70TH ANNUAL

STRUCTURAL ENGINEERING CONFERENCE

Thursday, March 6, 2025 | KU Union

KU SCHOOL OF ENGINEERING
The University of Kansas

Hosted by the
Civil, Environmental & Architectural
Engineering Department

CONFERENCE FAQS

PDHs

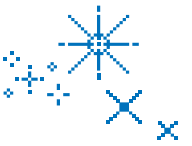
This conference offers a total of 6.5 professional development hours (PDH). An additional 0.5 PDH will be awarded to those who submit the Poster Ranking Sheet by the end of the conference day. The PDH certificate will be provided in an email after the event.

INTERNET

Select “KU Guest” and accept terms. No password is required.

PRESENTATIONS

For presentations that can be shared, a PDF copy will be available on the conference website.



CONFERENCE PLANNING

Conference Co-Chairs

Jian Li, Ph.D., P.E., F.ASCE
Professor
Dean R. and Florence W. Frisbie Associate Chair of Graduate Studies
Department of Civil, Environmental & Architectural Engineering
University of Kansas

William Kirkham, Ph.D., P.E., S.E.
Retired Director of Master of Civil Engineering (MCE) Program
Retired Professor of Practice in Civil Engineering
Department of Civil, Environmental & Architectural Engineering
University of Kansas

SAVE THE DATE

The 71st Annual Structural Engineering Conference will be held on **Thursday, March 5, 2026.**

AGENDA

7:30 - 8:15 a.m.	Registration and Continental Breakfast
8:15 - 8:20 a.m.	Introduction *Jian Li, Conference Co-Chair* *Elaina Sutley, Associate Dean for Impact and Belonging*
8:20 - 8:30 a.m.	Welcome *Caroline Bennett, Department Chair*

MORNING SESSION // Woodruff Auditorium, fifth floor

8:30 - 9:30 a.m.	**2024 Higgins Lecture** Think Global, Buckle Local: Exploring Local Buckling in Structural Steel *Benjamin Schafer, Willard and Lilian Hackerman Professor of Civil and Systems Engineering, Johns Hopkins University*
9:30 - 9:50 a.m.	Networking Refreshment Break
9:50 - 10:50 a.m.	Agency and Action in a Changing Climate: How SE 2050 Seeds Opportunity for Structural Engineers *Luke Lombardi, Senior Engineer, Buro Happold*
10:50 - 11:50 a.m.	Florida Building Inspection Laws *Jennifer A. Bridge, Associate Professor, University of Florida*
11:50 a.m. - 12:50 p.m.	Lunch

BUILDINGS SESSION // Woodruff Auditorium, fifth floor

1 - 1:05 p.m.	Introduction *Andrés Lepage, Professor and Director of Laboratories*
1:05 - 1:50 p.m.	Fundamentals of Structural Fire Protection: Designing for Safety and Resilience *Ben Brooks, Fire Protection Engineer, Brooks Fire Protection*
1:50 - 2:35 p.m.	From Retail to Rinks: How a Mall Turned Ice Center Is Defining Adaptive Reuse *Hunter Senior, Professional Engineer, Martin/Martin, Inc.*
2:35 - 2:55 p.m.	Networking Refreshment Break
2:55 - 3:40 p.m.	Drop-In Top Flange Shear Connection *Matt Yarnold, Associate Professor and Director of the Advanced Structural Engineering Laboratory, Auburn University*
3:40 - 4:30 p.m.	Current Trends in Performance-Based Wind and Seismic Design for Tall Buildings *Jeff Dragovich, Director of Applied Technology and Research, DeSimone*

AGENDA, contd.

