POST-TENSIONING CONVENTION

2022 PROCEEDINGS

APRIL 23-27, 2022

Hilton La Jolla Torrey Pines, La Jolla, CA

For more information, please visit post-tensioning.org.

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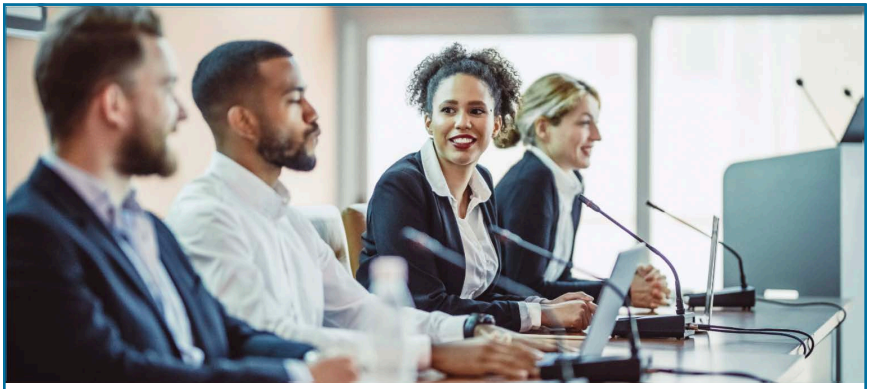
2022 Technical Sessions

Links to the technical session presentations are available from the following pages. Navigate to the session of interest and select "presentation" to view. Please note that not all sessions were approved for publication.



Technical Session 1: PT Bridges & Multistrand PT

Moderator: Brian Merrill, Wiss, Janney, Elstner Associates

Using Post-Tensioning to Design for Resiliency and Durability on the Largest Spliced Precast Concrete Girder Bridge in Vermont

Thomas French, HDR

The presentation will provide an overview of how Post-Tensioning was used to splice precast segments together resulting in the 860-foot-long bridge. Each bridge has five girders comprised of seven precast concrete segments spliced together by 850-foot-long 19-strand post-tensioned tendons. Through the design-build project delivery method, VTrans chose to replace two deteriorating 60-year old steel truss bridges.

Presentation not released for distribution

Precast Segmental Duct Couplers for Closure Pours

Agnieszka Joanna Skalska, GTI

This presentation will review current industry practices and present new solutions with enhanced precast segmental duct couplers to be installed in the closure pour of precast segmental balanced cantilever bridges, span-by-span construction, or continuity tendons between Bulb-T girders. The presentation will include discussion on improvements to precast segmental duct couplers making them stronger and suitable for closure pours while keeping the same corrosion protection levels and misalignment capacities.

Presentation not released for distribution

STGJV – Hart's – Phase 3 – Elevated Precast Airport Guideway Section, Post-Tensioning Elements and Construction Challenges

Guy Cloutier, LCPT International Consulting

This will be an overview of the Post-tensioning and constructibility of the Honolulu Elevated Guideway project, It will show the many uses of Post tensioning developed by the Engineer of Record and the construction crew. The Guideway Precast Sections will show the long spans and the various segment sections that were used on the project.

Presentation not released for distribution

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Technical Session 2: PT Bridges & Multistrand PT

Moderator: Bob Sward, Structural Technologies, LLC

Post-Tensioned Design, Materials and Construction Requirements in Washington State

Bijan Khaleghi & Anthony Mizumori, WSDOT

This presentation focuses on Washington State Department of Transportation (WSDOT) post-tensioned bridge design and construction practices relative to materials, post-tensioning systems and grouting of post-tensioning tendons for bridges. This presentation describes WSDOT's up-to-date requirement for post-tensioned concrete bridges to be consistent with PTI/ASBI M50.3-19 Specification for Multistrand and Grouted Post-Tensioning, PTI M55.1-19 Specification for Grouting of Post-Tensioned Structures, and PTI M10.2-17 Specification for Unbonded Single Strand Tendons.

Video | **Presentation**

Upcoming Revision of FIB Bulletin No. 75 - Polymer Ducts for Internal Post-Tensioning

Klaus Lanzinger, GTI

This presentation will provide an overview of the most important contents of fib Bulletin No. 75 for builders, designers and contractors, as well as an outlook on planned changes. Currently, fib TG 5.11 is reviewing this document and will issue a revised version in the near future. Fib Bulletin No. 75 Polymer-duct systems for internal bonded post-tensioning was issued in 2014 and is used as a cornerstone for technical approval process of polymer ducts. It provides information for the structural engineers regarding design and detailing of concrete structures containing tendons with polymer ducts.

