2019 PTI AWARDS

Recognizing excellence in post-tensioning applications
and the individuals who shape our industry

May 6, 2019 | Hyatt Regency Seattle | Seattle, WA, USA

Thank you, Exhibitors!

- ADAPT Structural Concrete Software
- ALLPLAN A Nemetschek Company
- CCL
- Con-Tech Systems
- DSI
- e-Longation
- Flickinger Machine
- Freyssinet Sustainable Technology
- GTI
- Halfen A CRH Company
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- Schwager Davis Inc
- Structural Technologies VSL
- Suncoast Post-Tension A Keller Company
- SureBuilt Concrete Forms & Accessories
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- Westco Systems
- Williams Form Engineering Corp.

Thank you, Sponsors!

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- Suncoast Post-Tension A Keller Company
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- info-gel
- ALLPLAN A Nemetschek Company
- JSW Stud Rails

Exhibitors and Sponsors listed are as of April 4

Schedule of Events

2019 PTI Awards Program
May 6, 2019 • 6:00 p.m. to 8:30 p.m.

The 2019 PTI Awards Program will honor the most outstanding post-tensioned concrete projects, as well as the individuals whose commitment, research, and service will continue to shape PTI and the post-tensioning industry for years to come.

6:00 p.m.	Reception
7:00 p.m.	Welcome—PTI President Todd Stevens
	Dinner
7:40 p.m.	Award Presentations – Master of Ceremonies: Tony Johnson, PTI Executive Director
	Presentation of TAB Awards
	Presentation of Fellow, Legends, and Lifetime Awards
	Presentation of Project Awards

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The PTI Technical Advisory Board (TAB) presents awards to groups and individuals who have gone beyond the call of duty and provided PTI with time and resources that are out of the ordinary.

These awards include:

James R. Cagley Award for the Most Active Committee Chair

The James R. Cagley Award is awarded for dedication and active leadership as Chair of a PTI Committee. It is recognition of outstanding contributions to the post-tensioning industry and to PTI.

Russell L. Price Award for the Most Active Committee Member

The Russell L. Price Award is given in recognition of active involvement and contributions to a PTI Committee. Recipients of this award have made outstanding contributions to the post-tensioning industry and to PTI.

Kenneth B. Bondy Award for the Most Meritorious Technical Paper

The Kenneth B. Bondy Award is given in recognition of a significant impact of a published paper in the PTI *Journal* or a paper presented at the PTI Convention.

2018 winners included:
Ben Soule, James R. Cagley Award for the Most Active Committee Chair
David Goodyear, Russell L. Price Award for the Most Active Committee Member
Ralf Leistikow, Kenneth B. Bondy Award for the Most Meritorious Technical Paper

Russell L. Price Award for the Most Active Committee Member

Gregory Hunsicker has been the Chair of the CRT-70 PT Systems Qualification Testing and Certification Committee, the Chair of the M-55 Grouting Committee, and the Lead of the CRT-100 TG-Multistrand and Grouted PT Certification Task Group for many years. To all three groups, he has not only provided leadership but also significantly contributed to the work of these committees and task group. Gregory's contributions to the new PTI Multistrand and Grouted PT Inspector program were unsurpassed and fundamental to being able to offer the first certification workshop in March 2019.

Gregory Hunsicker is currently providing services to clients through OnPoint Engineering and Technology where he serves as the Managing Member. His current scope of services include consulting in a wide range of activities within the post-tensioning industry including field services & planning, estimating, project management, sales, and engineering as well as supporting manufacturing and equipment activities. He currently is based in Dallas, Texas and is a licensed Professional Engineer in Texas.

TAB Awards

Kenneth B. Bondy Award for the Most Meritorious Technical Paper

Jared Brewe and Neal Anderson are receiving this award for their paper, "Development of a New-Generation Highstrength Post-Tensioned Anchor Bar," published in the December 2018 issue of the PTI *Journal.*

Dr. Jared Brewe is a Senior Project Manager with Simpson Gumpertz & Heger in Chicago, IL. His experience includes structural evaluation and rehabilitation of deficient and deteriorated structures, construction material evaluation and accreditation, and forensic investigation of defects and failures. He is a member of numerous ACI, ASCE/SEI, and PCI committees, including ACI 318 Subcommittee G – Precast and Prestressed Concrete and is the current Chair of the PCI Industry Handbook committee. Dr. Brewe earned his BS, MS, and PhD in Civil Engineering from Missouri University of Science and Technology in Rolla, MO. He is a licensed professional engineer in several states and a licensed structural engineer in Illinois.

Neal Anderson, PE, SE, FACI, FPCI, is a Staff Consultant with SGH involved with the investigation and rehabilitation of vintage structural steel construction, and reinforced, precast/prestressed, and post-tensioned concrete structures. Mr. Anderson has over 33 years of experience in the construction and engineering field working on a variety of structural and materials evaluations, bridge superstructure and deck repair projects, and assignments including structural building frames, building facades, plazas, slabs-on-grade, historic steel construction, and parking decks.

He served as one of the principal investigators for Precast/Prestressed Concrete Institute's (PCI) wide-ranging research program on the behavior and design criteria of welded headed stud anchorages. He serves on ACI Committee 318 - Structural Building Code, and is Chair of 318 Subcommittee B - Anchorage and Reinforcement. He is active with concrete anchorage issues as a member of ACI Committee 355 - Anchorage to Concrete and C680 - Adhesive Anchor Certification; he also serves on several PCI technical committees. He was a key author of the ACI Adhesive Anchor Installer Certification Program, and is a frequent lecturer and has published technical papers on concrete anchorage design and behavior.

Mr. Anderson is a Fellow of both the American Concrete Institute and Precast/Prestressed Concrete Institute. He is a licensed professional and structural engineer in Illinois, and professional engineer in several other states. Mr. Anderson received both his BS and MS degrees in structural engineering from Purdue University.

At the time of nomination, a Fellow shall have been a Member of the Institute for at least five years. A Fellow shall have made outstanding contributions to the post-tensioning industry in the areas of education, research, development, design, construction, or management. In addition, a Fellow shall have made significant contributions to PTI through committees and/or other involvement. A Fellow shall retain that membership rank as long as membership in the Institute is maintained.

