

PTI Structure Awards Competition

The Post-Tensioning Institute (PTI), Phoenix, AZ, reinstated its Structure Awards Competition in 2003—the first one PTI has held since 1987—with plans to continue the program as an annual event. Winners are chosen in five categories and seven projects received honorable mention. In general, any structure constructed or rehabilitated that substantially used post-tensioning as a structural component and was completed in the last 5 years was eligible.

Award categories include Buildings, Parking Structures, Strengthening/Rehabilitation, Bridges, and Industrial/Special Applications. Entries were judged on their individual merits for creativity, innovation, ingenuity, cost-effectiveness, functionality, constructibility, and aesthetics. The first-place winners are:

BUILDINGS

Borgata Hotel Casino and Spa, Atlantic City, NJ

The Borgata Hotel Casino and Spa features a 46-story, 2400-room tower. Post-tensioned, cast-in-place concrete construction was the structural system of choice after investigating many other systems. It provided the lowest floor-to-floor heights, the thinnest floor slab construction possible, efficient use of materials, and the flexibility to mold and adapt the structure to meet the design requirements.

The project used 579 tons (530 tonne) of post-tensioning tendons and more than 79,000 yd³ (60,000 m³) of concrete. Post-tensioned, cast-in-place concrete provided the design team with a flexible structural system to accommodate irregular column locations and slab openings, and to meet stringent slab edge deflection requirements, both efficiently and economically.

Award recipients are:

- Owner: Borgata Hotel Casino and Spa;
- Engineer: Cagley, Harman & Associates, Inc.;
- Architect: Anthony A. Marnell II, Chtd.;
- Contractor: Yates/Tishman Construction Managers; Collavino Northeast Construction Co., LLC; and
- Post-Tensioning Supplier: Lang Tendons.

PARKING STRUCTURES

Entry Pavilion, Community Hospital of the Monterey Peninsula, Monterey, CA

From its initial design in December 2000 to completion

in May 2003, this building, with three levels of underground parking, was challenging. Built in a region with high seismic activity, the design called for innovative solutions in post-tensioning to maintain efficient use of underground space and design economy. Post-tensioning allowed for shallow floor-to-floor heights, critical to the project, to control excavation, shoring, and retaining wall costs. Post-tensioning also allowed the structure's shape to conform to custom configurations, without



Borgata Hotel Casino and Spa under construction



Job site at the Entry Pavilion, Community Hospital of the Monterey Peninsula



Tendon jacking for the SR 520 Evergreen Point Floating Bridge Rehabilitation



Segment erection on the Route 895 Connector/Pocahontas Parkway



Exterior view of the Georgia Tech Student Athletic Complex II

excessive complexity of construction or cost. The upper level of the parking structure was designed to support all original site features.

Award recipients are:

- Owner: Community Hospital of the Monterey Peninsula;
- Architect/Engineer: Watry Design, Inc.;
- Contractor: John F. Otto, Inc.; and
- Post-Tensioning Supplier: Crispin Co. & Sumiden Wire.

STRENGTHENING/REHABILITATION

SR 520 Evergreen Point Floating Bridge Rehabilitation, Seattle, WA

With an average of 125,000 daily commuters, the Evergreen Floating Bridge is a vital link between Seattle and its environs. Damaged by a storm in 1993, the Washington Department of Transportation began a long-term preservation program for this vital structure. An innovative post-tensioning approach was the selected rehabilitation method. Traditional approaches for post-tensioning called for tendons typically 1000-ft-long (300 m) with numerous intermediate anchors; this would have required extensive bridge closures and would have added significant weight to the structure. Instead, the team developed a system using continuous tendons 3600-ft-long (1100 m) with fewer lightweight anchors. In addition, a full-scale mock-up was made to demonstrate the installation process. This solution enabled the bridge to remain open to traffic and to be completed \$12 million under the original budget.

Award recipients are:

- Owner: Washington State Department of Transportation;
- Engineer: KPFF Consulting Engineers;
- Contractor: Mowat Construction Co.; and
- Post-Tensioning Supplier/Contractor: AVAR Construction Systems.

BRIDGES

Route 895 Connector/Pocahontas Parkway, Richmond, VA

Route 895 is a major traffic artery through Richmond that crosses the James River and carries 24,000 vehicles daily. Completed in 2002, the Route 895 Connector/Pocahontas Parkway project was constructed under a single \$324 million design/build contract. The project featured several erection methods and interesting applications of post-tensioning technology. More than 2600 ton (2400 tonne) of post-tensioned strand were used on the project. The scope of post-tensioning work included design support, manufacturing, and installation of post-tensioning systems and components. The different methods of erection used on the project were: cast-in-place segmental construction utilizing form travelers, precast segmental construction using balanced cantilevers with overhead gantries, and span-by-span erection by crane using an underslung truss. In addition to the various construction methods, the post-tensioning technology played a role in achieving time and monetary savings.

