



EXCELLENCE IN STRUCTURAL ENGINEERING

NCSEA 14TH ANNUAL AWARDS PROGRAM

2011 Panel of Judges

The judging was held Wednesday August 17, 2011 in New York City, at the offices of Thornton Tomasetti. The 2011 awards jury included the following individuals:

Eli Gottlieb, P.E.

Thornton Tomasetti

Vesna Hadzibabic, P.E., LEED AP

NYC School Construction Authority

Scott Hughes, P.E.

Robert Silman Associates

Tim Lynch, P.E.

New York City Department of Buildings

Chris Cerino, P.E.

STV Incorporated

Karl Rubenacker, P.E., S.E.

Gilsanz Murray Steficek, LLP

Jeff Thompson, P.E., LEED AP

Buro Happold

At their annual meeting in Oklahoma City, OK on October 22, NCSEA announced the winners of the 2011 Excellence in Structural Engineering Awards. This awards program annually highlights some of the best examples of structural ingenuity throughout the world. Awards are divided into eight categories: four building categories which are separated based on construction cost, a bridge or transportation structure category, international structures, forensic-renovation-retrofit-rehabilitation structures and an "other" category which encompasses all types of non-building or bridge structures. All structures must have been completed, or substantially completed, within the past three calendar years.

The 2011 Awards Committee was chaired by Carrie Johnson (Wallace Engineering, Tulsa OK). The judging took place in New York City this year, and the judges were all members of the Structural Engineers Association of New York (SEAoNY). Ms. Johnson noted: "We had a record number of entries this year, and the quality and complexity of projects being entered continues to grow. The judges had an enormous task to evaluate all of the projects, and they did an outstanding job. The judging was really close in several of the categories, and the judges indicated that they had an interesting time reading about the various creative ways structural engineers resolve unique and challenging problems."

Outstanding Project Awards were presented in eight categories. Please join STRUCTURE® magazine and NCSEA in congratulating all of the winners. More in-depth articles on several of the 2011 winners will appear in the Spotlight Department of the magazine over the course of the 2012 editorial year.

NEW BUILDINGS UNDER \$10 MILLION

Outstanding Project

Fishers Island Residence

Fishers Island, NY

Skidmore, Owings & Merrill LLP

The design of the Fishers Island Residence is a response to its unique island setting and the very specific personal interests of the client. To this end, Thomas Phifer and Partners designed a 4,600 square-foot house that is unmistakably modern, but equally organic in its relation to the surrounding garden and landscape. As the project's structural engineers, SOM faced a unique challenge: to develop structural systems which could simultaneously meet the aesthetic architectural requirements and be economically viable and constructible given the site constraints and limited contractor capacity.



Award Winner

Raymond and Susan Brochstein Pavilion

Houston, TX

Haynes Whaley Associates



Brochstein Pavilion at Rice University is a simple building; it is a 6,042 square-foot coffee house with 10,700 square-foot of covered outdoor seating that is square in plan. But, as the saying goes, "the devil is in the details." The architecture is understated simplicity. The building has floor-to-ceiling glass on all sides. The glass framing, the structure, perforated metal ceiling, overhead shading devices, and interior elements are all white. This simplicity puts the structural design and details front and center. The modern design is a break from Rice's traditional architecture, and Brochstein Pavilion has become the social hub of the campus.

Award Winner

A. Zahner Company Facility

Kansas City, MO

Wallace Engineering Structural Consultants, Inc.



The Zahner Facility Expansion houses fabrication and functions as the primary loading dock for their campus. Well-known for producing iconic structures, Zahner gave the architect free reign to push the envelope on curtainwall design in a desire to create an icon in their hometown of Kansas City. The result is a billowing wave of aluminum that flows down the wall and around the corner. Daylight passes between the deep structural "fins" which act as mullions. The fins are built up aluminum plate girders comprised of a cut plate web that has a shaped closed section flange attached.

NEW BUILDINGS \$10 MILLION TO \$30 MILLION

Outstanding Project

HL 23

New York, NY DeSimone Consulting Engineers

Located in Manhattan's West Chelsea District at the corner of 23rd street and 10th Avenue, the HL23 project creates a new 14-story, 85,000 square-foot ultra-luxury residential building. The floor plate of the building, which is smaller at the base than at the top, owes its uniqueness to the existing elevated Exposed Retrofitted Highline Railway, located at the eastern portion of the building lot. A steel plate shear wall (SPSW) is located at the elevator and stair locations, and braced frames have been utilized for the secondary lateral system at the building perimeter.



Courtesy of Rinze van Brug.

Award Winner

Pasadena Department of Water & Power Building

Pasadena, CA Brandow & Johnston, Inc.



Courtesy of Sibylle Allgaier, Helipfoto.