Presentation not released for distribution

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Technical Session 2: PT Bridges & Multistrand PT

Moderator: Bob Sward, Structural Technologies, LLC

Transportation Infrastructure Mega Project in China. Upgrading the 4th Ring Transportation Corridor in Zhengzhou, Henan, China

Gernot Komar, Sun Engineering & Technology International

The City of Zhengzhou was in need of an additional elevated expressway to increase the traffic capacity from 10 lanes to 18 lanes on the 4th Ring Transportation Corridor to connect the inner city with the suburban areas. The focus of this project is to increase the capacity, by reducing the impact to the current traffic flow in a very short time frame and to meet the government requirements to implement green construction technology, which calls for an innovative solution.

Presentation not released for distribution

Using Post-Tensioned Concrete to Design and Construct Context Sensitive Footbridges at a Nature Preserve in Encinitas, California

Tony Sanchez, HDR

This presentation discusses the San Elijo Lagoon Conservancy in Encinitas, California, which needed two footbridges for its nature preserve. A context sensitive approach using post tensioned concrete was used and low profile bridges were custom designed for the site. Other architectural features included curved approaches, colored concrete and custom railings, and special details to provide a 100-year service life in a corrosive environment.

Video | **Presentation**

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Technical Session 3: PT Buildings

Moderator: Carol Hayek, CCL

CONRAC Maui - The Case for PT Moments Frames and Harped Tendons

Steven Baldridge, BASE

This presentation describes the 1.9 million SF facility / exceptional engineering project at Kahului Airport, Maui that went above and beyond to provide a state-of-the-art structure. Designed using a design-build approach, the structural engineerassisted the project's contractor to find several million dollars of savings ultimately shared with the project owner.

Video | **Presentation**

SigmaSlab®, Breakthrough in Slab Construction

Carol Hayek, CCL & Hendrik Thooft, Bekaert

This presentation first does an overview of the basic SFRC design principles and then goes into the specifics of these design principles of a combined SFRC/PT reinforced slab on ground. Next, the presentation discusses the benefits of combining SFRC with PT for ground supported slabs and lastly discusses practical aspects from real projects.

Video | **Presentation**

High Performance Concrete Voided Slabs with PT

Mike Mota, Cobiax USA & Michael Hopper, LERA

The purpose of this presentation is to highlight technologies that allow flat plate floor systems to economically achieve spans in the 45 to 50 ft range (13.7 to 15.2 m) commonly used in Class A office building construction. This presentation discusses the specific technology applications that can reduce the environmental impact of buildings.

Video | **Presentation**

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Technical Session 4: PT Buildings

Moderator: Bryan Allred, Seneca Structural Engineering, Inc.

270 Park Avenue: Pushing U-Loop Tendons to Their Limits

Mark Saliba, Freyssinet & Florian Aalami, Visicon

This presentation serves to shed light on the design and execution of JP Morgan Chase's new headquarters in New York City. The engineering team of the 270 Park Avenue skyscraper deemed it necessary to integrate vertical post-tensioning tendons into the foundation of the structure and ended up using 12 U-looped tendons while solving many design challenges such as the extremely tight U-loops radii.

Video | **Presentation**

Design of Post-Tensioned Concrete Buildings for Efficiency and Resilience

Leo Panian, Tipping Structural Engineers

This presentation describes strategies for the design of concrete floor assemblies and lateral load resisting systems that incorporate of post-tensioning to create cost-effective, sustainable, and resilient buildings. Examples will focus on the design of flat slabs with consideration for economy, long-term deflections, and future functionality.

Video | **Presentation**

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Technical Session 5: Special PT Topics & Research

Moderator: Thomas Kang, Seoul National University

Corrosion Test by Exposure to Salt Spray on Monostr and Anchorage

Fabio Albino de Souza, EBPX

One of the methods of combating corrosion is to avoid metal contact with the corrosive environment and this preliminary work aimed to evaluate three types of processes that can be used to protect the piece. Then the anchor plate was subjected to the salt spray test, that is, an accelerated laboratory test to simulate weather conditions in which it was possible to evaluate the efficiency of the processes used.

Video | **Presentation**

Unbonded Tendon Finishing - Cutting, Capping and Grout Pockets

Ted Neff & Sam Carnell, GTI

This presentation will review current specifications and industry practices for cutting tendon tails, capping encapsulated anchors and grouting stressing pockets. Potential pitfalls will be identified and recommendations for mitigating these problems will be discussed. In addition, proper procedures for plasma and pocket shearer cutting methods will be addressed.

