Innovations in architectural laminated glass

This year’s annual worldwide DuPont Benedictus Awards, which has now reached its ninth edition, received entries ranging from the addition to a Japanese imperial temple to the design of modern telephone booths. Special recognition was given to project areas such as residential, functional and space-saving. Student participants were asked to concentrate on architectural problems regarding the use of laminated glass in a theoretical design issue and, at the same time, investigating the many applications and uses of such glass as a building material.
Held in May 2001, in Denver, Colorado, United States, the AIA Annual Convention hosted this year’s DuPont Benedictus Awards, judged by a distinguished worldwide panel of architects. This year’s jury was made up of Henry N. Cobb, FAIA, Pei Cobb Freed & Partners Architects LLP, New York, United States; Odile Decq, Odile Decq Benoit Cornette Architectes Urbanistes, Paris, France; and Vassilis Sgoutas, Vassilis Sgoutas Architects, Athens, Greece, and president of UIA. The winner of the awards received a commissioned sculpture by well-known New York artist James Carpenter.

Exceptional merit was awarded to certain entries: Massimo d’Alessandro e Associati, Rome, Italy, for their practical and unobtrusive glass telephone booths that maintain the integrity of their historical surroundings; Werner Sobek Ingenieure & Lamm, Weber, Donath, Stuttgart, Germany, for a glazed cable net structure to link buildings at Rhön Klinikum AG, Bad Neustadt, Germany; and Auer + Weber, Stuttgart, Germany for a glass canopy at Heilbronn Main Station, Baden-Württemberg, Germany. Another three special acknowledgements went to: Architekten Petry + Wittfoht, Stuttgart, Germany, for a multi-level car column in Sindelfingen, Germany; Foster and Partners, London, United Kingdom, for the Queen Elizabeth II Great Court, British Museum, London, United Kingdom; and TEN Arquitectos, Cuernavaca, Mexico, for Hotel Habita in Mexico City.

MAINTAINING INTEGRITY

The first prize in the commercial sector was awarded to Takashi Yamaguchi & Associates, using Asahi Glass Company glazing, for the project regarding the addition to the Reigenko-ji Glass Temple, Nishikamo, Kyoto, Japan, which is an imperial temple built in 1638 by Emperor Gomizuno-o. The new addition to the temple involved three important factors: harmony with Japanese tradition, expression of the Zen spirit and the creation of a meditation space. The integrity of the 17th century building was maintained by placing the new structure underground.

Outdoor light is provided for the white underground space by a transparent glass box - the only object to

...simplicity of form and management of light.

The sky and trees seen through the skylight in the hall of the Reigenko-ji temple
appear above ground - in the Zen garden. Insulation, enhanced by double-glazing on the sash and steel frames, was used to avoid condensation, and a third layer of glass, creating the effect of deep-blue ocean water, was then added. The effect is easy to imagine - the independent buildings stand alone but are harmonically together at the same time.

Jun Murata, an architect with Takashi Yamaguchi & Associates, explained: “We selected laminated glass for several reasons. The first is that laminated glass provides the best safety solution for the extensive overhead glazing we wanted, preventing broken glass from falling into the temple beneath in case of breakage. Secondly, we aimed to achieve the colour of deep water by tinting one of the lights blue and building up this effect by using two more layers of glass; this can only be achieved in a laminated construction. In traditional Japanese karesansui rock gardens, architects used an expanse of white gravel to express the concept of water. We wanted to revive the ancient Zen architectural tradition of ‘expressing water without using actual water’ in a contemporary way, using an expanse of laminated glass.” The same laminated glass also provides insulation, keeping the underground space at an average temperature of 15°C.

Award judges Henry Cobb, Vassilis Sgoutas and Odile Decq said: “Yamaguchi’s work has the magic of pure architecture; it combines simplicity of form and management of light. The lead instrument is laminated glass. This project demonstrates that it is possible to build a link to a previous culture and still speak in your own voice. Laminated glass makes a strong contribution here to spirituality and space.”

