

Shigeru Ban: Exploring the limits of creativity

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Interview by Mikel Landa

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Shigeru Ban, awarded with the Pritzker Prize, is an architect committed with his profession and society. As a consequence, he is devoted both to large projects and to humanitarian work. Born in Japan, he studied architecture in the US, first in the Southern California Institute of Architecture and then in the Cooper Union in New York.

Ban is the founder of Shigeru Ban Architects (with offices in Tokyo, Paris and New York) and of Voluntary Architects Network (VAN), a NGO devoted to work in humanitarian emergency situations. His works reflect his mastery in structural conception and his innovative use of materials. Constant research helps him dominating wood and incorporating materials such as cardboard and paper to his architectural language and to structural functions.

*Your last work in Paris, **La Seine Musicale**, an ambitious project devoted to music placed in an island of the Seine River, will be inaugurated tomorrow. Tell us what it represents for the city and for you.*

The winning design that Jean de Gastines and I created for the international competition aimed an iconic building that should transmit an environmental concern. Placed in the northern edge of the **Seguin Island**, the building is the ending of an ocean liner, with a concrete base that emphasizes the massivity of the ship. An ellipsoidal auditorium with a sail represents a synthesis of the symbol, a poetical evocation in the western entrance of Paris. The design was also aimed to create an open building.

It is well known your concern on the social role of architecture; can we say this is a building that has been designed for everyone?

La Seine Musicale is a project that has been designed not only to be enjoyed by the people that pay the ticket for an event, but by everyone. This is an open project and people can enjoy the concert even outside. A big screen has been set on the southeast façade to make this possible. The roof of the concert hall houses a garden that will be open so the people can enjoy it any time, which is a part of the idea to open the building to the public.

A longitudinal axis organizes the inner spaces. People will cross the building just as they would walk along a street with the concert halls on one side and shops in the other. Even rehearsal rooms have openings that contribute to the visual porosity towards that interior street.

As you said before, the project is aimed to transmit an environmental concern. How was this target implemented in the design process of a project of a such-large scale as La Seine Musicale?

Instead of making the usual shape of a monument, I used the solar technology. Instead of putting the panels on the roof, I made a sail. If you see the building from the other bridge, it looks like a ship. So, instead of having a sail to receive wind, this 800 square meter sail is receiving sun. This sail moves following the sun, so the efficiency of the generation of energy is higher, while creating shading in the glass façade of the auditorium. Depending the time of the day, the shade that the sail projects inside the building is different and constantly changes its interior atmosphere. This is the way I created a monumental image of the building. Environmental technologies have been used to change the shape of the building depending the hour of the day and the season.

An exuberant garden covers the whole roof and surrounds a spheric shape made with a wooden hexagonal mesh covered with glass, which is the most iconic element of the project. Can you explain us about the wooden auditorium?



La Seine Musicale is a music hall complex including a 4,000 seat multi-purpose hall, a 1,150 seat classical music hall and a school of music located on Seguin Island in the western suburbs of Paris. Source: shigerubanarchitects.com



Seguin Island's master plan was developed by Ateliers Jean Nouvel. Source: shigerubanarchitects.com

Wood is a material with which I am at ease with. I usually try to use wood wherever and whenever is possible. La Seine Musicale is not an exception. However, it was not possible to use wood for the main structure of the building as a result of local architectural laws and regulations.

The auditorium is the jewel of the project. It is the element that enhances its identity. It has been conceived as a flattened sphere that floats on a pond. Borrowing the metaphor that of an egg, the yolk would be the concert hall and the white are the intermediate and access spaces, with the wooden hexagonal mesh representing the shell.

Outside, the volume expresses as a geometrical form that is immediately apprehensible, a sphere that has been flattened in its poles. The hexagonal mesh has been built with wooden glulam elements that achieve the effect of a shell, as if it was a basket, and rigidizes the ensemble. The fact of being totally covered with glass has as an effect of permanent transparency towards the immediate environment, both the garden on top of the concert hall and the borders of the Seine.

