A FRESH LOOK AT FURNITURE
Bamboo for Quality, Affordability, and Sustainability

THE PROBLEM
CRADLE TO GRAVE

ABSTRACT
Currently, the furniture industry contributes nearly 10 million tons of waste per year to American landfills. Materials such as adhesives, formaldehyde, and particle boards contaminate products, making them monstrous hybrids unable to be recycled. This is especially true of inexpensive furniture, which relies heavily on chemicals without regard to how hazardous they are to human health. The solution is to eliminate the damaging materials from furniture manufacturing altogether and replace them with a healthy, cost-effective alternative.

Our project proposed the use of bamboo to eliminate the need for toxic particle board and chemicals. While naturally strong, bamboo also offers us a more cost-effective and renewable alternative to many timbers. In addition, our new business concept offers ways to reclaim our bamboo products from consumers and disassemble them for reuse or recycling. Our goal is to reframe the way big businesses think about furniture production and decrease the amount of furniture in landfills as well as the amount of harmful, contaminating chemicals used. Our business model achieves a low price point, high quality of products, and an overall sustainability that furniture manufacturers must embrace more fully.

OBJECTIVE: Create a concept for a business that produces high-quality, sustainable furniture that is affordable to the majority of American consumers.

Mechanical Properties of Bambusa Vulgaris and Other Common Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Bambusa Vulgaris</th>
<th>Oak</th>
<th>Maple</th>
<th>Plastics (PP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength (MPa)</td>
<td>232</td>
<td>110</td>
<td>120</td>
<td>29.8</td>
</tr>
<tr>
<td>Compression Strength (MPa)</td>
<td>74.6</td>
<td>41.9</td>
<td>54.2</td>
<td>39.0</td>
</tr>
<tr>
<td>Modulus of Elasticity (GPa)</td>
<td>20.0</td>
<td>13.0</td>
<td>10.5</td>
<td>1.70</td>
</tr>
</tbody>
</table>

Price per Square Foot (USD)

- No more furniture added to landfills
- Stronger furniture at a low cost
- Rapid regrowth rate and renewability of bamboo
- No harmful chemicals in furniture

ACKNOWLEDGEMENTS
We would like to thank Provost Winston Sobeyejo for helping us further understand the uses of bamboo. We would also like to thank our Peer Learning Assistant, Isabelle Cordova, and our advisor, Professor Svetlana Nikitina, for their invaluable guidance and advice.

SELECTED REFERENCES


Abigail Benoit
Martin Carrau
Christopher DeMaio
Alex Hill
Matthew Shea