

# EXCELLENCE IN STRUCTURAL ENGINEERING



## NCSEA 12<sup>TH</sup> ANNUAL AWARDS PROGRAM

### 2009 Panel of Judges

Barry Arnold, P.E., S.E., SECB  
*ARW Engineers*

Julie Ott, P.E., S.E., SECB  
*ABS Consulting*

Paul McMullin, S.E., Ph.D.  
*Dunn Associates, Inc.*

Richard Seelos, S.E.  
*Reaveley Engineers + Associates*

Troy Dye, S.E.  
*ARW Engineers*

Tait Ketcham, S.E.  
*Dunn Associates, Inc.*

Don Barker, S.E.  
*BHB Engineers*

Chandra Clyde, S.E.  
*ABS Consulting*

Craig Wilkinson, S.E.  
*Reaveley Engineers + Associates*

Chris Hofheins, S.E., LEED AP  
*BHB Engineers*

At their annual meeting in Phoenix in October, NCSEA announced the winners of the 2009 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 five categories: three building categories which are separated based on construction cost, a bridge or transportation structure category, and an “other” category which encompasses renovations, rehabilitation, upgrades or non-building structures. All structures must have been completed, or substantially completed, within the past three calendar years.

The 2009 Awards Committee was chaired by Carrie Johnson (Wallace Engineering, Tulsa OK). The judges this year were provided by SEAU and the judging took place in Salt Lake City on August 25. Ms. Johnson noted “there were a record number of entries this year. In the twelfth year of the awards, the caliber of entries still continues to grow. Seeing the creative ways structural engineers resolve unique and challenging problems is impressive. There were a number of projects which scored highly in each of the categories, which attests to the high quality of the entries.”

Outstanding Project Awards were presented in five categories. Please join STRUCTURE® magazine and NCSEA in congratulating all of the winners. More in-depth articles on several of the 2009 winners will appear in the Spotlight Department of the magazine over the course of the 2010 editorial year.

## NEW BUILDINGS UNDER \$30M

### Outstanding Project

#### **Craig Thomas Discovery and Visitor Center**

Moose, Wyoming

Beaudette Consulting Engineers, Inc.

The Craig Thomas Discovery and Visitor Center is located along the Snake River, situated between the Snake River and the Teton Range, a few miles outside of Jackson, WY. The construction of the building utilizes materials consistent with the landscape and climate, with multiple Douglas Fir log frames supporting a glulam rafter roof system. A vast sloping window wall system looks out to the Teton Range, and is supported by custom steel mullions.

The lateral system is a combination of concealed braced frames, moment frames, and wood shearwalls. This structure posed special challenges, with 300 psf roof snow loads combined with high seismicity of the area.



Photos courtesy of Nic Lehoux Photography.

### Award Winner

#### **Project Frog Modular Unit**

San Francisco, California

Degenkolb Engineers



Courtesy of Project Frog, Inc.

Project FROG Leaps Ahead in High-Performance Learning Environments – More than 3.5 million college and university students take classes in modular trailers per year. FROG's modular system, quick to deploy and easy to assemble, is a high-performing and environmentally friendly solution.

FROG stands for Flexible Response to Ongoing Growth. Degenkolb designed FROG with light gage and structural steel to improve the lifespan of the structures, similar to permanent buildings that last 25 to 50 years. "This pre-engineered approach offers schools and other education institutions a quick-to-deploy, high-performance, reasonably priced middle ground between the traditional design/bid/build construction process and modular trailers," says Mark Miller, MKThink co-founder and principal.

### Award Winner

#### **Congregation Beth Sholom**

San Francisco, California

Forell Elsesser Engineers, Inc.



Courtesy of Victor Muscetto.

Congregation Beth Sholom's new campus creates dynamic spaces for worship, meetings, study and social functions for the congregation and community. The project consists of three seismically separated structures. The one-story plaza provides meeting and library space on the ground floor and space for public gatherings on the roof. The social hall is a tall, single story light-gage framed structure with long span roof trusses that sits on a concrete podium. However, the 704-seat sanctuary is the most dramatic element of the project. It is a large curved concrete shell structure that is supported on a narrow pedestal, giving it the appearance of almost defying gravity.



## NEW BUILDINGS \$30M TO \$100M

### Outstanding Project

#### **The Ritz Carlton Club & Residences**

San Francisco, California  
Middlebrook + Louie

This transformation of an historic San Francisco office building into a modern residential tower is a testament to the engineer's key role in revitalizing the urban landscape.

The original 8-story building (by Burnham and Root of Chicago) was built in 1890 and expanded several times in the 1900s.

In designing an essentially new facility, tasks included evaluating the historic structural elements; designing systems that incorporated these existing historic elements; and, providing a new, upscale 24-story building.

