

# Buildings on the Brink

*By Lisa Mitchell*

Architectural theorist Marcus Vitruvius Pollio might have had something to say about the literal twists and turns architecture has taken since his day around 27 BC. Vitruvius' three fundamental classifications - durability, practicality and beauty - became the guiding principles for classical western architecture throughout the Renaissance, Baroque and Neoclassical periods. In his absence, others have grasped the nettle, referring to millennium feats such as Norman Foster's London City Hall as "the glass testicle" and the Dutch architectural firm MVRDV's Hanover Expo experiment as "the club sandwich".

Critics and advocates may spout unintelligible theories to the ordinary man of environmental sustainability and of melding man and nature with steel pipes and glass, but we have to wonder if today's designs will endure as tomorrow's pyramids. Or will these arguably beautiful, technically advanced achievements be merely acknowledged in time's passage as, ahem, another Diller + Scofidio Blur?

## **1. Walt Disney Concert Hall, Los Angeles**

**Architect: Frank Gehry**

**To Be Completed: October 2003**

What next from the man who designed that curious curvature of 20th century fame, the Guggenheim Museum? Frank Gehry's encore, the Walt Disney Concert Hall in Los Angeles, promises more of the same. The Disney family donated \$US100 million to create this world class auditorium and new home for the Los Angeles Philharmonic Orchestra, which should be ready by October.

The concert hall's exterior walls, clad in stainless steel panels, curve and peak into the fluid sculptural shapes that are Gehry's signature. What you see is merely the tip of this shimmering berg. Below is a six-level subterranean car park and behind the façade are five performance and education areas.

The tech edge behind Gehry's design is the French computer modelling program, CATIA (Computer-Aided Three Dimensional Interactive Application), developed for aerospace industries in which issues of gravity are paramount. CATIA ensures absolute precision - a single joint one centimetre out of whack could ripple and foil the entire construction. Like the Guggenheim, the concert hall's warped geometry defies the right angles of normal construction. The engineers and manufacturers rely on virtual 3D models to create each component of the building.

Departing from the traditional shoebox shape of inner acoustic sanctums, the Concert Hall has a curved ceiling and audience members surround the orchestra platform. The form of the pipe organ, which has more than 6000 pipes, was also designed by Gehry, who left the shaping of its acoustic qualities to another master, organ designer Manuel Rosales.

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## **2. Milwaukee Art Museum - Quadracci Pavilion, Milwaukee**

**Architect:** Santiago Calatrava

**Completed:** 2001

Spanish architect Santiago Calatrava's ambitious \$US100 million design is no museum piece. This supersonic structure looks set to take flight using Lake Michigan as its runway. The low slung Quadracci pavilion is an addition to the original museum and crowned by an ingenious wingspan, with a sleek, cable-spanned pedestrian bridge extending from it. Like an outstretched arm toward the city, the bridge connects downtown Milwaukee to the museum's entrance. Calatrava hopes its leaning mast conveys a sense of direction and movement. Known for his curvilinear style and love of natural form, Calatrava's "Brise-Soleil" or wings are new and remarkable territory. Their sculptural look is simply achieved with reinforced concrete, painted white.

The Brise-Soleil are made from 72 steel fins that rise and fall from a spine like a bird in flight. They spread across the towering, vaulted, glass-covered reception hall and act as a sunscreen on blistering days but also close gently under stresses such as high wind. When open, the wings present a striking spectacle for curious visitors.

The critical issue of the project was whether the wingspan could withstand winds blowing off Lake Michigan. Prototypes were tested for wind tolerance, reverberations, and stability. Huge pincers, similar to those used by garbage trucks, were employed to twist and manipulate the prototype's wings to their stress limit.

## **3. City Hall, London**

**Architect:** Norman Foster

**Completed:** 2000

If Norman Foster had read his tea leaves, he might have understood the folly of transplanting the inspired design of his revamped Reichstag parliament from Berlin to London's new City Hall. The beauty of this sloping glass sphere has eluded some taxpayers but its owners, the Mayor and Greater London Authority, are proud of their environmentally sustainable, 65 million pound baby. "The glass testicle" and "clenched fist" are two of many stony comments thrown its way.