This jewel expresses both in the urban scene, becoming the symbol of the west entrance to Paris and inside as an exercise that seeks acoustical quality. Every material participates in the acoustic performance: absorbers, reverberants and diffusers. The vineyard configuration of the hall with a central scene and the audience surrounding it searches a close dialogue between orchestra and spectators.

Traveling in the Paris underground today, one can see posters fitted in its walls showing La Seine Musicale with its wooden auditorium displayed as an icon. You call it the jewel of the project. Why did you choose wood as the main material both for the inside and the exterior of the auditorium?

Wood is a material with which I am at ease with. I usually try to use wood wherever and whenever is possible. La Seine Musicale is not an exception. However, it was not possible to use wood for the main structure of the building as a result of local architectural laws and regulations. This fact limited but did not impede the use of wood in the project.

I like to make the most possible use of wood in my design, and I like to draw the most out of the possibilities wood gives as a structural and decorative material for my projects. Concerning La Seine Musicale, I used wood in the auditorium, both in its outside skin and in the interior. Its acoustic properties made it suitable for the interior walls. Cardboard has also good acoustic properties and I used it to create the ceiling of the concert hall.

Wood has good structural properties and gives me the possibility to design innovative solutions. I understand the election of wood for the structural mesh of the auditorium as natural.

The use of wood as a relevant part of the project is a constant in your architecture. We can see it in a variety of forms and functions. What does wood offer to your creativity?

Wood is a material that has its own specificities as a result of having been grown by nature. It has good structural properties together with a low density. Being less resistant than iron and steel, it matches iron and surpasses concrete in its resistance to weight ratio. It is also a material that can be machined, engineered, curved and glued to obtain complexity and precision. But it also has its own characteristics that make it special, different. One of them is **anisotropy**, which has an influence in structures and the ways elements are joined. All these characteristics offer great possibilities to creation.

To work with wood requires understanding the specific characteristics of the material. I always try to think how to make the best use and take advantage of them turning them into design possibilities. I try to use wood in most of my projects, and in each one of them I like to develop design taking advantage of those characteristics that are unique to wood.

Wood allows a high versatility in architecture and each project becomes a new challenge to extract the best of the material, a geometry that suits its physical properties while guaranteeing the rationality of the structure. I understand wood as a very versatile material, and it is that versatility that makes it a fountain for creativity.

Today, digital technology for design and fabrication is reaching every field in architecture. You have acknowledged in several occasions that as a young boy you wanted to become a carpenter one day. What is your position regarding to the old craftsmanship and the new technologies?

The role of the carpenter was vital in traditional architecture. His knowledge of the material and his mastering of joinery and geometry made possible to achieve great architecture works. Technologies have changed this situation, as there is no carpenter in modern wooden construction. Carpenters are necessary only when we construct traditional wooden architecture. They are also needed for the conservation works of wooden heritage.

While I use wood as a main material in my projects, my architecture has no relation with Japanese tradition. Although I was born in Japan, I studied architecture in the Southern California Institute of Architecture and the Cooper Union in New York, and my influences are contemporary. I try to draw the best out of wood, searching for new solutions that are structurally pure and functional and using new technologies for the fabrication process.

Technologies have evolved in the last decades both in the design and the fabrication fields, which result in more possibilities for the architect. Wood is a material suitable for this new era. What does digital design and fabrication represent in your work with wooden structures?



Anisotropy (opposed to isotropy) is the quality of exhibiting different values when the properties of matter are measured in different directions.

Source: Britannica.com

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Digital fabrication has some benefits that make it interesting for my architecture. One is that it enables us to achieve higher accuracy and precision when processing wood. A consequence is that new structural solutions can be fabricated with enough precision.



Tamedia is a seven-storey office building for 480 employees. It proposes a main structural system entirely designed in timber. The structure contains 2,000 cubic meters of spruce wood.