The 31,400 square-foot two-story new office building will also serve the City of Pasadena as an Emergency Operations Center. As the building is located in a very high seismic zone, a state of the art Buckling Restrained Braced Frame (BRBF) system was utilized as the lateral system. The BRBF system was exposed along these faces, and provided a clean and more aesthetically pleasing finished system.

The entire design team utilized Revit. This allowed the team to determine any clashes between the structural system and the mechanical/electrical/plumbing systems early on.

The building is LEED certified Gold.

Award Winner

Airport Traffic Control Tower

Dayton, OH AECOM



In celebration of the 100th anniversary of flight, AECOM drew architectural and structural inspiration for the design of this new Federal Aviation Administration tower from the Wright brothers' legacy of ambition, discipline and vision. The design goal was to provide an icon for the city of Dayton that exhibited both function and beauty. A diamond patterned, tapered steel structure veiled in glass encloses the central core of the tower as it reaches 225 feet above the surrounding site. The \$12 million tower now stands as a landmark for tourists, as well as a tribute to the Wright brothers.

NEW BUILDINGS \$30 MILLION TO \$100 MILLION

Outstanding Project

Shriners Hospitals for Children

Portland, OR Catena Consulting Engineers

The Shriners Hospitals for Children™ is a network of 22 hospitals specializing in the care of children with orthopedic conditions, burns, spinal cord injuries, and cleft lip and palate. With an aging facility in Portland, the Shriners expanded the existing hospital on a constrained site that demanded a creative structural solution. The result: a five-story, 73,000 square-foot hospital addition that spans 90 feet over an existing four-story parking structure. The concept saved the owner \$20 million in project costs by using Buckling Restrained Braced Frames for seismic resistance, an innovative system that saved in construction over 10% in structural costs.



Award Winner

Gateway Center – Westchester Community College

Valhalla, NY Leslie E. Robertson Associates, RLLP



This 70,000 square-foot project consists of three new buildings. The Gateway, a large and open volume serving as a lobby, is flanked by two buildings which house classrooms, offices, an auditorium, student lounge and a cafeteria. The Gateway's unique structural design consists of architecturally exposed, stackable steel "boxes," which are prefabricated and bolted together on site. A steel bridge crosses the Gateway and links the three campus buildings. The site is further distinguished by a 65-foot tall steel tower, which is lit at night to serve as a beacon for the campus. This facility received a LEED Gold rating.

Award Winner

Irving Convention Center at Las Colinas

Irving, TX Datum Engineers, Inc.



The Irving Convention Center is the first of several phases of a new entertainment district. In order to minimize the building footprint to conserve land for other development, the architect and owner wanted to utilize a stacked design. The lighter convention functions – ballrooms, meeting rooms, and food service – were located on multiple elevated floors above the main convention space. This arrangement presents unique engineering challenges due to the long spans and vibration transmission through the floors. Other architectural elements, such as the long cantilevered roof elements, and elevated terraces above column-free glass entries, created additional considerations that required carefully coordinated solutions.

NEW BUILDINGS OVER \$100 MILLION

Outstanding Project

Ray and Dagmar Dolby Regeneration Medicine Building

University of California, San Francisco

San Francisco, CA

Forell/Elsesser Engineers, Inc.

and Nabih Youssef & Associates

This new 70,000 square-foot facility, located on a steep hillside, houses several teams studying tissue development and cell based approaches to treating disease. The design-build team was challenged to design and construct this serpentine building supported on a triangular space frame, perched on a steep unstable hill. The structure, which is supported on “Triple” Friction Pendulum isolation bearings capable of translating up to 26 inches, was analyzed using non-linear response history analyses to verify that the superstructure would remain essentially elastic during an MCE event, and to assess the tendency of the structure to uplift at the uphill edge. Integrated Project Delivery techniques allowed the building to be completed in just two and one-half years.



Photos courtesy of Robert Canfield and Bruce Damonte.



Award Winner

Bank of Oklahoma Center (BOK)

Tulsa, OK

Thornton Tomasetti, Inc.



The anchor of Tulsa's Vision 2025, the city's comprehensive downtown revitalization effort, is the new \$178 million, 18,500-seat Bank of Oklahoma (BOK) Center. The elliptically shaped, 600,000 square-foot, multi-purpose event facility features lower and upper bowl seating, a premium level composed of 32 suites and club seating, and accommodates concerts, hockey, arena football, basketball, and community events. Since its completion in 2008, the BOK Center has become an icon for the City of Tulsa and has helped shaped the downtown area. The building is dynamic and exciting, a physical interpretation of the spirit of the people of Tulsa.

Award Winner

Arena Stage at the Mead Center for American Theater

Washington, DC

Fast + Epp



Courtesy of Nic Lehoux.

Arena Stage involved the upgrade of two heritage theatres and the addition of a new experimental theatre, and support spaces under a new roof and timber façade – a catalyst for redevelopment of a derelict Washington, DC neighborhood one mile south of the National Mall.