Video | **Presentation**

Staying Cool Under Fire: Evaluating Fire-Exposed PT

Tracy Naso & Ralf Leistikow, Wiss, Janney, Elstner Associates

National model building codes require that all new and existing buildings provide a minimum level of fire resistance. However, these codes do not provide guidance regarding the assessment of structural framing elements exposed to elevated temperatures, such as from a fire. When such buildings or structural framing members are also post-tensioned, the post-tensioning system adds an extra element to be evaluated. This presentation offers general guidance for approaching evaluation of fire-damaged PT structures based on past experience and industry recommendations for the assessment of fire damage, with special emphasis on the PT system.

Presentation not released for distribution

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Technical Session 6: Special PT Topics and Research

Moderator: Tracy Naso, Wiss, Janney, Elstner Associates

Automatic System for Measurement of Prestressing Tendon Force and Elongation

Thomas Kang & Suhyun Park, Seoul National University

In conventional practice, a worker monitors a pressure gauge and measures a jack piston movement or tendon tail movement by eye, but with some issues of uncertainty and inconvenience. To overcome such issues, the authors developed an IoT system for measuring prestressing forces of tendons. The system measures the effective elongation following the conventional measurement process, while it digitalizes and automates all processes. In this study, the automatic system was fine-tuned to improve its site application and has been applied in the field.

Presentation not released for distribution

Experimental and Analytical Studies on Impact Resistance of Prestressed Concrete Panels

Thomas Kang & Seong Ryong Ahn, Seoul National University

In this study, the impact resistance of reinforced concrete (RC) and post-tensioned (PT) panels subjected to various types of projectiles was investigated using both experimental and analytical methods, as follows: First, high-velocity impact tests were conducted on the behavior of RC and unbonded PT panels against rigid and deformable projectiles. Second, drop-weight low-velocity impact experiments were carried out using RC or unbonded PT panels of 2,400 × 2,400 × 350 mm. Dropping was repeated several times with the same mass of 2,200 kg while increasing the drop height. Finally, nonlinear finite element analyses of PT panels with different levels of prestressing were performed.

Presentation not released for distribution

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Technical Session 6: Special PT Topics and Research

Moderator: Tracy Naso, Wiss, Janney, Elstner Associates

Post-Tensioning Concrete Application for Digester Tanks - Tuas Water Reclamation Plant (TWRP), Singapore

Khaled Abdelmoula, GTI

The presentation will demonstrate the post-tensioning solution for PL2 requirements in different concrete members of the Digester Tank such as walls and cone roof. Details, and drawings show the construction of the digester. To achieve PL2 requirements, plastic ducts and couplers were used. The contractor wanted to use vertical loop tendons with a 5-meter radius for the loop – to maintain the PL2 requirement plastic duct had to be used so a specially formulated blend was developed for the tight-radius plastic duct application. The post-tensioning solution meeting PL2 requirements provides a long-lasting and durable structure for this important part of the Tuas Water Reclamation Plant (TWRP).

Presentation not released for distribution

Application of Post-Tensioned Ground Anchor for One of the World's Highest Hydro Power Projects

Nagarajkumar Bommakanti, Stresza Systems Global Tech

Tehri dam is one of the worlds highest dam that is constructed in the state of Uttarakhand, India with 1000 MW hydro power generation capacity. The dam has got approval for the extension of 4 x 250 MW pumped storage plant and has to be added with TRT inlet and outlet structure with the post tensioned permanent anchors protection. The new concept of recycling water from upper reservoir to lower reservoir needs a protected wall for out fall waters from the extension plant. This Technical presentation provides the information how the permanent anchors were fabricated installed and stressing activities carried out at such high altitude and challenging environments by meeting global standard for post tensioned ground anchors.

Presentation not released for distribution

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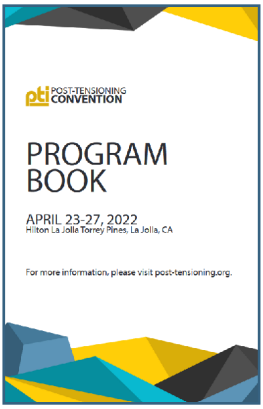
Program Booklet & Awards Booklet



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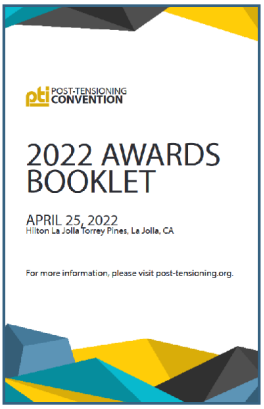