The resulting project is an attractive 24-story tower with over 250,000 square feet of luxury facilities.



*Courtesy of Tom Paiva.*

### Award Winner

#### **Schermerhorn House**

Brooklyn, New York  
Robert Silman Associates



*Courtesy of Polshek Partnership Architects.*

Schermerhorn House is a 94,000 square foot housing development located in downtown Brooklyn, NY, containing 200 single room occupancy units, offices, retail and a multi-purpose theater. The project is located over three of Brooklyn's oldest subway tunnels, which occupy the northern half of the site. In order to construct the concrete tower above without loading the subway tunnels, RSA designed four steel trusses to cantilever approximately 50 feet over the tunnels. Drilled shaft foundations support the trusses. The drilled shafts adjacent to the tunnel are sleeved in order to avoid imparting lateral forces on the tunnels under wind and seismic loads.

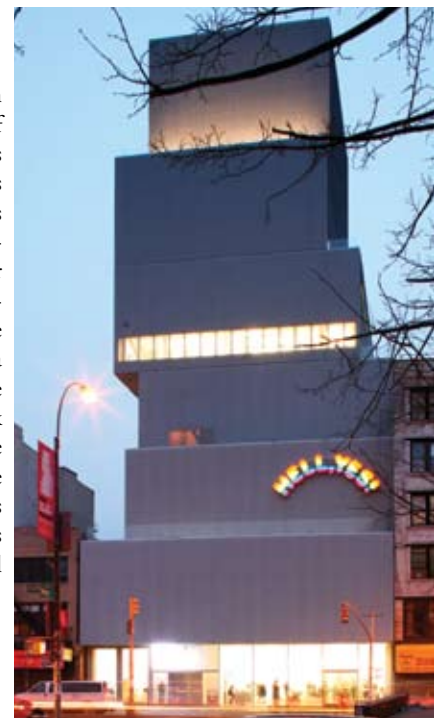
### Award Winner

#### **New Museum of Contemporary Art**

New York, New York  
Guy Nordenson and Associates with  
Simpson Gumpertz & Heger and  
SAPS-Sasaki Associates

The design for the New Museum of Contemporary Art consists of a series of rectangular volumes that shift laterally as they rise. As a result, the only continuous vertical structure is in the central elevator core. The exterior walls are built of a series of shifting trusses that wrap around the east and west facades, creating a number of floating corners. These trusses provide all of the setback transfers and the majority of the lateral resisting system of the building. The wall structure is kept to 8 inches in thickness to allow for minimal overall wall thickness.