Current Fellows include:

Bijan Aalami
Rashid Ahmed
Bryan Allred
Florian Barth
Asit Baxi
Kenneth Bondy
Ron Bonomo
John T. Bryant
James Cagley
Gregory Chacos
Guy Cloutier
John Crigler
Martin Cuadra
James P. Donnelly
Kenneth L. Douglas
Garth Fallis
David Goodyear
Jack Graves, Jr.
Scott Greenhaus
H.R. (Trey) Hamilton
Joe Harrison (2018 awardee)
Carol Hayek
Norris Hayes
Gregory Hunsicker
Donald Illingworth
Terry Johnson
Brian Juedes
Thomas Kang
Neel Khosa
Rattan Khosa
Marc Khoury
Don Kline
William Klorman
Cary Kopczynski
Larry Krauser
Robert Lytton
David Martin
Richard Martter
Thomas Mathews
Raymond Messer
Andrew Micklus, Jr.
Daniel Moser
Harley Nethken
Homer Parker, Jr.
Randall Poston
Russell L. Price
Dean Read
Douglas Schlegel
Guido Schwager
Charles Skarbrevik
Felix Sorkin
Tamara Spicer (2018 awardee)
Michael Sprinkel
Todd Stevens
Ryne Stoker
Bob Sward
Merrill Walstad
Edgar Zuniga

Congratulations, 2019 PTI Fellow, Jonathan Hirsch!

PTI Fellow Awards

Jonathan Hirsch is a Software Development Manager at Bentley Systems, Inc. He is responsible for the advancement of various structural design programs including Bentley's flagship post-tensioned floor design application *RAM Concept*. He is a licensed professional engineer with a bachelor's degree from Old Dominion University and a master's degree from Georgia Tech. During his 25-year career he has designed several million square feet of post-tensioned concrete structure. His contributions to the industry include publications on deflections and vibration, online lectures for PT designers and extensive work on PTI documents. He also spends significant time offering concrete design support to the multitude of *RAM Concept* users worldwide. Hirsch recently pioneered a technology to apply cloud based use of evolutionary algorithms to the design and optimization of post-tensioned concrete floors. He is the current Chair of PTI's Education Committee, a member of PTI's Board of Directors, and is also very active on the Building Design Committee and BIM Subcommittee.

PTI Lifetime Members

A Lifetime Member shall be a person of eminence in the field of post-tensioning, or one who has performed extraordinary meritorious service to the Institute.

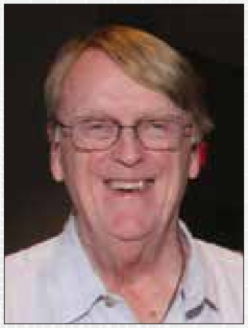
Current PTI Lifetime Members:

Bijan Aalami

Kenneth Bondy

Peter Reinhardt

Congratulations, 2019 Lifetime Member, Doug Rohrman!



With more than five decades of professional experience, **Douglass (Doug) Rohrman** has been serving as a lawyer in his own private practice, the Law Office of Douglass Frederick Rohrman, since 2013, having previously acted in the same capacity for DLA Piper from 2008 to 2013. Prior to these appointments, he served as partner at Lord, Bissell and Brook from 1997 to 2008 and Keck, Mahin & Cate from 1973 to 1997, having lent his expertise to the same firm as an associate from 1968 to 1973. He commenced his career as a legal coordinator for the National Communicable Disease Center from 1966 to 1968.

Alongside his primary career endeavors, Rohrman served as the executive vice president and director of the Kerogen Oil Company from 1967 to 2017. In addition, he was on the board of visitors of the Nicholas School of Environment at Duke University from 1991 to 2005, as well as chairman from 1993 to 2001. Serving a five-year term as a member of the financial aid initiative committee at Duke University from 2005 to 2010, he was also on the board of trustees of the Village of Kenilworth Library from 2011 to 2015.

To prepare for his career, Rohrman pursued formal education at Duke University. Thereafter, he received a Doctor of Jurisprudence from Northwestern University in 1966. He was admitted to the Illinois State Bar the same year. To share his wealth of knowledge with his community, he has published several articles in professional journals on both law and history and was on the editorial board of the Ecological Society of America from 2001 to 2010. Additionally, he co-authored two volumes of "Commercial Liability Risk Management and Insurance" in 1978 and 1986, as well as "Lender's Guide to Environmental Law, Risk and Liability" in 1993.

A native of Chicago, IL, Rohrman is happily married and has three children. In his spare time, he enjoys collecting autographed letters, manuscripts and ancient coins.

PTI's "Legends of Post-Tensioning" honor the members of PTI's Hall of Fame. These individuals have all made a significant long-term contribution to the development of the post-tensioning industry in North America and were selected from among nominees put forth by the PTI membership.

The PTI Hall of Fame was established in 2005 as part of the PTI Awards Program to recognize the pioneers and "superstars" of the post-tensioning industry. The honorees are the first of many deserving individuals who have contributed to the industry's success.

PTI Legends include:

Bijan O. Aalami
Charles R. Adams
Phil Arana
Florian G. Barth
James L. Beicker*
Kenneth B. Bondy
John E. Breen
Alfredo Bubion
Ned H. Burns*
James Cagley
Gregory Chacos
Gene Christian
Lucian Cloutier
Clifford L. Freyermuth*
Rene Friedrich
Jean-Philippe Fuzier
Neil Hawkins
Donald G. Illingworth
Harold Long
Robert L. Lytton
Richard Martter
Alan Mattock*
Russell Price (2018 inductee)
Peter Reinhardt
Edward K. Rice
Ed Schechter
Morris Schupack*
Guido Schwager (2018 inductee)
Khaled Shawwaf
Leo Spaans
Allan H. Stubbs
Mario Suarez*
David T. Swanson*
Man-Chung Tang
Robert Tuttle
William Velzy*
H. Carl Walker
Merrill Walstad
C. Nicholas Watry
Edwin B. Workman*
Lawrence Yegge

*Deceased

PTI Project Awards

The PTI Project Awards recognize excellence in post-tensioning applications. Any structure completed or rehabilitated in the past seven years that uses post-tensioning as a structural component was eligible. Entries were submitted by owners, architects, engineers, contractors, and post-tensioning suppliers.