MINIMUM VISUAL IMPACT
Combining modern technology with historical surroundings is always a big challenge when considering design and materials, maintenance, security and vandalism, especially in Massimo D’Alessandro & Associati’s project for telephone booths for one of the historical areas of Rome, Italy. This year’s...
DuPont Benedictus Awards gave exceptional merit to this project, which was designed in collaboration with Italian laminated glass producer Curvet, P. Ivona/Trait d’Union, and Bari Glass Technologies. The choice here fell on laminated flat glass panels, giving anyone using the booth a totally uninterrupted view of the surrounding historical buildings. The booth offers a full view, while acoustical quality and minimum visual impact on the square are guaranteed.

**FIRST GLASS TRAM AND BUS STATION CANOPY**

The first project of its kind in Germany, the glass canopy for the tram and bus station in Heilbronn, Baden-Württemberg, created by Fleur Keller of Auer + Weber, paved the way for overhead glass structures. The aim of this project was safe, transparent protection, which was obtained with the canopy’s 210 glass panels, each measuring 1.96 by 1.87 metres, which form a continuous, slightly curved, smooth roof surface. The canopy had to undergo extensive testing regarding the integration of glass, nodes and support pads under load conditions, as well as wind tunnel testing of its aerodynamic behaviour.

Structural engineering of the project was carried out in collaboration with Schlaich Bergermann und Partner, while the glazing firm involved was Frieß Metallbau AG. The finished canopy guarantees a high load-bearing capacity also for partially damaged glass, as well as being able to counteract the strongest winds with its weight. There are three layers to the 10-millimetre-thick glass panels, with all exposed edges being covered by stainless steel sections. Steel cables hold the large ‘sheet’ of glass, which uses its own dead weight for stability.

**SUNLIT HOOD**

An atmosphere of transparency and spaciousness was the aim of the project by German architects Werner Sobek Ingenieure & Lamm, Weber, Donath for a large private clinic situated in Bad Neustadt, Germany. Realized in collaboration with German glazing firm Mero, the project was
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...high load-bearing capacity also for partially damaged glass...

developed using a glazed cable net structure - a completely new technique - to allow people to move between the buildings, while protecting them from bad weather, but still letting in sunlight and fresh air.

The resulting sunlit hood is a very stable structure, with glass plates strong enough to carry the weight of a walking person, while the net structure can support great quantities of snow. The same structure uses very little building material, because of the wide use of glass, and gives almost total transparency combined with a very high level of safety. This new method of mounting glass plates offers many new possibilities for the use of glass in traditional constructions.

**THE GREAT COURT**

Further special recognition was given to Sir Norman Foster of Foster and Partners for the project regarding the Queen Elizabeth II Great Court of the British Museum in London, United Kingdom. Based at the core of the British Museum, the courtyard originally housed the Round Reading Room of the British Library, with other buildings added on to contain the continuously increasing number of books.

The move of the British Library to St. Pancras in 1998 suggested the exploitation of the Great Court. The area now gives access to all parts of the Museum, with public space increased by over 40 per cent and new facilities which include exhibition areas, auditoria, galleries, study and education rooms, as well as restaurants and shops.

The entire area of the Great Court is protected from the weather by an undulated glass roof without visible supports. The roof has 3,312 different-sized triangular glass panels, supplied by Wagner-Biro Binder, and smooth-moving minimal steel latticework, which compensates for its complex geometrical form.

Great importance was given to the environment, especially regarding the limiting of heat gain from the roof, therefore reducing cooling requirements inside the Great Court.

**FROM AN APARTMENT BUILDING TO A HOTEL**

The conversion of a five-storey apartment building into a 36-room boutique-hotel, with the addition of a swimming pool, sauna, bar and...
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restaurant, was the challenge of TEN Arquitectos for Hotel Habita in Mexico City, in collaboration with the glazing firm Val & Val.

Built in the 1950s and located in a fashionable commercial area, the building suffered only minor changes to its original, functionally sound structure. The balconies are contained between the original façade and the rectangular frosted glass panels which also enclose walkways. The only decoration of the new façade are the small, random-inserted unfrosted glass squares and rectangles give the building its beauty at night, with the alternate illumination from the clients’ rooms, which still conserve the privacy of the occupants.

PARKING SPACE

The lack of parking space originated the idea behind the project for a stacked parking building in Frankfurt, Germany. The architectural firm Petry + Wittfoht’s final choice fell on an automatically-operated stacking system, with

Bad Neustadt, Germany: the passageway between the buildings of the Rhön Klinikum AG private clinic is supported by wooden beams
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seven above-ground levels and two below, occupying a ground space of only 315 square metres.