Significant acoustic issues in the heritage components were a challenge to resolve while providing aesthetically and functionally excellent new facilities on a tight budget. The 500-foot long roof is supported on the new concrete “Cradle” theater and the 650-foot long glazed timber façade, forming an acoustic barrier around the freestanding heritage theatres.

NEW BRIDGE AND TRANSPORTATION STRUCTURES

Outstanding Project

Mike O'Callaghan-Pat Tillman Memorial Bridge

Des Moines, IA

T.Y. Lin International

Soaring 890 feet above the Colorado River, the Mike O'Callaghan-Pat Tillman Memorial Bridge is the first concrete-steel hybrid arch bridge in the United States. The innovative hybrid structure is designed to complement the historic Hoover Dam with the high-performance concrete arch, while limiting the load demands with a modern steel superstructure. The 1,900-foot long Colorado River crossing is the highest and longest concrete arch bridge in the Western Hemisphere, featuring the world's tallest precast concrete columns of their type. With a 1,060-foot main span, America's newest wonder exemplifies creative achievement and innovation of modern day structural engineering.



Award Winner

Washington Bypass

Washington, NC

Flatiron and AECOM



The Washington Bypass was a design-build project consisting of a 6.8-mile greenfield bypass route around the city of Washington, NC on U.S. 17, including a 2.8-mile bridge over the Tar River and surrounding wetlands.

To minimize the construction footprint, the team developed an innovative top-down construction approach using a now patented overhead Tilting Lead Gantry (TLG). The project resulted in minimal impact to the wetlands and an accelerated construction schedule, and has since been recognized with the Federal Highway Administration's Environmental Excellence Award, the Construction Innovation Forum's NOVA Award, the American ARTBA's Globe Award (honorable mention), and the AGC of America's Aon Build America Award.

Award Winner

Mexicantown Bagley Street Pedestrian Bridge

Detroit, MI

HNTB Michigan Inc.



Detroit's new Mexicantown Pedestrian Bridge is the first cable-stayed bridge in the world designed with a single plane of stays and an eccentrically supported deck system. It is also the first cable-stayed bridge in the U.S. designed with a curved alignment, a single pylon inclined in both directions supporting a single plane of stays, a single, variable width steel box girder composite deck system, and tuned mass dampers for both vertical and lateral responses to pedestrian dynamics. It re-integrates a community, and operationally and aesthetically enhances the busiest international trade crossing in North America.

INTERNATIONAL STRUCTURES OVER \$100 MILLION

Outstanding Project

Bitexco Financial Tower

Ho Chi Minh City, Vietnam

Leslie E. Robertson Associates, RLLP

An iconic landmark, the 263 meter Bitexco Financial Tower provides a model for Vietnam's global emergence through a sophisticated and sustainable structure built with 21st century construction standards. Innovative structural engineering decisions which influenced basement excavation, helipad assemblage, and the outrigger truss design, along with high safety practices onsite, ensured that the project finished before the targeted national celebration. Constructed with locally produced concrete and numerous sustainable features such as LED lighting, the office tower appears as a symbolic beacon towards the future of Vietnam, at all hours, with an energy and material saving design considerate of the world of tomorrow.



Award Winner

Altra Sede Regione Lombardia

Milan, Italy

Thornton Tomasetti Inc.



The Altra Sede Regione Lombardia is the Lombardy Regional Government's new headquarters complex. A competition to design the new government seat and civic square required entrants to consider a visible symbolic and functional presence in their designs. The final architectural design, by Pei Cobb Freed and Partners, was inspired by the region's interweaving mountain peaks, rivers and valleys and includes general assembly spaces, offices and areas for social interaction. The project includes five nine-story wave-like buildings totaling an area of 98,000 square meters, a 43-story tower, three parking levels and a plaza.

Award Winner

U.S. Embassy

Beijing, China

Skidmore, Owings & Merrill LLP



The new U.S. Embassy in Beijing has redefined the possibilities of embassy design by responding to the strictest of security requirements with elegant, integrated solutions. The structural team creatively reorganized conventional materials and assemblies of architecturally-exposed reinforced concrete, structural steel, and blast-resistant glass to create a secure compound that presents an open and welcoming face to the City of Beijing. An expressive response to difficult design conditions was accomplished through this innovative application of conventional embassy design materials. At 500,000 square feet, the new U.S. Embassy is the second largest non-military compound ever undertaken by the United States government.