Awardees were selected by a jury of industry professionals and were judged based on creativity, innovation, ingenuity, cost-effectiveness, functionality, constructability, and aesthetics.

2019 Project Awards Jury


Tim Christle


Amy Dowell


Michael Hopper


Gregory Hunsicker


Mark Jen


Tony Johnson

Photo not available at time of printing

Patrick Kelly


Martin Maingot


Brian Merrill


Sivakumar Munuswamy


Eric Ober

Sarah Mildred Long Bridge Replacement

Submitted by: Cianbro Corporation
Location: Kittery, Maine
Owner: Maine DOT, New Hampshire DOT
Architect: Figg, Hardesty & Hanover
Engineer: Figg, Hardesty & Hanover
Contractor: Cianbro Corporation
PT Supplier: Structural Technologies/VSL
Other Contributors: McNary Bergeron, Case Foundation, Shaw Brothers, West Wind, Unistress, Coastal Precast, Euclid, Atlantic Dismantling, Ninive, Structural Technologies, G&G, On Point, Panatrol, B&B Roadway, A&D Electric

Project Overview:

In 2014, a project to replace the Sarah Mildred Long (SML) Bridge began. The existing SML vertical lift bridge served as a critical link connecting Portsmouth, NH and Kittery, ME. The bridge carries Route 1A over the Piscataqua River and is the back up to the I-95 Piscataqua River Bridge. In addition to the vehicle traffic above, a second deck carries freight rail traffic to the Portsmouth Naval Shipyard.

The existing bridge had a steel superstructure, a concrete deck, and steel towers supporting the vertical lift span. The concrete superstructure of the new bridge is made up of post-tensioned precast concrete segments resting on concrete piers. The steel lift span is supported by four towers made up of post-tensioned precast segments. The foundation of the lift span towers was built by installing a post-tensioned precast concrete cofferdam, which was dewatered and filled with rebar and concrete. The control room cantilevers from one of the towers with a concrete floor and roof slab which are post tensioned to the tower. Three of the piers needed to support both the vehicle segments above, and the railroad segments below, which was accomplished by placing concrete columns up the sides of the segments and post-tensioning the columns to the segments.

Drilled shafts were installed to support the concrete piers. Precast concrete cofferdams were used on the shared piers. Cast-in-place concrete piers were placed on these foundations. The precast tower segments were cast on site. The vehicle and RR precast deck segments were cast off site and delivered. These segments were erected using balanced cantilevers. The towers were erected from a barge mounted crane, and the lift span was assembled on a barge and floated into place. The towers house all the electrical and mechanical components that operate the lift span.

The use of post tensioning allowed for an accelerated construction schedule. Precast concrete segments trucked on site, combined with the use of long span lengths and shared piers, minimized the number of piers required all while reducing the construction impact to marine traffic and the public. The railroad bridge below and the vehicle bridge above were erected in a balanced cantilever style of erection both of which utilized 19-0.6" diameter strands for cantilever and bottom slab tendons. After the cantilevers were constructed, closures were made between adjacent cantilever tips which allowed for 27-0.6" diameter strands to be pushed through the 330' long external draped tendon, pier to pier, which reduces dead and live loads. The railroad and vehicle bridge shared three piers. At the three shared piers, the vehicle bridge was integral with the columns with an extensive amount of post-tensioning to allow for the long cantilevers. The approach portion of the bridge meets the vertical lift span in the center of the structure. The vertical lift span is supported by four towers consisting of 22 precast segments. Segments were erected and then post tensioned together using 19-0.6" diameter strands tendons that surpassed lengths of 380'.

Jury Comments:

- This is a very unique dual-purpose structure in a lift bridge. It's also very pleasing to the eye and entirely functional.

Botanical Garden Atocha-La Liria Bridge

Submitted by: Stup Latino America
Location: Ambato, Ecuador
Engineer: Planing CIA Ltd., Rodrigo Salguero ISCH
Contractor: Ivan Acevedo
PT Supplier: Stup Ecuador

Project Overview:

In one of the most colorful countries in the world in a small town known as Ambato, you can find two beautiful and very antique constructions, La Quinta Juan Leon Mera and La Liria. These two historical buildings form part of the botanical garden Atocha – La Liria, one of the greatest arrangements of plants and flower species.

Over several years, the Ambato River and some topographical accidents resulted in the visitors having to walk a long distance between the two main houses, and in some cases the access was closed for security reasons. Therefore, the Ambato municipality decided to make a pedestrian crosswalk to improve access.

The crosswalk needed to be a part of the environment: it needed to improve the landscape but account for the safety of the pedestrians and the possibility of seismic events. In addition, only a small budget was assigned to the botanical garden and it was integral that the flora and fauna of the site was preserved.

The civil engineer designed an ingenious bridge taking advantage of the canyon of the river and the rock formations in both abutments of the bridge. It was decided to design a suspended bridge with two main ribs that worked as the principal tension members and as the railway for sliding the precast concrete segments.

Using post-tensioning and precast concrete segments helped to achieve the goals of building a structure that impacted the environment as little as possible, preserving the landscape, adhering to the budget of a small city, all while combining easy solutions with small equipment at the site and taking maximum advantage of the materials.

Post-tensioning made the project possible. From the stabilization of the abutments, to the railway for the precast segments installation, and finally the main reinforcement for the rib-beams of the bridge, this structure was made to be seismically resistant while becoming part of the environment.

Jury Comments:

- It was innovative to use PT for a suspension pedestrian bridge with precast segment installation. It was great to see how well it blended with its environment.
- This bridge used a very unique and innovative application of PT technology resulting in a striking bridge - perfect for its location.

Kinects Tower

Submitted by: Cary Kopczynski & Company
Location: Seattle, Washington
Owner: Security Properties
Architect: Bumgardner Architects
Engineer: Cary Kopczynski & Company
Contractor: Andersen Construction Company
PT Supplier: The Conco Companies
Other Contributors: Stoneway Concrete

Project Overview:

Kinects is a state-of-the-art tower in downtown Seattle's fastest growing neighborhood. The 550,000 square foot project is an excellent example of how post-tensioning can be creatively and successfully used to achieve value added project goals.