Access to the stack is by means of a magnetic smart card, and cars are left on a pallet that automatically slides the vehicles vertically and horizontally to the next free parking space. The process is reversed for collection of the cars.

The façade is animated by the building’s mechanical activities, which can be observed through the transparent skin, which is supplied by Schöning Glasban GmbH. Suspended from the structural columns supporting the decks, this same skin, made up of 2.93 x 1.80-metre glass panels, absorbs and controls the noise level, as well as protecting the building’s interior from the weather. Reinforced glass on the ground floor gives additional security.

INTERIOR AND EXTERIOR SPACE

The seamless connection between the interior and exterior space of the Dayton House, Minneapolis, Minnesota, United States, awarded Vincent James Associates and James Carpenter Design Associates special recognition for its safety, security, ultraviolet radiation and thermal control. The home was also to provide a minimum of physical and visual barriers in order to display the owner’s significant art collection.

Four layers of 1/4-inch thick laminated, insulating ‘water clear’ glass, supplied by Standard Vent Glass + Figla, was used to mingle the building, garden and art collection. Functional and aesthetic aims were met with large windows and withdraw-
Glass projects

...almost total transparency combined with a very high level of safety.

Night view of the Hotel Habita facade, Mexico City, Mexico, with light effects from various rooms

ing glass walls, thus making the limits between the house and the garden almost invisible.

CRYSTAL PRISM

Special recognition was also given to TEN Arquitectos for the House IA, at Peña, Valle De Bravo, Mexico. The architects decided to maintain the original stonewall, which defined the levels of the project, and to install an overhead crystal prism. A blind contention wall concealing a pool, which creates a fragile equilibrium between the latter and the lake, forms the street direction facade.

The crystal prism, from Val & Val, holds a low volume containing the service areas, separating the living and dining room, and the main bedroom. The sliding walls of the glass-enclosed living room open towards the lake, and the facade towards the patio; the pool rotates to create an open environment.

Continuity of space is achieved thanks to the thin columns supporting the roof, while a neutral pallet, which improves the exterior surroundings, emphasizes the changes in vegetation and landscape. The glass covering gives the possibility of a continuous view, as well as creating transparency and opaqueness during the different times of the day.

STUDENTS’ AWARDS

Architectural students from Oklahoma State University, United States, Tianjin University, Tongji University and the National University of Singapore swept the DuPont Benedictus Student Design Competition.
First Prize was awarded to Daniel Ralls, a 5th year student at Oklahoma State University, under the faculty sponsorship of John H. Bryant, FAIA. Second prize was awarded to the Tianjin University team of Ning Dong, Yu Yu, Yingkai Chen, Miao Miao, Yue Gao and Jingtao Dong under the faculty sponsorship of Denong Zon. The third prize went to Lei Chen, Min Li and Yan Yang of Tongji University under the faculty sponsorship of Yongliang Shi.

Honourable mentions were awarded to Oklahoma State University student Andre J. Klare under the direction of John H. Bryant, Tiah Nan Chyuan of the National University of Singapore under the direction of Low Boon Liang, and Oklahoma State University student Robbie Forslund with faculty sponsor John H. Bryant.

CONCLUSIONS

Two residential projects - one in the United States and one in Mexico - were honoured with special recognition by the 2001 DuPont Benedictus Awards.

Vincent James Associates and James Carpenter Design Associates received certificates of special recognition for the Dayton residence in Minneapolis, and Bernardo Gomez-Pimienta and Enrique Norten of TEN Arquitectos received a certificate for the Gomez-Pimienta home in Valle de Bravo.

The DuPont Benedictus Awards are named after Edouard Benedictus, a French chemist who discovered the process for laminating glass, which is today specified by architects for its security, safety, sound- and shatter-resistance, and energy-saving features, as well as for its absolute clarity.

DuPont is the producer of an
expanding family of glass laminating products and technologies, including *Butacite*® polyvinylbutyral (PVB) interlayer, *SentryGlas*® Plus ionoplast interlayers and *SpallShield*® composite for laminated glass.

The Call for Entries for the 2002 DuPont Benedictus Awards were to be announced in autumn on the company website, together with the names of past winners and further entry information. ■