FORENSIC/RENOVATION/RETROFIT/REHABILITATION STRUCTURES

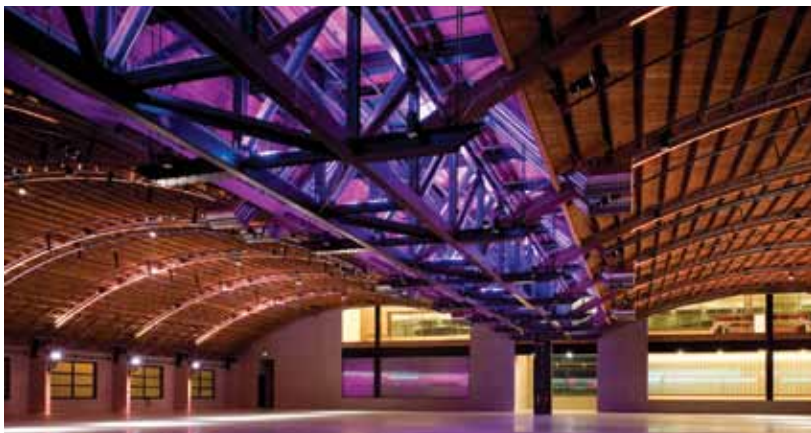
Outstanding Project

Warner Drive

Culver City, CA

Structural Focus

The Warner Drive project involved renovating an existing one-story warehouse to create an upscale venue for parties or production space. A new 110-foot steel truss supports the roof, allowing for the removal of interior columns, and special construction sequencing allowed for truss installation without shoring the roof. In addition, a new one-story parking garage was built below the existing building and a two-story office space was added to the front of the warehouse. The exposed truss and exposed wood framing create a functional and architecturally inspiring spacing, giving new life to a once forgotten building.



Photos courtesy of Michael Schmidt.

Award Winner

Pier Stabilization and Partial Demolition

Chester, PA

William J. Castle, P.E. & Associates, P.C.



In 2009, a pier structure on the Delaware River was evaluated to determine the best procedure to remove a partially collapsed section of dock measuring approximately 150 by 80 feet, without damage to the existing structure. Due to shifting of the structure and severe deterioration of the piles, the pier had to be stabilized prior to demolition to prevent further damage or possible injury. To accommodate the confined location and limited capacity of the area to be removed, a precision method of removal was utilized for the demolition of the deteriorated concrete and steel section. Demolition was completed by January 2010.

Award Winner

The Carquinez Senior Apartments

Richmond, CA

Tipping Mar



With an extremely low budget, a ground-floor retrofit for the 36,000 square-foot Carquinez, achieving life-safety at the DBE hazard (475-year return period) and collapse prevention at the MCE (2,475-year return period) was achieved with structural ingenuity. A weak-story building with strong-but-brittle upper stories, it also possessed an inherent torsional imbalance. The solution required designers to strengthen the ground floor while protecting the upper floors, harnessing the strength of the upper floors without taxing them.

The final design: four new eight-foot-long concrete walls founded on new grade beams with micropiles. The toughened ground story created base absorption, acting as a filter to absorb most of the seismic energy and protect the upper floors.

OTHER STRUCTURES

Outstanding Project

Left Coast Lifter

San Francisco Bay, CA *Liftech Consultants*

The Left Coast Lifter is a barge-mounted crane designed to erect the major components of the San Francisco-Oakland Bay Bridge self-anchored suspension span. Owned by American Bridge/Fluor Daniel Joint Venture, and fabricated by Shanghai Zhenhua Heavy Industries Co., Ltd., it is the largest barge crane on the West Coast. The boom, or arm, is 25 stories tall and can lift 1700 metric tons, equivalent to approximately one thousand automobiles. The barge is towed by tugboat and adjusted using the barge's computer-controlled positioning system. The structure can be folded down onto the barge for transport overseas or within United States waterways.



Award Winner

Cai Guo-Qiang – I Want to Believe Exhibit, Inopportune: Stage One

New York, NY *Gilsanz Murray Steficek*



The Cai Guo-Qiang: I Want to Believe exhibition in New York's landmark Guggenheim Museum was a site-specific installation, designed by the artist. Inopportune: Stage One, Cai's largest installation to date, presented cars suspended in the void of the central atrium of the Frank Lloyd Wright rotunda.

Structural engineering creativity was necessary for all facets of the installation: determining cable tensions, checking skylight ribs, analyzing the rotunda floor, assessing the system for hanging each car – the cables, winches, shackles, etc., and providing reinforcing as needed within each car.

Award Winner

Staring Lake Observatory

Eden Prairie, MN *Larson Engineering, Inc.*



Staring Lake Observatory is a truly unique public building. Unassuming by design, this 16- by 16-foot “cabin in the woods” structure is an atypical public observatory and blends beautifully into its wooded lakeshore setting. Most telescope observatories have a track supported sliding roof, or dome with sliding window, through which a telescope is aimed at the sky. Staring Lake Observatory has two rustic, wood-sided walls that swing open and a green, metal rotating roof that allows an unobstructed view of the sky, and showcases one of the largest reflecting telescopes in Minnesota. ■