The project vision was to create a uniquely designed building which would distinguish it from towers nearby; create a building with an engaging form that would be clearly visible at a distance; and maximize the floor area at upper levels. Post-tensioning was the key to realizing this vision. Three sides of the 41-story tower taper outward as the building rises, creating more rentable square footage at the top of the building where views are best and rents highest. Further, the distinctive shape is visible from all directions and separates the building visually from competing projects nearby. Construction started in early 2015 and finished in 2017, and the project achieved LEED Silver certification for its sustainable materials and advanced design.

Kinects' structure consists of cast-in-place concrete with post-tensioned slabs and a shear wall core. The gravity system utilizes 8" thick two-way post-tensioned slabs at all levels, with cantilevers of thirteen-feet extending beyond slanted perimeter columns. The efficient use of post-tensioned slab cantilevers eliminated many columns, resulting in open and spacious layouts and unobstructed exterior views from all sides. PT also resulted in reduced mass, which allowed smaller columns and foundations, and created reductions in lateral forces under seismic load. Finally, PT lowered the floor to floor height and, importantly, in this modern era of sustainability, lessened the building's carbon footprint. Post-tensioning, high strength concrete, and high strength rebar were successfully combined in Kinects to create an iconic building that has been well received by the neighborhood and awarded honors from many professional organizations.

Kinects is an excellent example of how post-tensioning can be used to create exceptional buildings. The structural design of Kinects effectively used post-tensioning to resist horizontal thrust forces from sloping columns and achieve the project's key design goal of maximizing the floor area at upper levels where views are best and rents highest. PT flat plates were used at all levels, including the subterranean parking. This resulted in reduced mass, which translated to reductions in column size, foundations, and shear walls. It also lowered the floor to floor height and, importantly in this modern era of sustainability, reduced the building's carbon footprint.

The slab system utilized 8" thick post-tensioned flat plates with thirteen-foot perimeter cantilevers at three sides of the building. This resulted in fewer perimeter columns and optimized slab bending moments. Concrete outriggers 18" deep by eight-foot long were placed at the double cantilever corners to mitigate slab deflection by extending the support points of the cantilevers and allowing PT high points to be located nearly eight feet from the columns.

The slant columns, made possible with post-tensioned flat plates, eliminated transfer beams, maximized formwork productivity, and maintained the rapid construction schedule. The PT structural design for Kinects also reduced the concrete volume and reinforcing bar tonnage, improved the formwork efficiency, and facilitated faster construction.

Jury Comments:

- The elegance and beauty of this project is in the simplicity of the structural design. Carefully positioned columns eliminate the need for fussy transfer elements and the benefits of PT are fully utilized to achieve the cantilever spans.

Award of Merit

Ritz-Carlton Residences Waikiki Beach, Phase 2

Submitted by:	Baldridge & Associates Structural Engineering, Inc.
Location:	Honolulu, Hawaii
Owner:	PACREP 2, LLC
Architect:	Guerin Glass Architects
Engineer:	Baldridge & Associates Structural Engineering, Inc.
Contractor:	Albert C. Kobayashi, Inc.
PT Supplier:	Suncoast Post-Tension
Other Contributors:	CMC Rebar

Project Overview:

The Ritz-Carlton Residences Waikiki Beach, Phase 2, which recently opened to the public in October 2018, is a 38-story, 350-foot tall, 245-unit luxury tower in the vacation mecca of Waikiki. The tower sits atop a seven-story podium that includes a vehicular drop off area at level 2, parking on levels three to five; back of house space on level 6; and the main lobby, pools, restaurant and other amenities on level 7. The development also includes street level commercial space. This tower is the second tower of a two-phase project and both towers share common spaces at the podium floors.

While not intending to upstage its neighboring Phase 1 tower, the Phase 2 tower was designed with a unique geometry. As the tower reaches the mean height of approximately 240 feet in urban Waikiki, the floor plan rotates east to face the landmark Diamond Head crater located at the far end of the district. To achieve this a large portion of the floor plan would need to cantilever as much as 30 feet beyond the floor plan below.

The project, with its unique site, was encumbered by 10 underground easements, vehicular access under the tower and an underground wastewater pump station. Offset columns were used to avoid impacting the easements, ground floor retail space, and the underground wastewater pump station. Also, the podium utilizes several post-tensioned transfer girders at level 7 to transition tower walls and columns onto a different set of podium level columns and walls. This transition allowed for the most efficient design of sellable spaces at tower levels while accommodating parking and service areas at podium. 7" thin post-tensioned slabs utilized in the parking and tower levels allowed the project to maximize the number of floors within the 350'-0" height limit in Waikiki.

The project was encumbered by height limits, easements, a large wastewater pump station, and truck maneuvering areas under the building. These demanding conditions required long spans with maximized clear heights. The only way for the building to meet all project requirements was using post-tensioning. Most of the floors were 7" thick post-tensioned slabs to stay within the overall building height limits.

To meet the goal of optimizing sellable residential area the podium utilized 11 post-tensioned transfer girders to allow for a completely different plan of columns and demising walls in the tower floors.

The penthouse levels were designed with some spectacular large double-story atrium spaces. The atrium openings were achieved by hanging partial-floor post-tensioned slabs with steel hanger columns from the roof level. The roof slab not only had to support the loads from the hanging columns, but also the loads from heavy mechanical equipment in the center, or landscaped rooftop terrace loads on the perimeter. The roof level transfer slab thickness, strength, and serviceability (deflections) could only be achieved utilizing post-tensioning.

Jury Comments:

- This project met the challenges of height limits, easements, a large wastewater pump station, and truck maneuvering areas under the building. These required long spans that could only be efficiently achieved through post-tensioning. Add to this hanging columns with a roof level transfer slab, transfer girders and a transfer truss. Visually striking cantilever rotated and cantilevered floors at the upper levels.