*Courtesy of Richard Anderson.*





## Outstanding Project

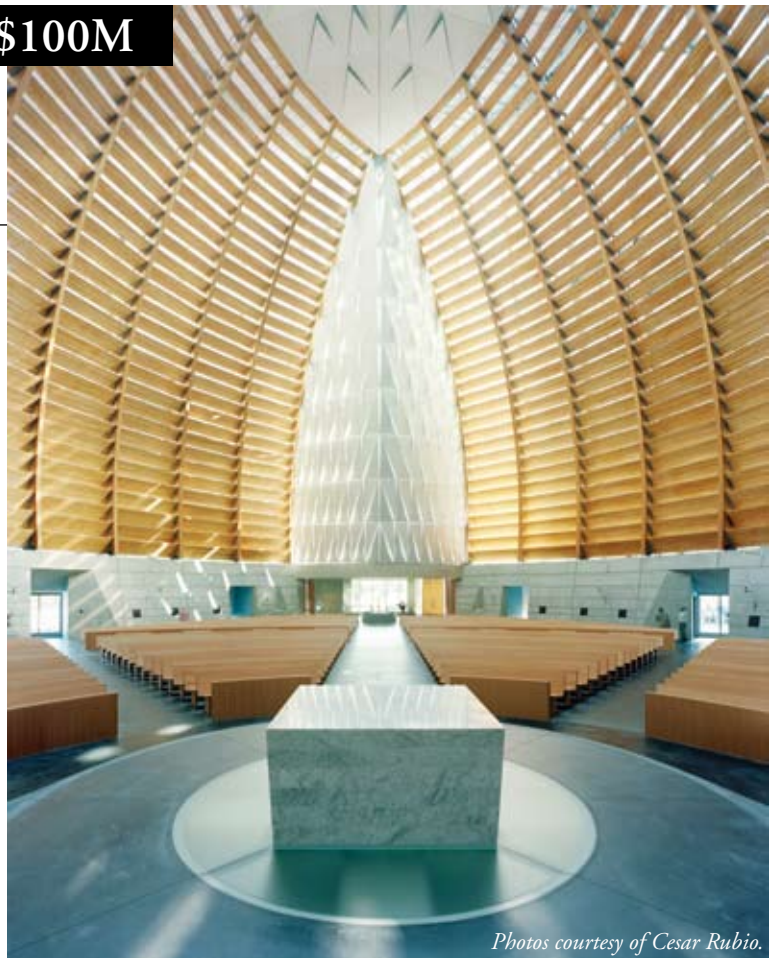
### *The Cathedral of Christ the Light*

Oakland, California

Skidmore, Owings & Merrill, LLP

The Cathedral of Christ the Light is defined by sacred geometries and designed for lightness by using seismic isolation to manage ground motions and reduce the demand on the superstructure during an earthquake. The play of light transforms the structure and its material throughout the day. The Cathedral incorporates a highly innovative use of natural, yet ordinary materials with an ethos of sustainability.

Glued-laminated timber from sustainable forests, exposed reinforced concrete using replacement fly ash, recycled high-strength steel, aluminum, and glass create the symbolic form. The Cathedral is the centerpiece of a 21,000-square-metre complex with a complement of facilities that includes a mausoleum, a conference center, health and legal clinics, administrative offices, bishop and clergy residences, a bookstore, a cafe, and community-serving ministries.



*Photos courtesy of Cesar Rubio.*

## Award Winner

### *Shanghai World Financial Center*

Shanghai, China

Leslie R. Robertson Associates, RLLP



*Courtesy of Mori Building Company.*

The 101-story Shanghai World Financial Center is the world's third tallest building, and the tallest in China. The building houses 70 floors of office space designed to accommodate 12,000 people, and a mixed-use program of hotel, trading, museum and retail. The project was originally designed in 1993, with piling installed by 1995. Construction subsequently went on hold. In 1999, the developer, Mori Building Company, decided to increase the building height from 460 meters (1,509 feet) to 492 meters (1,614 feet). An alternative structural design was needed, one that responded to the beauty of the architecture while meeting extraordinary engineering challenges that included reuse of the existing foundations. The resulting design for the Shanghai World Financial Center stands as a major Asian landmark and symbol of redevelopment in Shanghai.

## Award Winner

### *Richmond Olympic Oval Roof*

Richmond, British Columbia

Fast + Epp



*Courtesy of Hubert Kang.*

The Richmond Oval is a multipurpose sports and recreation facility that will serve as the Long Track Speed Skating venue for the 2010 Winter Olympics. The one-of-a-kind 6.5 acre roof structure features hollow, triangular-shaped composite wood-steel arches, which span 310 feet and conceal mechanical ducts, electrical conduits, and sprinkler pipes. Spanning between the arches are novel, prefabricated "Wood Wave" panels, consisting of pine beetle kill 2x4's and plywood. As one of the largest timber roofs in the world, it not only represents an economical design solution, but also a striking aesthetic quality and enhanced acoustic performance.



