

**2007 international bamboo building  
design competition**

category: structural art installation

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## 2007 international bamboo building design competition

### Elisa Jansen – research paper

As concerns for the sustainability of our lifestyle continue to grow, bamboo is becoming more and more prominent as a building material around the globe (ILL.01 – ILL.03). Although bamboo has found many traditional uses in different cultures<sup>1</sup>, many new uses for it have also come into existence. Currently bamboo can be found in a growing range of applications from flooring to corrugated sheeting<sup>2</sup>. This growing interest can be explained partly because of its incredible strength and flexibility. Its known tested properties are better than those of wood, and in the case of tensile and bending strength, often better than those of steel<sup>3</sup>. This new interest in bamboo also arises partly from its incredibly quick rate of growth and self-replacement. As stated by Matilda McQuaid,

“There are many reasons for bamboo’s appeal: It is inexpensive; it is intensely renewable (growing up to fifteen metres in its first year); its cultivation can prevent soil erosion; and it converts more carbon dioxide to oxygen than many other plants. The plant is suitable for construction use within five to eight years, and it has a yield twenty-five times higher than timber. Unlike timber, it regenerates after being harvested. It is very sturdy because of its hollow interior, which is light and elastic. And there is no waste with bamboo, since it does not have to be stripped of bark and its leaves can be used as fodder.”<sup>4</sup>

Bamboo has recently been receiving global attention thanks to architects

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1 American Bamboo Society

2 INBAR technologies / Bamboo Composites

3 RWTH AACHEN

4 McQuaid, Shigeru Ban. Courtesy of [paperforager.wordpress.com](http://paperforager.wordpress.com)

such as Renzo Piano and Shigeru Ban. Although Shigeru Ban's work is most notorious for his use of recycled paper products, many of Shigeru Ban's paper tube creations make reference to bamboo construction methods, such as the Japan pavilion for EXPO 2000 in Germany (ILL.04). However, bamboo has not yet reached its full potential as a building material for the ecologically conscious consumer. This is due in part to a simple lack of knowledge and familiarity within the design professions. The design competition sponsored by Bamboo Living aims to change this. As stated on the website, the competition's objectives include: raising awareness of the uses of structural bamboo; introducing architects and designers to working with bamboo as a structural material; and promoting an environmentally sustainable housing alternative in the building industry<sup>5</sup>.

The objectives of the competition seem to demand a showcase, a display of bamboo uses in all their forms. The project we developed, then, began as exactly that: a structure which needed no reason for being outside of showcasing itself, an architectural form of exhibitionism. Also, the importance of process became evident in the need to showcase not only the material's immediate applications, but also their ease of assembly, to render the material more approachable to a greater audience. Thus the design focuses not only on the process of assembly and construction, but also on the process of experience of the built object, creating a clear sequence of changing spaces.

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5 Abridged excerpt from: 2007 International Bamboo Competition

Such a structure draws inspiration from several different existing building types, namely museums and temporary exhibitions. Museums as typologies have been evolving for some time, becoming more and more a space for action and interaction rather than merely observation<sup>6</sup>. This new form of museum probably comes from the current trend for engagement in learning rather than mere passive absorption<sup>7</sup>. This creates a new idea of a museum, and thus also of an exhibition space, as an environment in which the visitor's role as an observer takes on secondary importance to the more tactile experience of participation. Thus, the ability of the space to function for workshops/classes/etc. becomes progressively more important than the passive "observer" ritual of a traditional museum. In the architectural form of the proposed temporary structure, this change manifests itself in the transformation from traditional display cases into the building envelope itself. The objects of observation not only become more active as participating in the support and protection of the structure, they also submit to a more subconscious sensory experience, one which may be occasionally noticed in passing, while in the midst of an unrelated activity. So the clear sequence of changing spaces is left virtually free of programme, allowing the situation and users of the moment to decide how to make the best use of the given space. Instead, particular lighting conditions created by the "backdrop" of structure and cladding encourage a conscious exploration of a particular space and its limits, without imposing it. The intention is similar to that created by the spaces defined in the landscape installation by Teshigahara (ILL.05). In this way the variety of bamboo structures and surfaces

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6 Racana, MAXXI lecture.