Buildings

Award of Excellence

LA Stadium & Entertainment District at Hollywood Park

Submitted by: Kiewit Infrastructure West Co.
Location: Inglewood, California
Owner: Kroenke Sports & Entertainment
Architect: HKS
Engineer: Walter P. Moore, Kiewit Infrastructure Engineers
Contractor: Turner AECOM, Hunt NFL JV
PT Supplier: Schwager Davis, Inc.
Other Contributors: McNary Bergeron & Associates, Kiewit Infrastructure West Co.

Project Overview:

The $3.3 billion, state-of-the-art City of Champions football stadium is being built in Inglewood, California, as the new home for both the Los Angeles Rams and the Los Angeles Chargers. Located adjacent to the Newport-Inglewood Fault, and within the glide path of LAX airport, the stadium's field level will be approx. 100 ft. below ground due to airport height restrictions. With around 3 million sf of usable space, the facility design has an expected seating capacity of 80,000 (maxing out at 100,000) and includes 16,000 premium seats and 275 luxury suites. The building also features an entertainment district dubbed "NFL Disney World" by NFL officials. The new stadium is scheduled to open for the 2020 NFL season. The respondent's role entails 5 million cubic yards of excavation and construction of the 100-ft. high mechanically stabilized earth (MSE) wall around the stadium, as well as the stadium's massive precast roof columns and associated foundations, encompassing 7.6 Million linear feet of PT strand.

The innovative use of the MSE wall and isolated post-tensioned system resulted in savings of more than $100 million and the methodology selected allowed for the aggressive schedule to be met. Coordination was required for multiple construction operations occurring simultaneously, including installation of the MSE and straps around the plinth columns, construction of the plinth columns and lateral struts, construction of the butterfly caps, erection of the blade columns, and post-tensioning operations.

The design of horizontal and vertical post-tensioning in the roof substructure in addition to the blade column isolator allows the roof to withstand a 9.0 earthquake. Moving the post-tensioning tendons outside of the concrete made the construction of the precast blade columns possible due to the amount of steel required. In addition, the post-tensioning substantially reduced the overall duration of the project.

To safely and efficiently post-tension the columns at heights up to 165 feet off the ground, a self-contained PT platform was used. It housed all the equipment for the operation while also eliminating the need for tie off and protecting from dropped objects. The platforms were designed to easily sit on top of the ring or cap for one quick mobilization by the crew, utilizing the erection crane after the last segment had been placed. The efficiency of the precast system and reduction of the construction schedule was the result of the design optimization by integrating design, engineers, and the construction team from the early stages of the project.

When the blade columns were completed, a cast-in-place parapet wall was built to support the isolator bearings and the roof structure. Each parapet wall is unique to capture the slope of the roof depending on the location along the perimeter of the stadium. The completed blade columns received a fog finish to achieve the architectural vision for a monolithic column inside the stadium.

Jury Comments:

- A one-of-a-kind application of post-tensioning to enable seismic isolation of the roof structure from the stadium bowl deep excavation. This project is a prime example of using the longevity benefits of post-tensioning paired with base isolation to minimize risks in high seismic zones. Advances in these technologies enable project teams to execute amazing projects that were not feasible just a few years ago.

Industrial/Special Applications

Award of Merit

Precast Segmental PT Box Girder Wind Turbine Foundation

Submitted by: RUTE Foundation Systems, Inc.
Location: Chippewa County, Minnesota
Owner: Palmer's Creek Wind, LLC
Architect: RUTE Foundation Systems
Engineer: Barr Engineering Co.
Contractor: RUTE Foundation Systems, Fagen
PT Supplier: Structural Technologies
Other Contributors: Marvel Bridge Engineers, Beton Consulting Engineers, K & M Rebar, Armeni Consulting Services, American Engineering & Testing

Project Overview:

In January 2018, a Minnesota wind farm contracted for the wind industry's first precast post-tensioned wind-turbine foundation structure. The wind farm owner was motivated to explore an industry problem. With cast-in-place technology, foundation structures cannot be taken apart or moved without destructive demolition. The owner wanted the ability to move the structure either prior to turbine tower erection or after 20-year decommissioning. Wind projects sometimes require late-stage changes in turbine locations or to the turbines themselves. This can even occur after foundation work has already begun.

The project's 500-foot-tall wind-turbine and tower impart significant design loads on the foundation: 584,000 lbs vertical dead load and 45,000,000 lb-ft overturning moment live load. The large overturning demand provided a design challenge and great opportunity for post-tensioning technology. The structure was designed by a combined group of segmental-bridge and wind-turbine-foundation designers. The prototype design was completed within a short schedule and required rigorous use of standards from both industries. The segments were match-cast with 10,000 psi self-consolidating concrete at a southwest Minnesota facility and then transported 30 miles to the wind farm site. The 12 girder segments were assembled and post-tensioned in the excavation. The post-tensioning system is comprised of 16 tendons, eight in each direction.

Each tendon includes 19 strands, each 0.6 inches in diameter, and the strands terminate in the standard multi-strand trumpet anchorages used in bridges. Approximately 8 million pounds of compressive force are applied in each of two span directions of the 61-foot-diameter structure. The foundation was backfilled with compacted soil which is the same technique for a cast-in-place foundation. The wind turbine generator tower was erected and topped with the nacelle and rotor in November 2018.

The typical shallow foundation for wind-turbines is cast-in-place reinforced concrete. It ranges from 300 to 700 yards of continuously placed concrete and requires transportation of reinforcement and erection in a remote location. A shallow foundation built with precast concrete segments and post-tensioning, however, permits all concrete work to be completed off-site and limits both road impacts and the time crews spend working inside the excavations.

Other advantages include corrosion resistance and ease of reuse and removal. The wind energy industry is pursuing taller and more powerful turbines with larger foundation loads. The precast segmental post-tensioned form of shallow foundation will be able to grow more easily for larger loads than the tapered-thickness mat foundations which predominate in the US now. Although the geotechnical investigation and design requirements are identical for both types, the demand for larger volumes of continuously placed concrete in remote areas and the concrete heat of hydration are not factors with a precast foundation.

While foundation total costs of cast-in-place versus precast may be difficult to compare in some cases, an essential benefit to the levelized cost of energy (LCOE) is realistic and is expected to be demonstrable with a precast post-tensioned foundation solution.

