Bamboo Design and Construction in Thailand
Bamboo Art Gallery at Arsomsilp

Thana Uthaipattrakoon

Master of Architecture Program
in Community and Environmental Architecture
ARSOMSILP INSTITUTE
INTRODUCTION
INTRODUCTION
INTRODUCTION
1. To experiment the natural potential of bamboo as well as to build people confidence of bamboo construction in contemporary context.

2. To construct a bamboo building for public uses.

3. To publicize local wisdoms of bamboo construction in Thailand and subsequently develop and apply the knowledge to contemporary uses.

4. To gather available information and provide knowledge relating to bamboo construction.

5. To encourage and promote the uses of bamboo building in the future.
1. To be an artistic lobby to welcome guest before entering into the institute.

2. To signify the identity of the institute that emphasizes local wisdms and values natural sustainable materials.

3. To provide a multi-purpose space for Arsomsilp Institute’s activities.
<table>
<thead>
<tr>
<th>Compression Test</th>
<th>Compression Test</th>
<th>E-modulus Test</th>
<th>Tension Test</th>
</tr>
</thead>
</table>

Bending Test

10th World Bamboo Congress: Damyang, South Korea
<table>
<thead>
<tr>
<th>Species0</th>
<th>$\phi$ (inch)</th>
<th>Allowable Stress (kg/cm²)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Compression</td>
<td>Tension</td>
<td>Shear</td>
<td></td>
</tr>
<tr>
<td>Dendrocalamus asper</td>
<td>5</td>
<td>86</td>
<td>270</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Dendrocalamus membranaceus</td>
<td>3</td>
<td>60</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>105</td>
<td>288</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>119</td>
<td></td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
### Engineering Calculation

<table>
<thead>
<tr>
<th>Member</th>
<th>Compression</th>
<th>Tension</th>
<th>Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridgepole</td>
<td>Maximum Stress</td>
<td>11.33</td>
<td>38.54</td>
</tr>
<tr>
<td></td>
<td>Allowable Stress</td>
<td>60.23</td>
<td>288.18</td>
</tr>
<tr>
<td>Column</td>
<td>Maximum Stress</td>
<td>121.95</td>
<td>36.36</td>
</tr>
<tr>
<td></td>
<td>Allowable Stress</td>
<td>86.75</td>
<td>270.22</td>
</tr>
<tr>
<td>Rafter support</td>
<td>Maximum Stress</td>
<td>76.07</td>
<td>33.04</td>
</tr>
<tr>
<td></td>
<td>Allowable Stress</td>
<td>60.23</td>
<td>288.18</td>
</tr>
</tbody>
</table>

#### Compression & Tension Stress Analysis

#### Shear Stress Analysis

#### Bending Stress Analysis

10th World Bamboo Congress: Damyang, South Korea
<table>
<thead>
<tr>
<th>No.</th>
<th>Member</th>
<th>Bamboo Species</th>
<th>Diameter (inch)</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ridgepole</td>
<td><em>Dendrocalamus strictus</em></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Column</td>
<td><em>Dendrocalamus asper</em></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Rafter support</td>
<td><em>Dendrocalamus strictus</em></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Rare rafter support</td>
<td><em>Dendrocalamus strictus</em></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
CONSTRUCTION PROCESS

10th World Bamboo Congress : Damyang, South Korea
CONSTRUCTION PROCESS

Dendrocalamus asper
9 metres long

Thrysostachys siamensis
6 metres long

Dendrocalamus strictus
6 metres long
1. Appropriate Species for Construction

ไผ่ตง
Dendrocalamus asper
H 20.00 – 30.00 m / L 0.20 – 0.50 m
Ø 0.10 – 0.20 m / T 1 – 3.75 cm

ไผ่ซาง
Dendrocalamus membranaceus
H 10.00 – 25.00 m / L 0.20 – 0.45 m
Ø 0.05 – 0.12 m / T 0.7 – 1.5 cm

ไผ่รวกดํา
Thyrsostachys oliveri Gamble
H 10.00 – 17.00 m / L 0.30 – 0.60 m
Ø 0.045 – 0.07 m / T 0.02 – Solid

10th World Bamboo Congress: Damyang, South Korea
19 / 09 / 2015
CONSTRUCTION PROCESS

10th World Bamboo Congress: Damyang, South Korea
Skilled | Unskilled
---|---
45 working days

10th World Bamboo Congress: Damyang, South Korea
<table>
<thead>
<tr>
<th>Catagory</th>
<th>Amount (U$)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo Structure</td>
<td>50,350</td>
<td>48</td>
</tr>
<tr>
<td>- Bamboo Treatment</td>
<td>8,875</td>
<td>(9)</td>
</tr>
<tr>
<td>- Bamboo Pole</td>
<td>21,140</td>
<td>(20)</td>
</tr>
<tr>
<td>- Labor</td>
<td>15,000</td>
<td>(14)</td>
</tr>
<tr>
<td>- Other</td>
<td>5,335</td>
<td>(5)</td>
</tr>
<tr>
<td>Foundation</td>
<td>28,695</td>
<td>28</td>
</tr>
<tr>
<td>Floor Covering and Bench</td>
<td>19,500</td>
<td>19</td>
</tr>
<tr>
<td>Lighting</td>
<td>5,715</td>
<td>5</td>
</tr>
<tr>
<td>Total Construction Cost</td>
<td>104,260</td>
<td>100</td>
</tr>
</tbody>
</table>
10th World Bamboo Congress: Damyang, South Korea

COST, TIME AND LABOR

- **Total Structure Cost**: 48
- **Bamboo Structure**: 33
- **Bamboo Pole**: 9
- **Bamboo Treatment**: 18
- **Others**: 11
- **Labor**: 30
- **Foundation**: 28
- **Floor Covering and Bench**: 19
- **Lighting**: 5

**10th World Bamboo Congress: Damyang, South Korea**
10th World Bamboo Congress: Damyang, South Korea
“Experimenting concrete examples in parallel with study and research for knowledge and social acceptance “
FUTURE PROJECT

BAMBOO HUT
Arsonsilp Institute of the Arts, Bangkok

10th World Bamboo Congress : Damyang, South Korea
BAMBOO HUT
Arsomsilp Institute of the Arts, Bangkok

10th World Bamboo Congress : Damyang, South Korea

19 / 09 / 2015
FUTURE PROJECT

10th World Bamboo Congress: Damyang, South Korea

ARCHITECT OFFICE
Arsomsilp Institute of the Arts, Bangkok
AFFORDABLE BAMBOO HOUSE
Arsomsilp Institute of the Art, Bangkok

10th World Bamboo Congress : Damyang, South Korea

19 / 09 / 2015
10th World Bamboo Congress: Damyang, South Korea
MEETING HALL
The Hill Area and Community development Foundation

10th World Bamboo Congress : Damyang, South Korea

19 / 09 / 2015
FUTURE PROJECT

10th World Bamboo Congress : Damyang, South Korea

DINING HALL
Meditation Cluster, Bodhi Hill Project, Myanmar

Meditation Hall for 200 people
Meditation Cluster, Bodhi Hill Project, Myanmar
10th World Bamboo Congress : Damyang, South Korea
THANK YOU
19.09.2015

10th World Bamboo Congress : Damyang, South Korea