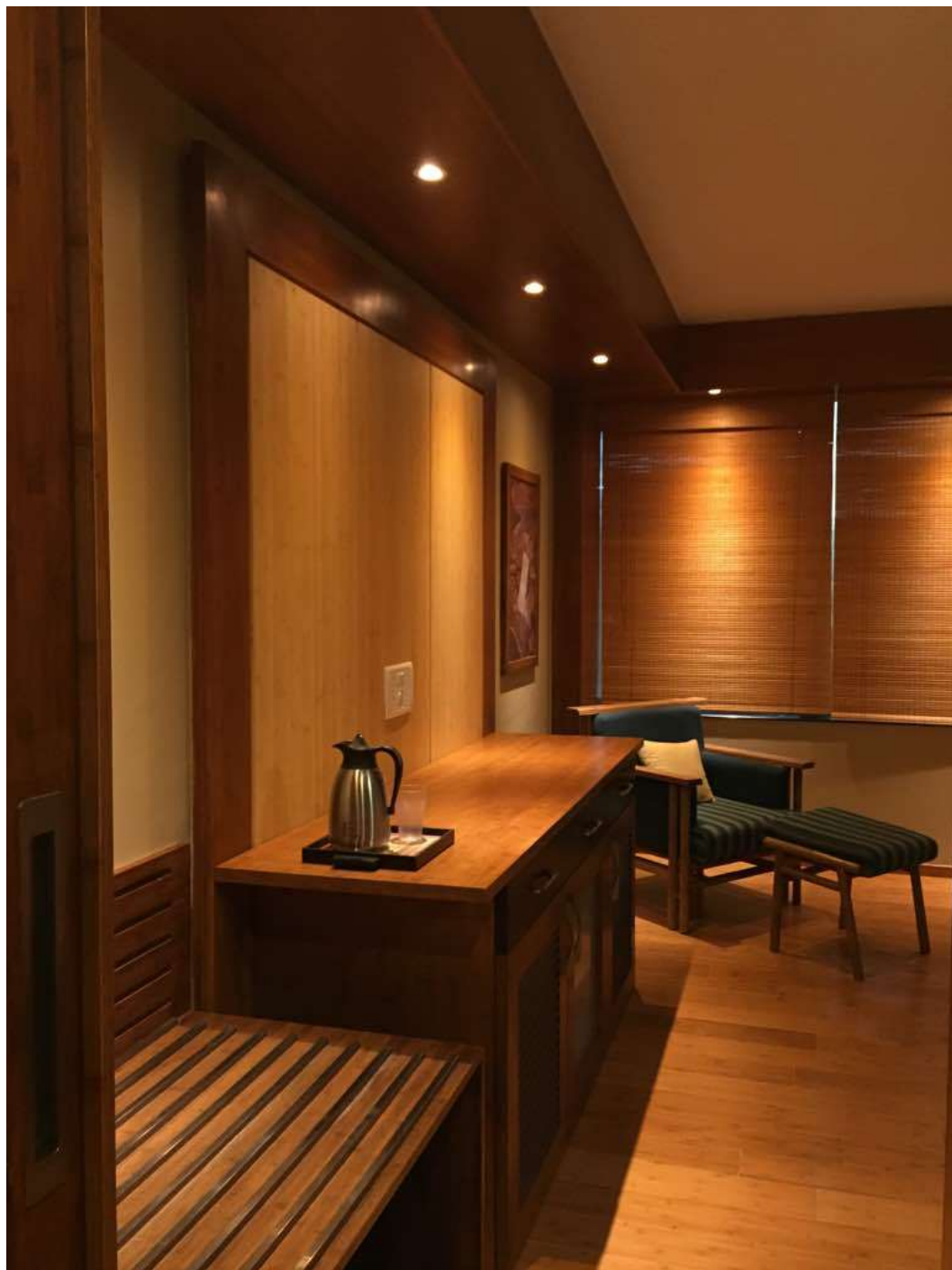















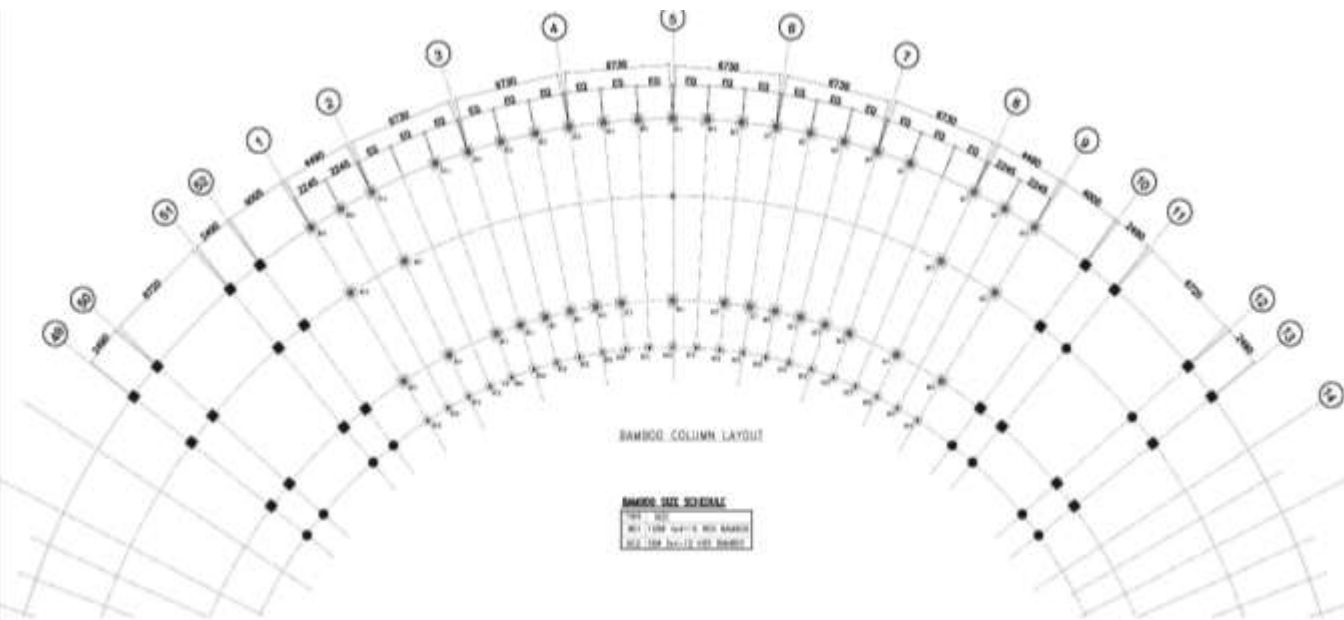