Jury Comments:

- This structure used a creative and innovative use of existing PT construction techniques, brought to bear on a different structural application. It also illustrates a timely and efficient solution to a fast-growing infrastructure/energy sector construction industry.
- This project shows a new and innovative market for post-tensioning. PT solved many constructability issues and provided the opportunity for reuse. Awesome!

Industrial/Special Applications

Segal Visitors Center

Submitted by: Walker Consultants
Location: Evanston, Illinois
Owner: Northwestern University
Architect: Perkins + Will
Engineer: Walker Consultants
Contractor: Power Construction
PT Supplier: DSI

Project Overview:

A parking structure and visitors center with 435 parking spaces on five levels of parking and two levels of the visitors' center. The structure has a new state-of-the-art visitor center for the university's prospective students and their families. The 170,000 SF facility includes an auditorium with 160 seats, meeting rooms, offices for admissions staff and a two-story reception area. A lake and the surrounding landscape provide dramatic backdrop for the visitors to enjoy. The structure is cast-in-place, post-tensioned concrete structure with conventionally reinforced column and shear walls. There are future horizontal expansion capabilities.

The post-tensioned parking structure has many challenges. The long span beams with the curved west façade to follow the roadway. The overall height limitation due to the city zoning requirements. Supporting a very appealing architectural façade with vertical fabric fins infill the limestone on the north and east side; and cladding with fritted glass curtain wall on the south and west side. A portion of the north end of the building built over an existing parking deck.

To meet the above challenges, post-tensioned floor system was utilized to reduce the members sizes. 5½" thick post-tensioned slabs supported by 36" deep beams with PT anchors at the curved edge of the slab. To meet the aggressive exposure zone requirements, fully encapsulated PT system was utilized. Pour strip was closed with a more stringent mix design with fibers and corrosion inhibitor. Shearwall pour delayed by 28 days to allow for post-tensioning and to alleviate the restraining caused by the volume change movements.

Considering the site restrictions, geometry, and a higher level of durability requirements, post-tensioned system was an excellent option that not only met owner's objectives but have exceeded their expectations.

Jury Comments:

- This project is a great example of combining the efficiencies of PT construction with striking architectural expression in a mixed-use parking structure application.
- Beautiful integration of the parking and visitor's center with the site and surrounding landscape.

Award of Merit

Miami Design District Museum Garage

Submitted by:	Timothy Haahs & Associates, Inc.
Location:	Miami, Florida
Owner:	Miami Design District Associates
Architect:	Timothy Haahs & Associates, Inc.
Engineer:	Timothy Haahs & Associates, Inc.
Contractor:	KVC Constructors, Inc.
PT Supplier:	Suncoast Post-Tension
Other Contributors:	Terence Riley, WORKac, J. MAYER H., Nicolas Buffe, Clavel Arquitectos, K/R, A. Zahner Co., Entech Innovative, Jamian Juliano-Villain, Island Planning Assoc., Bromley Cook, Ford Engineers, Florida Engineering Services, TLC Engineering, Speirs + Major, Green Space Strategies

Project Overview:

The Museum Garage is a 927-space, 7-story, mixed-use structure in the Miami Design District, Florida. Composed of cast-in-place, post-tensioned concrete, the Museum Garage features five (5) distinct custom façades, valet parking, retail & restaurant areas on the ground floor, and a basement level with mechanical car lifts. A slew of creative structural design techniques was developed to support the artistic façade designs. Slab edges were reinforced to address the eccentric loading generated by the façade components. A system of mullions was also developed to transfer the loads of the façades to the slab edges.

Other enhancements included stair and elevator towers, parking access control for different user types, location of islands and parking equipment. To complement the District's dedication to the creative experience, this unprecedented structure provides an attractive connection between parking and the rest of the development with its vibrant façades, dramatic lighting, and ground floor retail spaces to engage the pedestrian.

The use of post-tensioning allows for a long span structure, which provides greater internal visibility and flow capacity by reducing the number of columns. This provides users a better level of service. Operationally, a post-tensioned structure is also more durable. Minimal construction joints also result in lower long-term maintenance costs. The cantilevered, 3 ft. deep post-tensioned beams can also take heavy loads from 6 levels of loading. These cantilevered sections were crucial in providing a design solution and structurally supporting the heavy architectural façade elements (i.e. -planters, metal ornaments, fiberglass cars, etc.).

Jury Comments:

- Beautiful structure fitting its location. Post-tensioning provided solutions for the geometry, a clean structure and supporting the weight of the external elements such as the planters and architectural elements.
- PT allowed for an efficient and open garage structure coupled with a visually impressive exterior that will very likely become a point of interest in its own right within the Miami Design District.

Parking

East Link Extension/I-90 Homer Hadley Floating Bridge Retrofit

Submitted by:	Jacobs, Schwager Davis
Location:	Seattle, Washington
Owner:	Sound Transit
Engineer:	WSP, KPFF Consulting Engineers, Jacob Myer, Guido Schwager
Contractor:	Kiewit Hoffman
PT Supplier:	Schwager Davis
Other Contributors:	Jacobs, Washington State DOT

Project Overview:

The Homer M. Hadley (HMH) Floating Bridge is one of the longest floating bridges in the world and is part of the I-90 freeway. It takes traffic from Mercer Island, westward to downtown Seattle on the northern lanes of the bridge. The southern 'express' lanes have been leased to Sound Transit in anticipation of the construction and subsequent operation of a light rail extension, taking the existing light rail system eastward, approximately 14 miles, from downtown Seattle to the City of Redmond. This will be the first time light rail has ever been constructed on a floating bridge anywhere in the world. Sound Transit (transit agency) agreed to add longitudinal post-tensioning to the pontoons of the HMH Bridge, to extend the life of the bridge by minimizing the current racking of these pontoons in adverse weather.