BRIDGES SESSION // Big 12 Room, fifth floor

1 - 1:05 p.m.	Introduction *Will Collins, Associate Professor*
1:05 - 1:50 p.m.	Raising A Cable-Stayed Bridge: The Eugene Talmadge Memorial Crossing *Steve Hague, Vice President and Bridge Group Director, HNTB* *Angela Kingsley, Bridge Engineer, HNTB*
1:50 - 2:35 p.m.	Navigating the Aftermath: Key Bridge Cleanup Operations *Joe Knapp, Vice President, Genesis Structures* *Steve Percassi, Associate, Genesis Structures*
2:35 - 2:55 p.m.	Networking Refreshment Break
2:55 - 3:40 p.m.	Fern Hollow Bridge Emergency Replacement Project *Jason Fuller, Senior Project Manager, HDR*
3:40 - 4:30 p.m.	Deployable Tool for the Installation of Cross-Frames in Highly Skewed and Curved Steel Girder Bridges *David Byers, Co-Principal Investigator, Genesis Structures*

2024 Higgins Lecture

Think Global, Buckle Local: Exploring Local Buckling in Structural Steel

Woodruff Auditorium

8:30 – 9:30 a.m.

Benjamin Schafer

Willard and Lillian Hackerman Professor of Civil and Systems Engineering
Johns Hopkins University

Benjamin Schafer, Ph.D., P.E., is the Hackerman Professor of Civil and Systems Engineering at Johns Hopkins University, the Director of the Ralph O'Connor Sustainable Energy Institute and an active volunteer and leader on multiple AISC committees.

Abstract

Local buckling is an important phenomenon in steel structures, and this talk aims to place the phenomenon in the much larger global context of what structural engineers have achieved for society and what work we have left to do. Utilizing a historical lens, the talk explores the origins of local buckling in civil structures and how engineers harnessed the best theory of the time to understand and control local buckling. The simple ideas that underpin local buckling limits in current structural design are revealed and along with them the possibilities for harnessing local buckling to create new thin, efficient solutions for the future. Given the extreme state of current global infrastructure challenges, specific examples of steel innovations rising to meet these current conditions and the importance of local buckling in these solutions are highlighted.

Learning Objectives

1. Identify main developments in the AISC Specification related to local buckling.
2. Describe the difference between the two approaches: limiting local buckling versus embracing local buckling.
3. Explain how applying local buckling concepts can help meet the challenges of sustainability.

9:50–
10:50 a.m.

Agency and Action in a Changing Climate: How SE 2050 Seeds Opportunity for Structural Engineers

Woodruff Auditorium

Luke Lombardi

Senior Consultant
Buro Happold

Luke Lombardi advocates for the evolving role of structural engineers in the built environment. Lombardi's background as a practicing engineer is central to his understanding of materials and the construction industry. He has become an emerging leader on embodied carbon as co-chair of the SE 2050 Program and co-lead of the CLF Los Angeles Hub. He hopes to empower others to be curious and collaborate on today's solutions to the industry's biggest challenges.

Abstract

Though the laws of physics remain the same, the practice of structural engineering is constantly advancing and evolving. From progress made in computer-based analysis to advancements in seismic design, engineers can incorporate these advances to not only meet the expectations of our clients but manage our businesses while continuing to serve our communities.

In recent years, structural engineers have taken a leading role in the sustainability discussion as research into the impacts of material manufacturing has grown. The SE 2050 Program, first established in 2020, has expanded to include commitments from over 150 firms and become a focused initiative of the Structural Engineers Institute. This presentation will delve into the transformative landscape of structural sustainability and demonstrate how firms across the country are making progress by meeting emerging policies, proactively advocating for the value structural engineers bring and achieving the aspirational goals of the Program.

Learning Objectives

1. Understand the fundamental terminology and the structural engineers role with embodied carbon.
2. Be able to communicate the value structural engineers bring to clients when considering embodied carbon.
3. Learn about the resources available to structural engineers on se2050.org.

Florida Building Inspection Laws

Woodruff Auditorium

10:50 – 11:50 a.m.