BAMBOO RESEARCH & TRAINING CENTRE

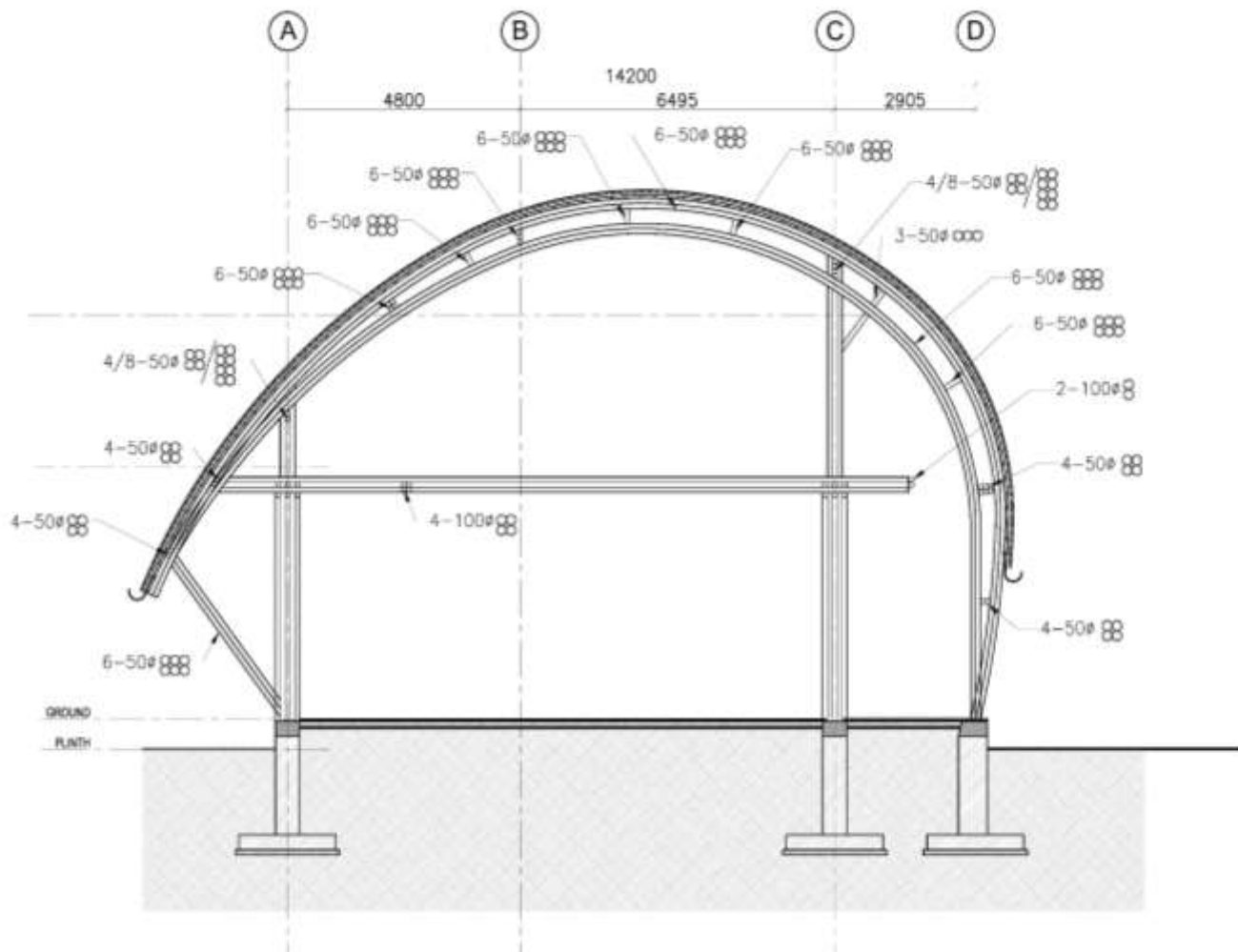
**CHICHPALLI, CHANDRAPUR,
MAHARASHTRA, INDIA**