At approximately 3,600 linear feet, the installation of post-tensioning in the HMH Bridge is believed to be the longest applications of post-tensioning in the world. If this was not challenging enough, the construction operation included fabricating, delivering and installing approximately 1,800 pieces of anchor frame steel collectively weighing 41,000 lbs into the confined spaces of the pontoons and hand transporting them to each end for the erection of 20 anchor frames. The pontoons were cored and 20 tendons containing over 1 million feet of strand were installed through the pontoons to each anchor frame. During the stressing operation the strands were elongated approximately 20 feet to create a force of 615,000 lbs on each of the reaction frames resulting in a 'shrinking' of the bridge by approximately 3 inches. All of this was achieved while constantly 'ballasting' the floating bridge to maintain stability and buoyancy during construction.

The HMH Floating Bridge comprises of 20 pontoons, made up of phase 1 pontoons in the center of the bridge and phase 2 pontoons on either end. The phase 1, center pontoons of the Bridge did not have any longitudinal post-tensioning installed when constructed in 1989. This makes the pontoons susceptible to racking during high wind events that can result in micro-cracking of the hull and deck of the bridge. This in turn can lead to corrosion and leaks within the pontoons and ultimately reduce the life of the bridge. A concern of adding light rail on the bridge was that additional stress could expedite this deterioration.

The addition of post-tensioning pulls the pontoons together, keeping the concrete in a compressive state which minimizes stresses and therefore increases the durability and useful life of the bridge. Without the addition of the post-tensioning application the remaining design life of the bridge once light rail opened would have been 35 years. The addition of post-tensioning extended the useful life of the bridge by an additional 25 plus years.

In addition, the post-tensioned bridge can endure stronger wind events ensuring more reliable transit by reducing service interruptions as a result.

Jury Comments:

- The planning, coordination and executing the project with minimal interference to the traffic is commendable. Very creative in providing solution for anchorage reaction frame, stressing and grouting one of the longest tendons with almost no defects in the grouting process is great. No reported safety incident is another plus point to the construction team.

25 Beacon

Submitted by: CCL USA, Inc.
Location: Boston, Massachusetts
Owner: SDC-DLJ Beacon Hill, LLC
Architect: CBT Architects
Engineer: McNamara Salvia
Contractor: SEA-DAR Construction
PT Supplier: CCL USA, Inc.

Project Overview:

Beacon Hill in Boston is a conservation area characterized by narrow streets and heritage-protected Federal-style façades. Numbers 6 and 7 Mount Vernon are two townhouses, which have been refurbished as luxury 21st century properties, along with a building to the rear, which was converted into luxury condos as part of the same project (25 Beacon).

The plan for the development was to add value with a parking basement that would serve both the townhouses and the condos in a location where on-site parking is extremely rare and on-street parking is not permitted. The basement had to be constructed in a way that would protect the above-ground structure during excavation and post-construction, along with the adjacent properties, which share structural walls. The design of the structural solution for the basement also needed to address the requirement for vehicle movements and a proposed capacity of 14 parking bays.

The conservation area location also involved design and buildability challenges. Modifications to the external aspect of the properties had to be 'in-keeping' with the local architectural context and original design, and the narrow streets severely restricted vehicle movements, the equipment that could be used and any cranage requirements.

To overcome the heritage restrictions relating to exterior modifications, the basement parking lot was designed with a ground-level entrance and an elevator to take vehicles below the building.

The construction contractor began brainstorming alternatives and proposed the idea of a top down construction program that would enable the above-ground structure to be supported without underpinning during the excavations. The contractor brought in the post-tensioning specialist to advise on feasibility and design a suitable solution.

Combining mini piles with a post-tensioned slab tied into the structural walls, the project team designed a solution that supported the above-ground structure during the excavation and continues to support it post-construction. To avoid the need for a U-beam underneath the slab and embracing the existing structural walls, a post-tensioned two-way transfer slab solution woven through the walls was developed. The solution provided adequate capacity to support the self-weight and the movements of the above-ground structure while allowing for top-down construction.

The intent was once the slab reached its capacity, the structure above would be free from its original foundations, allowing these foundations (concrete and reinforcement) to be cut from beneath the slab.

This two-way slab solution was very appealing to the project team because it leaves an open-plan parking garage just two internal columns, essentially yielding a transfer slab of 32 ft spans intertwined with the existing walls.

Jury Comments:

- Innovative solution utilizing PT to simplify required site stabilization, enabling top down construction to create a parking basement in a historic area where parking is hard to find.
- This was a creative solution in a very tight area and keeping with the historical architectural requirements.

R.H. Johnson Recreation Center

Submitted by:	Suncoast Post-Tension
Location:	Sun City West, Arizona
Owner:	Sun City West Property Owners and Residents Association
Architect:	Dig Studio
Engineer:	Felton Group
Contractor:	K.L. McIntyre General Contractor
PT Supplier:	Suncoast Post-Tension
Other Contributors:	Weaver Concrete, Inc.

Project Overview:

Sun City West is a Del Webb master planned community for active adults located on the outskirts of Phoenix, AZ. It was started in the early 1970's and was completely built out by 1998. It has 18,200 housing unit and a population of about 30,000 people.

The tennis courts at the R.H. Johnson Recreation Center in in the development was closed on March 26, 2018 to undergo a $1.5M, 7-month renovation project. The focus of the project was the resurfacing of the 15-tennis courts within the complex. The complex reopened on November 29, 2018.

The plans called for the overall resurfacing of the 15 tennis courts with post-tension concrete slabs. The current asphalt courts were less than 20-years old and were crumbling and cracking, causing the Pro-Bounce surface to also crack leaving dead spots, and affecting playability, but most importantly caused the courts to be a hazard to the players' safety.

Post-tensioning offered a long-term solution by providing an esthetically pleasing and structural solution to the recurring cracking, crumbling and unsafe playing surface associated with asphalt tennis courts. Playing surface coating are expensive to repair and/or replace when the surface they are applied to does not hold-up over time. The longevity of post-tensioned concrete afforded the property owners a one-time solution that would prevent the unnecessary expense of repairs and/or replacement that could impact the maintenance budget of the association and the property owners.

Jury Comments:

- A great example of life cycle cost improvements and high-end aesthetic appeal using a well thought out, PT slab-on-ground solution.
- Promotes effective use of PT for sport court slabs while emphasizing that the use of PT provides long-term durability.