Jennifer A. Bridge
Associate Professor
University of Florida

Dr. Jennifer Bridge is an associate professor in the Engineering School of Sustainable Infrastructure and Environment at the University of Florida and serves as the Vice Chair for the ASCE 11 Committee on the Structural Condition Assessment of Existing Buildings. She is the director of the National Science Foundation (NSF)-funded Natural Hazards Engineering Research Infrastructure Experimental Facility at UF and heads the Smart Infrastructure Management Laboratory. Bridge conducts research in the areas of wind hazard mitigation and structural health monitoring. Her research has been funded by NSF, the U.S. Department of Energy, the Florida Department of Transportation and the Florida Building Commission.

Abstract

The 2021 partial collapse of Champlain Towers South in Surfside, Florida, drew attention to the age-based building safety inspection programs and resulting building maintenance practices in Broward and Miami-Dade Counties in Florida. For decades, structural inspections had been required in both counties for many buildings when they reached 40 years of age, and every 10 years thereafter. Following the Surfside collapse, the Florida Building Commission initiated a study to evaluate the original 40-year inspection programs and provide recommendations for a similar regulation to be implemented across the state. In 2022, the statewide law was passed mandating structural milestone inspections of condominiums over three stories every 10 years after the buildings reach 30 years of age. This presentation will provide an assessment of the implementation and outcomes of the 40-year building inspection programs and provide an overview of the new Florida inspection law. The potential benefits and challenges of such inspection requirements will be discussed, as well as recommendations for achieving the desired outcomes for a range of stakeholders.

Learning Objectives

1. Identify existing standards, guidelines and regulations for conducting condition assessments of existing buildings nationwide and in local jurisdictions.
2. Understand the requirements of Florida's Building Structural Safety Inspection Program.
3. Describe the challenges of standardizing inspection reports based on visual inspection of existing buildings.

1:05 – 1:50 p.m.

Fundamentals of Structural Fire Protection: Designing for Safety and Resilience

Buildings // Woodruff Auditorium

Ben Brooks

Fire Protection Engineer
Brooks Fire Protection Engineering, LLC

Ben Brooks is a licensed professional fire protection engineer specializing in fire protection design, consulting and analysis with more than a decade of experience in laboratories, higher education facilities, healthcare facilities, office buildings, campus wide systems, data centers, commercial structures and government projects as the qualified fire protection engineer (QFPE) with expertise in water-based, chemical and gaseous fire protection systems, smoke management and control systems and fire alarm/ mass notification systems.

Abstract

Structural fire protection is crucial for preserving building integrity and ensuring occupant safety during fire events. This presentation introduces structural engineers and engineering students to key fire protection principles, including fire-resistant materials and structural fire ratings. Participants will explore the role of building codes and fire protection standards in structural design, with a focus on their real-world applications. Through case studies, the session will demonstrate how fire affects building materials and structural systems, highlighting common failure points and effective design strategies. By the end of the presentation, attendees will gain a solid understanding of structural fire protection and its essential role in safe and resilient building design.

Learning Objectives

1. Identify key principles of structural fire protection, including fire-resistant materials and performance-based design approaches.
2. Demonstrate knowledge of fire protection regulations, including their role in ensuring structural integrity and occupant safety during fire events.
3. Evaluate case studies of structural fire performance to recognize effective fire-resistant design and common failure points.

From Retail to Rinks: How a Mall Turned Ice Center Is Defining Adaptive Reuse

Buildings // Woodruff Auditorium

1:50 – 2:35 p.m.

Hunter Senior

Professor Engineer
Martin/Martin, Inc.

Hunter Senior was born and raised in Denver, Colorado, and made his way in 2013 to Lawrence, where he studied architectural engineering. He achieved his master's in civil engineering with an emphasis in structures in 2019. He conducted research on the effects of maintenance walkways attached to overhead sign structures and how they affect lifetime performance.

He entered the industry working for his current firm, Martin/Martin Consulting Engineers, back in his hometown. There, he has worked on close to a hundred projects ranging from full retrofits of existing hospitals to new sports arenas to large manufacturing facilities.