Source: shigerubanarchitects.com; tamedia.ch

For a detailed description of the structural solution, see: Anteman, M. (2014). Seven Storey Wood Office Building in Zurich. *Detail. Review of Architecture and Construction Details*, 2, 174-180.

I am not interested in making 'unusual' shapes only because technology makes them possible to be built. Digital fabrication has some benefits that make it interesting for my architecture. One is that it enables us to achieve higher accuracy and precision when processing wood. A consequence is that new structural solutions can be fabricated with enough precision. It also enables us to reduce time in the fabrication process making complex solutions affordable.

My aim is to use it effectively in fabrication processes, to make solutions possible and accurate. I understand creativity as independent from technologies. And as a consequence, digital processes don't have an influence in my design; they are but a tool in the developing and fabrication processes.

Wood is usually seen as a non-durable material compared to others. However it is a recurrent material in your projects, a material that you especially master. What is your view of durability regarding to wooden structures?

People think that its durability is limited, but Japan has a long tradition in wooden buildings; some of them have been built more than a thousand years ago and are still standing. We understand concrete and iron as durable materials, but both are quite new and have been used in architecture for only one or two centuries. In Japan many old buildings have been standing much longer than those made of more modern materials such as concrete and iron. This only fact shows that the durability of wood is very high.

In the Tamedia project in Zurich (2013), the formal simplicity of the structure is achieved by the use of rigid joints made with wood that have been specifically developed for the project. They enable a structure without bracings. How did both the structural concept and the elliptical wooden joints of Tamedia arise?

As I said before, I like to design a structure taking advantage of the materials properties, which means understanding its specificities and using them in the design process to reach new formal and structural solutions. These might vary from complex spacial wooden meshes to simple post and beam structures.

When I designed Tamedia office building in Zurich, the idea was to create a transparent space by the use of a wooden post and beam structure. The central part of the building – where the offices are – is separated from the exterior by two transparent skins that contain a buffer space for complementary uses. I wanted to create a unique image both from the inside as well as from the city.

One challenge was to avoid the use of diagonal bracings to keep the idea of a simple structure for a transparent space. The second challenge was to achieve the needed rigid joints by the only use of wood, avoiding metallic solutions. Basically, metal joints are more suitable than wooden to achieve rigid joints. Rigid connections made with wood are not easy to achieve, and I

was forced to create a new rigid solution by the only use of wood. I created an elliptical joint taking advantage of geometry and the choice of the appropriate species of wood for each use, glued laminated spruce for the posts and beams and beech for the elliptical pins. CNC milling of wood allowed the necessary precision to make this joint efficient. Wood properties and digital fabrication allowed me to create something that is new to wooden construction.

Following with the same project, is it a singular work, or will it be the beginning of a new direction in the use of wooden structures?

Tamedia was a project where I developed a new solution that was designed to solve a specific structural issue. I don't understand it as a beginning of something, but as a logical solution for achieving a rigid joint made of wood that allowed me to create a structure that suited my idea of transparency for the spaces. It is just a continuation of the architecture which I have been working on. So, it is not indicating by itself a new direction or any future development. I understand each project as an opportunity to create something new, but not as something that will be interpreted or repeated in the future.

*In many of your projects the structure takes a relevant part, further than just complying with its loadbearing mission. It can be seen as the central organizer element. You have used wooden meshes in the **Centre Pompidou in Metz**, post and beam frames in Tamedia but also cardboard trusses, arches and domes. What does the structure represent for you?*

As I said a little earlier, I am not interested in making unusual forms arbitrarily, illogically, that is to say, without any reason. I don't like to be influenced by the trendy shapes that are the fashionable style of the day. I understand the structure as the core of the project. I like structure to have protagonism in my architecture, both inside and outside, so that it helps organizing the spaces and being a relevant part of the character of the building.

I am interested in the versatility that architecture offers. When I design a project, I want to take advantage of the properties of wood to make a rational structure that suits the needs of the project by designing a geometry that fits to the materials specific characteristics. A consequence is that I create forms that are geometrically pure and structurally functional.