Award of Merit

Athletic Running Track Renovation

Submitted by: Classic Turf Company
Location: Burlington, Connecticut
Owner: Region 10 School District
Architect: Region 10, Classic Turf Company
Engineer: Classic Turf Company, Jerry Kunkel
Contractor: Classic Turf Company
PT Supplier: Builders Post-Tension
Other Contributors: Stockmeir Urethanes, MEI

Project Overview:

The design-build company installed four post-tensioned tennis courts for this same client about four years ago. At the time, after the post-tension system was explained and the client understood the advantages, it was mentioned by the design-build company that when the school was ready to rebuild the track and field facility that post tension should be highly considered for the track reconstruction.

This school and town are smaller than most in the area. They do not have the opportunity to raise the amount of money it takes to rebuild these facilities every 10 years, so they wanted to do something that would last a lifetime. After three years of debating and raising money, the post-tension system was chosen for the track reconstruction. The design-build company performed the conceptual design of the post tension system, the finish track surface and the construction of both.

The overall scope of the project was to construct a new post-tension track with new perimeter fencing and the installation of new sod for the football field on the interior of the track. The existing track was asphalt which had several structural issues, most of which were cracking. The planarity of the existing track, size, and slope were all within standards of athletic running track construction. This resulted in the new post-tension track to be installed directly on top of the existing without removing any existing material. The post-tension floor was placed raising the track elevation by 4 ½”. Additional material was brought in to raise the elevation of the field and new sod was installed. Perimeter fencing and the track surface were then installed. The track surface is a non-porous 100% waterproof system. Resulting in substantial protection of the post-tension slab from all of mother nature’s elements here in the northeast.

There are so many problems with using asphalt as a base material in the Northeastern United States. We are seeing newly installed asphalt developing cracks when used for tennis courts or running tracks just after several years. The surface material used for running tracks is extremely expensive, sometimes twice the cost of asphalt depending on what surface system is chosen. The running track surface material has a life span of up to 20+ years if recoated on time and properly. When asphalt is used for the base of these tracks the owner never can use the track surface to its maximum potential because the asphalt base develops structural issues even before the track surface needs replacement. This results in the demolition of the entire track and then reconstruction, repeating this vicus cycle.

The use of post-tensioned concrete in athletic running tracks is ideal. When designed and installed correctly, the post-tensioned base under the running track surface has the capability of lasting longer then the track surface itself. This makes the initial investment by the owner into the facility worthwhile. There will never be a need to reconstruct the entire track from the ground up only the routine recoating of the track surface itself.

Jury Comments:

- Glad to see that a small school district had the vision to consider full life cycle costing in order to reduce long-term costs and ensure an extended functional lifespan with minimal maintenance.

Slab-on-Ground

55 Hudson Yards

Submitted by: WSP USA
Location: New York, New York
Owner: Related Companies, Oxford Properties Group, Mitsui Fudosan America, Inc.
Architect: Kohn Pederson Fox, Kevin Roche, John Dinkeloo & Associates
Engineer: WSP USA
Contractor: Gilbane Building Co.
PT Supplier: AMSYSCO, Inc.
Other Contributors: ADAPT Corp.

Project Overview:

The 55 Hudson Yards project is part of the Manhattan Western Expansion project by Related/Oxford Properties. Located on 11th Avenue between 33rd and 34th Street, the 51-story tower reaches 760 feet in height and encompasses 1.3 million square feet of gross area, including a 10-floor podium.

Amongst the most significant engineering challenges of the project are the site and load-carrying constraints due to large interaction with existing MTA infrastructure, as well as the maximization of both column-free spaces and flexibility for future modifications. These challenges were successfully addressed by incorporating post-tensioned concrete elements in three distinct ways, and a unique construction sequence aimed at creating a specific vertical load path.

Post-tensioned applications were implemented in a) 40-50 feet, 9-in. thick slabs; b) bonded tendons draped over a 39-feet deep transfer wall; and c) straight tendons on 9th floor to carry horizontal loads associated with walking columns at the transition between the podium and the tower.

The unique construction sequence was triggered by the need to redirect vertical loads to specific locations in the foundation where ample load-carrying capacity had been identified, and away from the existing MTA infrastructure located directly underneath the building. The required sequence was developed by means of a "construction gap" left open until the redirection of loads had been successfully concluded.

Paramount to the project was the requirement to provide flexibility for potential future changes per tenant's requests. Provisions for floor layout modifications were achieved by using a banded distribution of tendons creating rather ample tendon-free zones where tenants may create new floor openings. Furthermore, 3D laser surveys were carried out during construction to determine the as-built location of all post-tensioning tendons.

The interaction and overlapping of new structures with existing infrastructure is becoming not only more common but also more complex in dense urban environments. Fifty-five Hudson Yards greatly exemplifies the need for innovative design strategies and construction techniques to address the challenges of extensive projects in dense urban settings.

To achieve the lightest possible concrete structure while directing loads from the central core to the perimeter, post-tensioning systems were used in three different ways.

First, the thickness of typical floor spanning 40 to 50 feet was reduced to only 9 inches using post-tensioned slabs. The weight of the floors was further decreased with the use of 130-pcf lightweight concrete, a somewhat unconventional practice for post-tensioned floor slabs.

The second implementation was the provision of bonded post-tensioned tendons draped over a 39-feet tall transfer wall located in 9th and 10th floors to redirect a portion of the vertical load of the central core to the perimeter.

Finally, at the change in geometry between the tower and the podium, walking columns were used to transfer vertical loads to the perimeter columns. This solution resulted in significantly large compression and tension forces within the 10th and 9th floors, respectively. The latter were carried by straight post-tensioned tendons.

Jury Comments:

- A truly innovative approach for using the secondary effects of post-tensioning to control the tower's load path. This project has opened the door for the use of post-tensioning in the NYC developer market and is a huge win for the entire PT industry."
- Post-tensioning has been used in an innovative, non-traditional way to meet extremely challenging project criterion. The successful delivery of this project helps blaze a trail into new markets and new applications of post-tensioning systems.

Project of the Year

2019 PTI COMMITTEE DAYS
October 2-4, 2019
Hilton Santa Fe Historic Plaza
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May 3-6, 2020
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