Abstract

Vacant shopping malls offer unique opportunities for urban development. In Tulsa, Oklahoma, an abandoned mall's department store was transformed into the WeStreet Ice Center, featuring two ice rinks and serving as the Tulsa Oilers' new home.

The project involved significant structural changes, such as removing or strengthening almost half of the building's columns, extending roof spans with new trusses that were installed in-place and completely retrofitting the lateral force resisting system. This was all installed while maintaining the building's envelope and roof slopes. Creative design in conjunction with innovative truss installation resulted in significant savings related to cost, schedule and environmental impact when compared to a traditional new build. The WeStreet Ice Center showcases adaptive reuse, transforming old spaces into valuable community assets.

Learning Objectives

1. Understand challenges in adaptive reuse projects.
2. Learn best practices for heavy retrofits.
3. Identify opportunities to reduced embodied carbon.

2:55 – 3:40 p.m.

Drop-In Top Flange Shear Connection

Buildings // Woodruff Auditorium

Matt Yarnold

Associate Professor and Director of the Advanced Structural Laboratory
Auburn University

Matt Yarnold, Ph.D., P.E., has roughly 21 years of structural engineering research and design experience. He began his career at Lehigh University, receiving his bachelor and master's degrees. Following graduation, he accepted a position with the engineering firm Ammann & Whitney. From a successful career as a consultant, he returned to academia, where he completed his Ph.D. at Drexel University. Yarnold's passion for research and teaching led him to Tennessee Tech University. In 2017, he joined the Zachry Department of Civil & Environmental Engineering at Texas A&M University. In 2023, he moved to Auburn University as the director of the Advanced Structural Engineering Laboratory.

Abstract

Drop-in top flange steel shear connections were recently studied as an erector-friendly alternative to shear tab and double-angle connections. The research and development of this novel connection will be presented. This will include a summary of the full-scale testing program and numerical modeling. The session will end with practical design guidance for the future implementation of drop-in steel connections.

Learning Objectives

1. List the advantages and disadvantages of drop-in connections over shear-tab connections.
2. Identify the primary failure modes for drop-in connections.
3. Explain the design procedure for drop-in connections.

Current Trends in Performance-Based Wind and Seismic Design for Tall Buildings

Buildings // Woodruff Auditorium

3:40 – 4:30 p.m.

Jeff Dragovich

Director, Applied Technology and Research
DeSimone

Jeff Dragovich leads the Applied Technology and Research group at DeSimone Consulting Engineering. His 30 years of professional experience includes seismic design of reinforced concrete structures, performance-based wind and seismic design, nonlinear analysis and software development.

In addition to his experience in industry and academia, he worked as a research structural engineer in the National Earthquake Hazards Reduction Program at the National Institute of Standards and Technology. He is currently the secretary for the Structural Engineering Institute (SEI) PBD committee.

Abstract

The current trends of how a performance-based design (PBD) is accomplished are presented. The topics covered include an overview of the PBD philosophy, the primary guidelines utilized in the execution of a PBD, performance objectives and hazards considered and the associated analysis requirements. Emphasis will be given to the aspects of implementing PBD on building projects that typically do not arise in a prescriptive design.

Learning Objectives

1. Name the two primary reference guidelines presented for performance-based wind and seismic design.
2. Summarize the differences between force and deformation-controlled element actions.
3. Identify the PBD structural analysis modeling features that require special consideration.

1:05 – 1:50 p.m.

Raising A Cable-Stayed Bridge: The Eugene Talmadge Memorial Crossing

Bridges // Big 12 Room

Steve Hague

Vice President and Bridge Group Director
HNTB

Steve Hague is an HNTB vice president and bridge project manager. After starting his career in HNTB's Dallas office, he relocated to Kansas City where he specialized in the design and construction of major river crossings and complex bridges around the country including nine cable-stayed bridges and 12 bridges over the Mississippi River. Most recently, he developed the proof of concept and is performing the independent design review for the reprofiling of the Eugene Talmadge Memorial Bridge in Savannah, Georgia. He is a licensed Professional Engineer or Structural Engineer in 24 states.