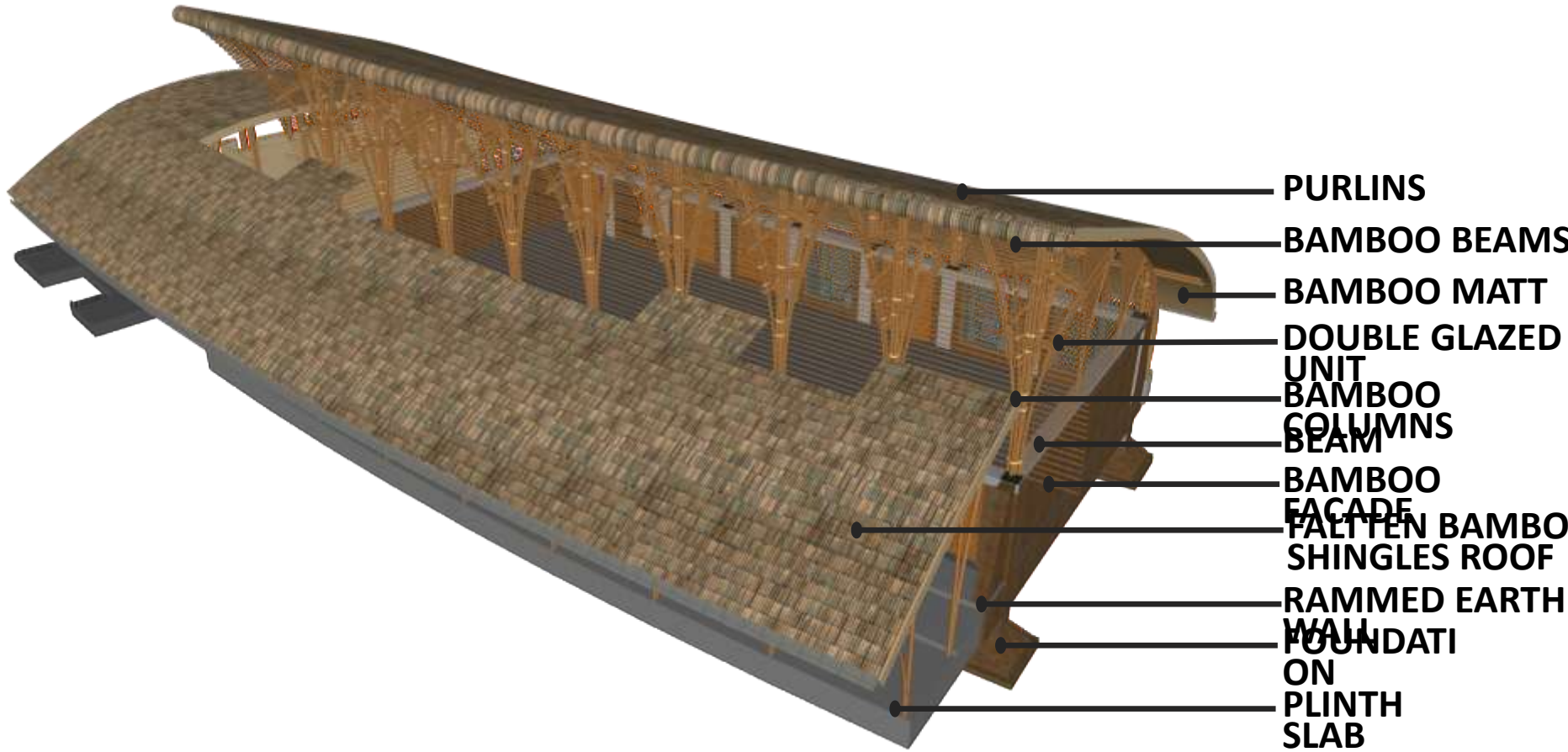




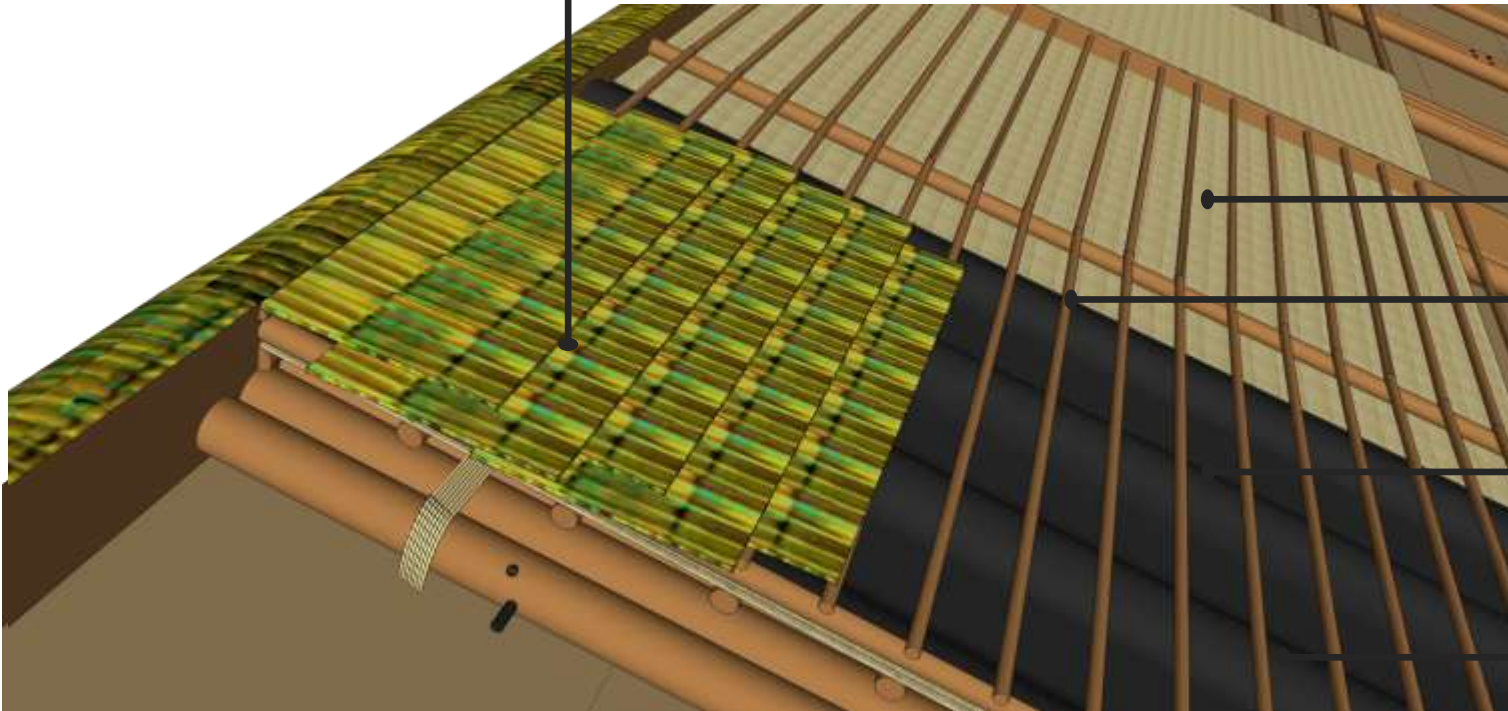
BAMBOO COLUMN LAYOUT...



SECTION...



**FLATTEN BAMBOO
SHINGLES ROOF**



BAMBOO MAT

SUB PURLINS

BITUMEN SHEET

PURLINS



VIEWS...



VIEWS...



VIEWS...















Thank You