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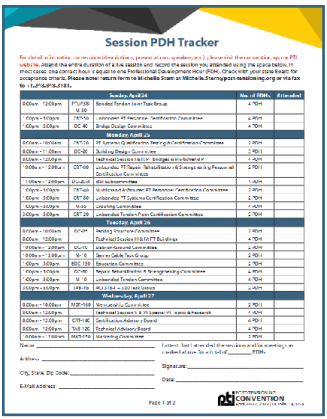
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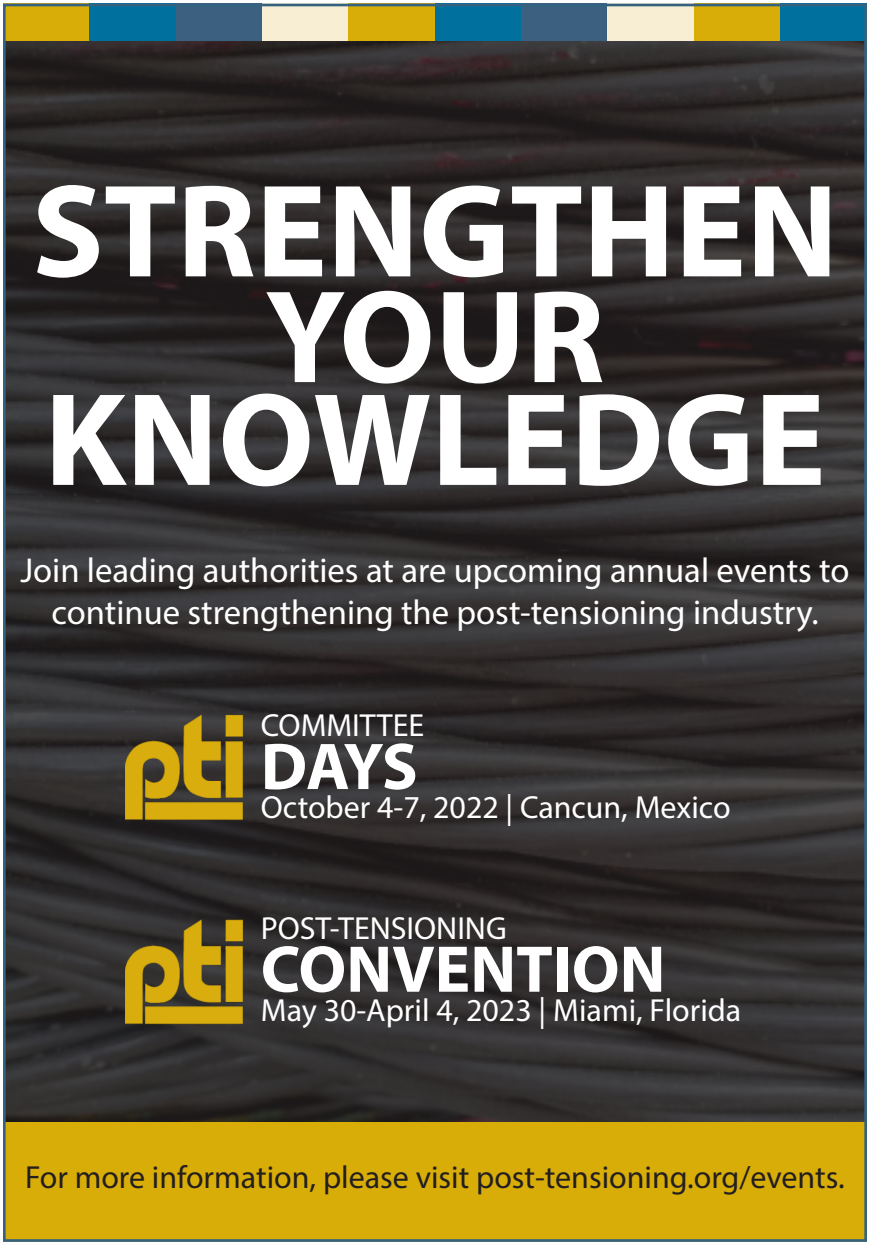

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Have Post-Tensioning Questions? We Have Reinforced Answers.

PTI has engineering staff available to assist you with any post-tensioning related technical questions you might have about a document or a project.

If you have a technical question, issue, or challenge to be met with post-tensioning, our team can provide assistance and answer. Contact us via e-mail at *technical.inquiries@post-tensioning.org*.

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