Detractors may yet applaud Foster, who stands at the tech edge of eco-friendly design. The building is shaped like a futuristic bike helmet to minimise the amount of heat penetration by direct sunlight on its surface. Each floor is inclined at an angle to shade the offices below. Inside the 11 storey building are administrative offices, an assembly chamber, a public library, gallery and restaurants.

More than a muscular flourish, the City Hall's heavy lattice framework contains steel elements about 300mm in diameter that have hot water running through them. These heat the building, while the insulated panels, each unique in shape and design, are expected to halve the heat loss of an average office block. The cooling system uses naturally chilled water plumbed from London's bedrock that is circulated throughout the building and requires far less energy to run than an average air conditioning system. Water is then recycled to flush the toilets.

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Inside, a 730m long spiral staircase and ramp ascend the building, allowing the public to probe the daily activities of the city's controllers in the assembly room, much like Foster's Reichstag dome design in Berlin.

Open plan offices are flooded with light but the City Hall's transparency is not apparent to passers-by until after dark, when lighting effects turn the structure into a luminous spaceship.

#### **4. Burj Al Arab Hotel, Dubai**

**Architect:** Tom Wright

**Completion:** 2000

The seven star Burj Al Arab (Tower of the Arabs) hotel has become an outstanding symbol of wealth and sophistication. This ultimate escape is built on a man-made desert isle to avoid casting a shadow on the beach 300m away. At 321m, it is the tallest hotel in the world and just 60m short of the Empire State Building.

The incredible steel exoskeleton is built to withstand seismic events and high winds. A triangular frame wraps around a second V frame that contains the hotel rooms (there are no reception areas, but a butler for each suite), both veiled by its billowing sail - a translucent, curving, atrium wall made from two layers of Teflon-coated fibreglass screen. This is the first time the material has been used in such massive and elongated proportions. It ensures that blasting Arabian sandstorms will not erode the windows. By day, the screen filters the scorching sun with ethereal results inside, while at night, the sail becomes a huge screen for hypnotic, half-hourly light shows.

The structure virtually floats on a bed of sand. Hundreds of cement pylons driven 40m deep into the seabed do not anchor into bedrock. Instead, loosely cemented sand and silt placed along the length of the pylons hold the building in place by friction.

Anything in the hotel that looks like gold, probably is - 22-carat gold leaf. A golf cart might come in handy for bed to bathroom transfers in the largest three-bedroom suite which is 780sq m. If you fancy your own elevator, cinema, rotating bed and dressing room the size of a typical hotel room, book the royal suite on the top floor.

#### **An Expo to Remember**

Ever since the unveiling of the Eiffel Tower at the Paris World Fair in 1889, World Fair and Expo participants have aspired to present the haute couture of architecture. Of all these, Diller + Scofidio, the genius architectural theorists of New York's intelligentsia, pulled off the ultimate anti-spectacle with the Blur building.

Designed for the Swiss Expo 2002, their temporary media pavilion was a steel skeleton obscured by a perpetual man-made cloud wafting over Lake Neufchatel. The dense cloud was generated by more than 31,000 teeny computer controlled nozzles. Water was pumped from the lake into high pressure sprays that created

droplets so fine, they remained suspended in the air, creating the misty, enveloping, blur effect.

At the Hanover Expo 2000, Dutch firm MVRDV chose a more organically inspired feat and hard core testament to environmental sustainability. The Dutch Pavilion highlighted the need for densely populated countries such as the Netherlands to maximise their use of land, light and energy.

The result was a bizarre marriage of nature and technology in a five floor building whose second floor contained a flourishing greenhouse with thousands of plants. The third level contained an oyster shaped theatre with a 360-degree projection screen while level four was landscaped with mature trees tended to by artificial light. On the level above, artificial rain hailed. A stand of electricity generating windmills on the top floor doubled as the building's power generator, and recycled water was used throughout the pavilion.

MVRDV intended its work as a statement: man can enhance his quality of life through multilayered landscapes that marry urban density and nature in the absence of space. Unlike many Expo buildings which are dismantled after the show, MVRDV's "club sandwich" was spared and transformed into an international forum for renewable energy by a local business consortium.

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