Angela Kingsley

Bridge Engineer
HNTB

Angela Kingsley is a technical advisor and bridge engineer at HNTB in Minneapolis with over 15 years of structural engineering experience for highway, transit and rail projects. She has experience with structural analyses, load ratings and design for new and rehabilitated bridges. Projects include major restoration of the historic 3rd Avenue and Franklin Avenue arch bridges in Minneapolis. Kingsley has a bachelor's of civil engineering from the University of Minnesota and a master's in civil engineering from the University of Washington.

Abstract

This is a story about taking a bridge from the past into the future. The US 17/SR 404 Spur Bridge, known as the Eugene Talmadge Memorial Bridge, spans the Savannah River and is a key landmark in the historic port city. As the size and capacity of container ships have increased over the last 30 years, the cable-stayed bridge has become a limitation to vessels that call on the port. The Georgia Department of Transportation (GDOT) and the Georgia Ports Authority (GPA) are planning for eventual replacement of the existing bridge with a new tunnel to improve vertical clearance. HNTB proposed an interim solution: raising the bridge superstructure by adjusting the length of the stays to increase vertical clearance by approximately 20 feet over the navigation channel. This presentation will describe the conditions and the details that make this innovative solution possible.

Learning Objectives

1. Describe global shipping trends and impacts to navigational draft requirements at major bridges.
2. Assess conditions that permit or preclude major profile changes in a cable-stayed bridge.
3. Describe the work required to make major profile changes in a cable-stayed bridge.

1:50 – 2:35 p.m.

Navigating the Aftermath: Key Bridge Cleanup Operations

Bridges // Big 12 Room

Joe Knapp

Vice President
Genesis Structures

Joe Knapp is a vice president of Genesis Structures, a construction engineering firm headquartered in Kansas City, Missouri. Over 20 years as a professional engineer, Knapp has specialized in various construction and demolition engineering projects across the nation. These projects include steel girder bridge erection and demolition, suspension cable bridge demolition, precast girder bridge erection and demolition and deep foundation construction. Knapp also specializes in marine-based construction and demolition operations, designing float-in and float-out methods for bridge construction as well as barge-mounted equipment operations.

Steve Percassi

Associate
Genesis Structures

Stephen Percassi Jr., PE, is a senior structural engineer at Genesis Structures. Prior to his current role, Percassi worked at Bergmann Associates as a project manager and bridge construction engineering manager, and at Erdman Anthony as a project manager and senior associate. Percassi holds a MS in Structural and Earthquake Engineering from the University at Buffalo and a BS in Civil Engineering from the same institution.

Abstract

On March 26, 2024, in Baltimore, Maryland, the unimaginable struck. The collapse of the Francis Scott Key Bridge left a trail of destruction, as a nearly mile-long stretch of the bridge fell into the Patapsco River, obstructructing the crucial waterway and threatening the lifeblood of river traffic.

This presentation delves into the efforts taken to clear the wreckage. From the immediate response to the final removal of debris and clearance of the navigation channel we will spotlight the engineering and demolition techniques employed and introduce the extraordinary team contractors that were assembled to take on this monumental challenge.

Learning Objectives

1. Learn about marine-based equipment operations and the differences between the various equipment used.
2. Learn about the means and methods used for removal of components from a waterway.
3. Gain insights about the logistics of this type of material handling and disposal.

2:55 – 3:40 p.m.

Fern Hollow Bridge Emergency Replacement Project

Bridges // Big 12 Room

Jason Fuller

VP & Senior Project Manager
HDR

Jason Fuller is a Pennsylvania State University graduate. He has 33 years of experience managing and designing transportation and construction projects with complex bridges and/or unique delivery processes. Fuller served as design manager for the design and construction portions of PennDOT's Rapid Bridge Replacement Project (P3) that included 558 bridge replacements throughout the Commonwealth. Fuller is HDR's design project manager for the Fern Hollow Bridge Replacement Project.

