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

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

![Map showing bamboo distribution worldwide](image1)

**International Trade in Bamboo**

**Top Exporters ($ mn)**
- China: 1238
- Veitnam: 86
- Indonesia: 176
- EU: 214
- USA: 31
- Philippines: 36
- Singapore: 20
- Thailand: 18
- Others: 22

**Top Importers ($ mn)**
- China: 4
- EU: 607
- Others: 221
- USA: 289
- Japan: 256
- Russia: 30
- Korea: 30
- Australia: 32
- Singapore: 38
- Canada: 46

**Exports: $1.88 bn**
**Imports: $1.60 bn**

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**Global Market Size**
- **India**: 10 mn hectares
- **India**: $4.35 bn
- **India**: Market Leader
- **India**: Estimated size of Indian bamboo industry

**China**: 5.4 mn hectares
- **China**: $19.5 bn !!
- **China**: Chinese area under bamboo – about half that of India
- **China**: Size of Chinese Bamboo industry

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[1]: Global Forest Resources Assessment 2010, FAO
[2]: International Trade of Bamboo & Rattan 2012, INBAR
• 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
Age Grading
Treated and Graded Bamboo
Straightening
Straightening
Bamboo Furniture
Prefabrication of Construction component
Pre-fabricated components
Seat-out
Seat-out
Gazebo
Hotel Lemon Tree, Goa
Cidade De Goa
Meditation Center, Infosys, Hyderabad
Cottage
Cottage
Roof for Farm house
Bamboo Boathouse
Pavilion, Sesa Goa
Pavilion, Sesa Goa
Interiors & Details
India's largest bamboo structure at Hyderabad
Restaurant building at Itafushi, Maldives
Nature Interpretation Center, Palava
MANDAP INTERIOR
WAY TO DINING
BAMBOO DINING AREA
Bamboo strip board
Bamboo to splits
Splits to board
Bamboo Board
VVIP Guest house for Infosys at Hyderabad
PLINTH
SLAB
FOUNDATIONS
BEAM
BAMBOO
COLUMNS
RAMMED
EARTH
WALL
BAMBOO
BEAMS
DOUBLE
GLAZED
UNIT
FALLEN
BAMBOO
SHINGLES
ROOF
BAMBOO
FACADE
BAMBOO
MATT
PURLINS
WALL
FOUNDATION
ON
PLINTH
SLAB
Thank You