# BRIDGES AND TRANSPORTATION STRUCTURES

## Outstanding Project

### **Kingsway Bridge**

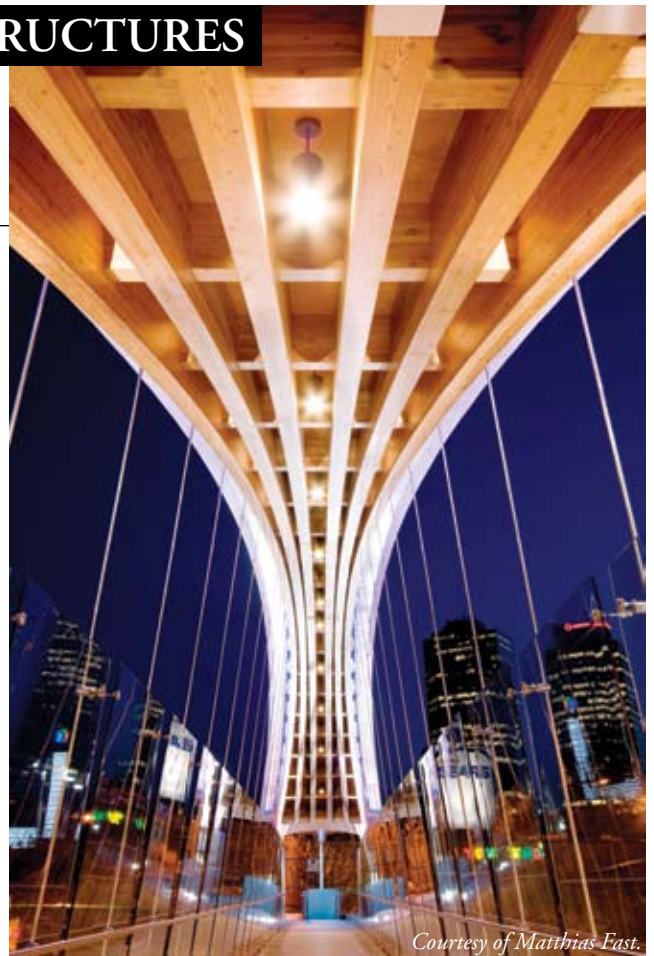
Burnaby, British Columbia

Fast + Epp

Kingsway Bridge is an elegant, one-of-a-kind bridge structure consisting of an amazingly thin concrete walkway suspended from a composite timber and steel arch. The covered wood portion of the arch structure features a series of bi-axially curved glue-laminated beams that are anchored by custom shaped steel haunches at both ends. The timber components exude warmth, enhance the dynamic, multi-material expression of the bridge, and demonstrate the viability of using a rapidly renewable resource in a construction sector that is dominated by steel and concrete. It is believed to be the first bridge ever to feature a timber drop-in span between steel haunches tied together by a post-tensioned concrete platform.



*Courtesy of Fast + Epp.*



*Courtesy of Matthias East.*

## Award Winner

### **The New I-35W Bridge**

Minneapolis, Minnesota

FIGG



*Courtesy of Tim Davis.*

The new I-35W Bridge is a modern concrete bridge for the future, designed and built in 11 months. The owner, Minnesota Department of Transportation, created a remarkable vision for quality, safety and innovation that was successfully achieved on this 10-lane interstate bridge over the Mississippi River with sustainable eco-friendly materials, “smart-bridge” technology, first use of LEDs for major highway lighting, and concrete with nanotechnology that cleans the air (gateway element). The elegant bridge is also transit- and suspended pedestrian-bridge ready. Extensive public involvement provided education opportunities and helped to restore public confidence in infrastructure.

## Award Winner

### **Bob Kerrey Pedestrian Bridge**

Omaha, Nebraska

HNTB Corporation



*Courtesy of HNTB.*

In May of 2006, the design-build team of APAC-Kansas, Inc. and HNTB were awarded a \$22 million contract for the design and construction of a 2,222 foot pedestrian bridge spanning the Missouri River. The project included a one-of-a-kind, 1,012-foot curvilinear cable stayed bridge, with a main span length of 506 feet. The superstructure is supported by single pylons that rise 200 feet above the river's surface.

With its completion in September 2008, the Bob Kerrey Pedestrian Bridge crossing the Missouri River became one of the longest pedestrian spans ever designed and constructed, as well as a landmark for the surrounding community.



## Outstanding Project

### **The University of Illinois Memorial Stadium Phased Development**

*Champaign/Urbana, Illinois  
HNTB Corporation*

The University of Illinois embarked on sweeping updates and renovations to their historic Memorial Stadium, which included adding luxury suites, club seating, press areas, larger concourses, concessions and other fan amenities, and a new north end-zone seating bowl and training facility.

The plan called for extensive modifications to the existing structure, all done while preserving its historical façade. Some of these modifications included seismic upgrades to current codes, removal of existing columns, threading new structure through the existing, and new transfer trusses to support the portions of the main existing transfer trusses and upper balcony girders that remained.



*Photos courtesy of Brad Feinknopf.*

## Award Winner

### **Utah State Capitol Seismic Base Isolation and Restoration**

*Salt Lake City, Utah  
Reaveley Engineers & Associates*



*Courtesy of Reaveley Engineers + Associates.*

Due to seismic deficiencies and proximity to an active fault, the 300,000 square foot historic Utah State Capitol was seismically retrofitted. Using innovative load transfer methods, 265 seismic base isolators were installed beneath the foundation.

Other creative solutions included: innovative Cathodic Protection System, computer model verification, strengthening of the Dome and Drum, bracing the massive unreinforced masonry parapets, strengthening pediments above each primary entrance, strengthening of granite columns at entrances with epoxy and strengthening of nonstructural elements.

As opposed to the previous bleak diagnosis, the expected seismic performance of the Utah State Capitol is now superb.

## Award Winner

### **Marriott Marquis Atrium Ballroom Addition and Renovation**

*Atlanta, Georgia  
Uzun & Case Engineers, LLC*



*Courtesy of Benjamin Lipford.*

The Atlanta Marriott Marquis Atrium Ballroom Renovation was made possible by the innovative design and engineering required to convert an existing ballroom roof structure into an active assembly occupancy floor for a new 302,740 square foot column-free ballroom. Based on static and dynamic analysis, careful coordination, and creative design, Uzun & Case Engineers accomplished the unusual task of adding a new ballroom on the top of an existing ballroom and renovating conference spaces to the Marriott Marquis. This project will ensure that the Marriott Marquis remains one of the premier hotel and conference centers in Atlanta for years to come.