Your architecture can be understood as a constant search of innovation. You have a very personal way of integrating materials in your design, and also have incorporated materials such as cardboard tubes to structural uses. How did your interest in materials emerge?

I have always been interested in materials, as they are the base to design architecture with. Studying their characteristics gives you the capacity to find

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Pompidou Center in Metz is a complex including an art museum and a theater. "The roof is made from laminated wood in a hexagonal woven pattern composed in the form of a Chinese bamboo-woven hat. This large wooden roof is covered in a Teflon-coated fiberglass membrane and allows soft natural light to filter into the interior. The main galleries are a series of 90 m x 15 m cantilevering rectilinear tubes that float above the ground". Source: shigerubanarchitects.com

new designs and solutions. I like to work with natural materials, to respect their characteristics and to explore their relation with structures, highlighting their properties and through improving them, discover new possibilities for designing architecture.

Local materials also highly interest me, as well as available materials. Using cardboard tubes for my projects is an example of using available materials but with a new, practical approach. The same could be said when I started using containers as temporary and movable structures. The containers were there. I only thought they could be used as a structure without being modified, and created the **Nomadic Museum**.

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The **Nomadic Museum** (New York 2005, Santa Mónica 2006, Tokyo 2007) "was a temporary museum housing an exhibition of large-scale photographic works by artist Gregory Colbert". It was "constructed out of locally rented shipping containers and recyclable paper tubes". Source: shigerubanarchitects.com

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R. Buckminster Fuller (1895-1983) was an American architect, inventor, theoretician and visionary. He worked to solve global problems of housing, transportation, education, energy, ecological destruction and poverty. In the thirties he published *Shelter Magazine*. He is the author of 28 books. Source: bfi.org

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Frei Otto (1925-2015) was a German Architect and inventor. He founded the Development Centre for Lightweight Structures (Berlin) and the Institute for Lightweight Structures (University of Stuttgart). In 2015 he was awarded with the The Pritzker Architecture Prize (posthumously). Source: freiotto.com

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The **Alvar Aalto** exhibition was programmed in Tokyo by the MoMA in 1986. "In order to avoid the expense and the inevitable waste of resources, recycled paper tubing was adopted as alternative material and was used to create ceiling panels, partitions, and display stands. The material explorations in this exhibit design mark the beginning of 'paper architecture'". Source: shigerubanarchitects.com

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Paper Arbor is a pavillion built in 1989 in Nagoya, Japan, for the Odawara Festival. Forty-eight tubes treated with water-proofing paraffin were used structurally. "These were stiffened with a glue compound and joined at their heads by a wooden compression ring". After dismantling the structure, it was verified that the resistance to the compression of the tubes had increased. Source: shigerubanarchitects.com; thecrimson.com

Research in materials and its application to architectural design is one of the features that identify your work. You introduced paper as a structural material. How did all begin?

When I was a young student, I admired the work of **Buckminster Fuller** and **Frei Otto**. I was interested in the way they mastered the use of materials and structures and in the fact they were able to create their own style. At that time, it was a kind of a dream to invent by myself a structural material someday.

Paper is a material which is even more fragile than wood. So, how can it be used as a structural material? The opportunity came when I was designing the **Alvar Aalto exhibition** in Tokyo. I was interested in and curious about developing something out of this material. I used paper rolls to create the ceilings and walls for the exhibition spaces. In the **Paper Arbor** project, I used paper rolls as a structural material for the first time. It proved to be reliable. When I used the cardboard tube, it proved to be quite strong, so I thought it could be used as a structural material. People usually think in high-tech materials when developing something new, but even the raw material that are around us, or a humble material like the cardboard tubes, can be used as structure, giving them a new function, more meaning, and more design possibilities.

Paper has some features that make it suitable for architecture. It is an evolution of wood. Paper rolls can be made of recycled paper. But once they've finished their cycle, they can be recycled again into new paper tubes. This fact makes me think about ephemerality and durability in a different way. 

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