Abstract

On January 28, 2022, the Fern Hollow Bridge in Pittsburgh collapsed. Although there were some injuries, no lives were lost. Within days after the collapse, PennDOT on behalf of the City of Pittsburgh and FHWA used an emergency declaration to hire HDR to design the replacement bridge and approached Swank Construction Company, LLC to construct the project using a design-build process. As design began in February of 2022, it was clear that schedule and budget were critical to implementing the emergency declaration for the project. Within the first few weeks, early design coordination with the agencies, contractor and designer explored various material types and methods of construction. The permanent bridge was reopened to traffic in under 11 months, on December 22, 2022, (with site restoration under bridge and other minor activities through summer 2023). This could only be accomplished in such a rapid timeframe by the collaboration that the emergency design-build process provided.

Learning Objectives

1. Explore how the emergency declaration allowed PennDOT and the City of Pittsburgh to utilize all available powers, resources and personnel deemed necessary, and to sole source the design-build team.
2. Review how design packages were done in parallel, with critical path items broken out into partial submissions, to expedite design and construction
3. Learn how collaboration and teamwork among all parties (owner, agencies, contractor and designer) was crucial to opening the permanent bridge to open to traffic in under 11 months.

Deployable Tool for the Installation of Cross-Frames in Highly Skewed and Curved Steel Girder Bridges

Bridges // Big 12 Room

3:40 – 4:30 p.m.

David Byers

Co-Principal Investigator
Genesis Structures

David Byers is a founding principal of Genesis Structures, where he specializes in the design, erection and demolition of complex bridge structures of all types. Byers earned his Ph.D. in Civil Engineering from the University of Kansas in 1999 while working in the bridge design office of HNTB Corporation in Kansas City, Missouri. Byers is a registered professional engineer in 26 states and Washington D.C. and a member of the American Society of Civil Engineers (ASCE) and the International Association of Bridge and Structural Engineering (IABSE).

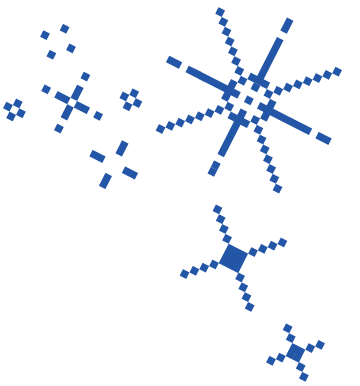
Abstract

This presentation will introduce a novel deployable tool that enables the installation of cross-frames in highly skewed and curved steel girder bridges, including numerical and experimental investigations demonstrating its feasibility. This research investigates a novel deployable tool, made up of a double-acting hydraulic jack and two tension members, designed to facilitate the installation of a cross-frame without requiring force-fitting. To evaluate the tool's efficacy, a numerical investigation using three-dimensional finite element (FE) analyses of two prototype bridges was performed to first understand the challenges in cross-frame fit-up. The deployable tool was then incorporated into the developed FE model to determine the forces in the system throughout its deployment and the installation of the cross-frames. A control sequence for the deployment was developed and evaluated. Results demonstrated that the tool successfully adjusted the girder geometry, with jack forces within practical ranges for off-the-shelf hydraulic jacks and stress levels within acceptable limits to not over-stress the system. This research also experimentally investigated the behavior of this deployable tool and adjacent girders using a one-quarter scale test setup that represents a portion of a built bridge during one stage of erection where cross-frames would be installed. Seven test scenarios were investigated, with varied parameters including differential vertical displacement and rotation. The behavior of the girders and the tool was monitored as the tool is deployed to achieve the desired geometry adjustment between the girders.

Learning Objectives

1. Understand cross-frame fit-up challenges for highly skewed and curved girder bridges.
2. Recognize a new technology – the deployable tool – to assist with the fit-up of cross-frame.
3. Analyze numerical and experimental results that demonstrate the feasibility of the deployable tool.
4. Comprehend the control sequence and recommendations for the use of the tool.

NOTES



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