Award recipients are:

- Owner: Virginia Department of Transportation;
- Design/Build Contractor: Fluor Daniel and Morrison Knudsen;
- Engineer: Parsons Brinkerhoff and Site Blauvelt Engineering; and
- Post-Tensioning Supplier: VSL.

INDUSTRIAL/SPECIAL APPLICATIONS

Georgia Tech Student Athletic Complex II, Atlanta, GA

Completed in October 2002 for approximately \$40 million, the renovation and expansion of the Georgia Tech Student Athletic Complex allows for the adaptive reuse of the existing aquatic center, constructed for the 1996 Summer Olympic Games. Post-tensioning was needed for the construction of a long-span concrete frame structure that spans the 50 m competition and diving pools and spectator seating area. With a clear span of 170 ft (50 m), the structure has 10 parallel structural concrete frames. The 13-ft-deep (4 m) frame girders are post-tensioned and were constructed in a staged sequence with incremental post-tensioning at each stage to reduce construction loads imposed on the pool floors.

Award recipients are:

- Owner: Facilities, Georgia Institute of Technology;
- Architect: Hastings & Chivetta Architects, Inc.;
- Engineer: ABS Consulting/Continental Concrete Structures, Inc.;
- Contractor: Beers Skanska; and
- Post-Tensioning Supplier: Continental Concrete Structures, Inc.

HONORABLE MENTION

PTI presented honorable mention awards to the following projects:

Medical Research Building III, Vanderbilt University, Nashville, TN (Buildings Category)

This \$74 million, 10-story structure is a fully bonded post-tensioned reinforced concrete structure. Post-tensioning was chosen for economy, flexibility, and durability. (Owner: Vanderbilt University; Structural Engineer: Carpenter Wright Engineers; General Contractor: Centex Rogers, Inc.; Concrete Contractor: Charter Construction, Inc.; and Post-Tensioning Supplier: PT Systems.)

Humphrey Terminal Parking and Transit Center, Bloomington, MN (Parking Structures Category)

An eight-level, \$130 million parking structure used 3 million linear ft (970 km) of tendons for this cast-in-place post-tensioned construction. (Owner: Metropolitan Airports Commission; Engineer: SRF Consulting Group, Inc.; Architect: Miller-Dunwiddie Architects; Contractor: Knutson Construction Services; and Post-Tensioning Supplier: PT Systems.)

Fallingwater Renovation, Mill Run, PA (Strengthening/Rehabilitation Category)

The renovation of Frank Lloyd Wright's masterpiece was completed in only 5 months. Post-tensioning was chosen for strengthening the structure for a variety of reasons: strength, durability, long life, and aesthetics. (Owner: Western Pennsylvania Conservancy; Engineer: Robert Silman Associate, PLLC; Post-Tensioning Consultants: Mario Suarez and Schupack Suarez/TDEG; and Post-Tensioning Supplier/Contractor: VSL.)

Smart Bridge, Blacksburg, VA (Bridges Category)

The tallest bridge in Virginia, the Smart Bridge is set in a rural area. The bridge was designed and constructed to complement the surrounding area, using post-tensioning and reinforced concrete to satisfy functional, aesthetic, and economic requirements of the project. (Owner: Virginia Department of Transportation; Engineer: FIGG Engineering Group; Contractor: PCL Civil Contractors Inc.; and Post-Tensioning Supplier: AVAR.)

East/West Golf Cart Bridges at The Bridges at Rancho Santa Fe Golf Course, Rancho Santa Fe, CA (Bridges Category)

The 285-ft-long (87 m) x 13-ft-wide (4 m) stressed-ribbon design pedestrian bridge takes maximum advantage of modern prestressing steel. Precast segments are suspended from the cables, joined, and bonded. Secondary sets are post-tensioned to generate a large compression force in the concrete. (Owner: HCC Investors; Engineer: T.Y. Lin International; Architect: Marsh & Associates; Contractor: FCI Contractors; and Post-Tensioning Supplier: Dywidag Systems International.)

JFK Airport Light Rail Transit System, New York, NY (Bridges Category)

An 11 mi (18 km) light rail system, of which 8.7 mi (14 km) are elevated, runs between various areas of JFK Airport and Jamaica Station. A design/build/operate/maintain project, its superstructure costs are estimated at \$100 million. (Owner: The Port Authority of New York and New Jersey; Engineer: FIGG Engineering Group and STV, Inc.; and Design/Construction: Slattery USA.)

University Hall Tension Ring Repair, Charlottesville, VA (Industrial/Special Applications Category)

With the University Hall structure experiencing corrosion and some wire and strand breakage, there was a need to strengthen the outer ring of the dome. Using a unique application of post-tensioning, the engineer was able to provide an elegant and aesthetically pleasing solution. The project was completed on time and under budget. (Owner: University of Virginia; Architect: Severud Associates; Contractor: Structural Preservation Systems; and Post-Tensioning Supplier/Engineer: VSL.)