7 Racana, MAXXI lecture.

can be freely explored and studied through or despite other activities, without however becoming the sole focus for a visitor's attention.

This structural display of bamboo takes on many forms: in order to become a true showcase, the installation needed to include as many different samples as possible. The structure, therefore, is comprised of an eclectic mix: prefabrication (glulam) technologies applied to bamboo, bamboo space frames complete with steel connectors (ILL.06), bamboo bundles as structural columns, bamboo woven into canopies and claddings of various kinds through traditional binding methods (ILL.07), live bamboo used as a decorative element, and a few others.

The element of mobility of the structure causes it to take on some of the qualities of tents, among other things. Elements were considered in order to be quickly and easily dismantled and re-assembled on a new site, with joints and details in full view. Pavilions such as Renzo Piano's IBM pavilion offer great precedence for such structures (ILL.08). In the IBM pavilion, steel pieces cap wooden elements and allow for quick assembly of joints. Similar steel joints can be created for bamboo as well. Grooves in the prefabricated glulam-type materials have also been conceived for interlocking joints. Woven cladding is assembled into panels which can be arranged differently according to local sun angles and conditions, creating new light and shadow variations for any given hour, location, or arrangement of panels.

**ILLUSTRATIONS:**



**ILL.01 - bamboo**



**ILL.05 - Teshigara, landscape installation**



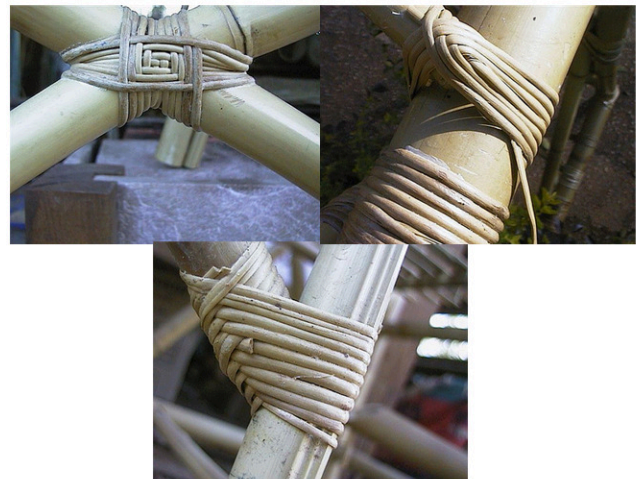
**ILL.02 - bamboo scaffolding**



**ILL.06 - Renzo Piano, bamboo steel connection**



**ILL.03 - Kengo Kuma, Great Bamboo Wall**



**ILL.07 - traditional bamboo connections**



**ILL.04 - Shigeru Ban, EXPO 2000 Japan Pavilion**



**ILL.08 - Renzo Piano - IBM Pavilion**

The structure, overall, was designed to reflect a growing need to educate the greater public on the possibilities of bamboo as a building material. Flexibility of space, ability to view the structure and transparency of the process serve to encourage this through the design and entry for this competition.

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## LIST OF ILLUSTRATION SOURCES

ILL.01 – bamboo

<http://onthaitime.com/images/bamboo-forest.jpg>

ILL.02 – bamboo scaffolding

<http://www.worldwidewanderings.com/Dcp03467.jpg>

ILL.03 – Kengo Kuma, Great Bamboo Wall

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ILL.04 – Shigeru Ban, EXPO 2000 Japan Pavilion

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ILL.05 – Teshigara, landscape installation

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ILL.06 – Renzo Piano, bamboo steel connection

[http://bambus.rwth-aachen.de/eng/reports/modern\\_architecture/referat.html](http://bambus.rwth-aachen.de/eng/reports/modern_architecture/referat.html)

ILL.07 – traditional bamboo binding images

source unknown

ILL.08 – Renzo Piano, IBM Pavilion

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