2026

KIEWIT ENGINEERING

TECHNICAL SUMMIT

SPONSORED BY KIEWIT'S CHIEF ENGINEERS COUNCIL

ABSTRACTS

PRESENTATIONS FOR **FEBRUARY 24, 2026**

CHIEF ENGINEERS PANEL
ENGINEERING WITH INTELLIGENCE: INTEGRATING AI INTO EVERYDAY PRACTICE

PIERRE YVES PONSONNET, TAYLOR PHILLIPS, WAEL SBEIH, FOREST RONG

10:00 AM – 11:00 AM

As engineers begin to increasingly utilize artificial intelligence (AI) in their everyday practice, it reshapes the way we design, model and deliver complex projects. Due to its prevalence, Kiewit's leaders are now tasked with determining a planned approach to AI's usage that results in efficient project innovation and not just neglectful oversight.

In this panel, Kiewit's Chief Engineers will share how AI is being integrated into real-world engineering workflows, where it's adding value—and where human judgment still takes precedence. Panelists will discuss how they evaluate emerging tools, guide their teams through uncertainty, and uphold technical standards in an evolving landscape.

Whether you're testing your first AI script or managing a project team adapting to new tech, this session offers grounded insights from those leading Kiewit's engineering future.

RAPID FLOOD-RESILIENT DESIGN USING 2D BLE MODELING: A BORDER PROJECT PROVEN BY FLOOD

ALAN TURNER, ALEJANDRO GONZALEZ

11:15 AM – 12:15 PM

In just seven weeks, a 5.7-mile border infrastructure project was designed and substantially constructed in Quemado, Texas, featuring a 30-foot bollard fence, access roads, two bridges and three major culverts across a complex floodplain.

The corridor faced an extreme real-world test when, in July 2025, over 15 inches of rainfall, exacerbated by the breach of a 40-acre-foot detention dam, generated flows exceeding a 100-year return period flood event. Despite the magnitude of the flood, hydraulic structures designed for the project performed as intended, sustaining only minor damage and validating the projects flood-resilient design.

Central to this success was the innovative use of a publicly available Federal Emergency Management Agency (FEMA) Base Level Engineering (BLE) two-dimensional (2D) rainfall-runoff model as a primary design tool; an approach typically reserved for flood risk assessment rather than infrastructure design. The model successfully simulated complex overland flow dynamics, backwater interactions, and compound flooding that conventional one–dimensional (1D) methods could not adequately capture. Rainfall-runoff estimates from the FEMA BLE models were incorporated to simulate flood behavior under a range of storm scenarios. The inputs were used to estimate site-specific flow rates and flood levels across the corridor. These provided the necessary technical foundation for infrastructure siting and sizing in compliance with U.S. International Boundary Water Commission (USIBWC), USACE, and Texas Facilities Commission (TFC) criteria. This presentation will highlight how 2D floodplain modeling facilitated rapid scenario evaluation, supported interdisciplinary coordination, and supported informed design decisions to obtain a resilient infrastructure design within a highly compressed schedule.

TRANSFORMING PROJECT DEVELOPMENT THROUGH THE APPLICATION OF NOVEL DIGITAL TOOLS

LILAS AL-HAKIM, ROSS FARANSSO

11:15 AM – 12:15 PM

The project development that occurs during the pre-detailed design phases is intended to evaluate their technical and commercial viability. Given the relatively short durations of these phases, the industry has been limited in the amount of work that could be accomplished. To perform a rigorous analysis, multiple facility layout options must be evaluated and accurate cost estimates must be developed for each of those. With the results being optimized for safety, operability and constructability.

To address these challenges Kiewit has developed KADE, or Kiewit Algorithmic Design and Engineering. KADE is a deterministic AI solution that uses minimal inputs to automatically create a nearly 30% 3D model and generate material quantities to support the Total Installed Cost estimate during the pre-detailed design phases.

This presentation will provide an overview of how Kiewit is redefining the approach to project development through the use of KADE. It will cover the objectives, direct use and benefits that result from KADE to the project development process and customers.

POWER SUPPLY FOR DATA CENTERS: DESIGN ISSUES & APPROACHES

DIANE FISCHER, TATIANA ROGERS

12:30 PM – 1:30 PM

The world of artificial intelligence is increasing the demand for data centers throughout the country. With that demand, power for data centers is also increasing at a dramatic rate. Power plants designed specifically for data centers have some unique requirements related to reliability and electrical power quality and control. In addition, the scale of these facilities and schedule demands associated with getting these projects online are injecting unique challenges into the power industry. This presentation will discuss these issues and how Kiewit is addressing them.

INNOVATIVE & COST EFFECTIVE SUSTAINABLE SOLUTIONS FOR PFAS MANAGEMENT

KRISTEN JENKINS

12:30 PM – 1:30 PM

The main driver for per and poly fluoro alkyl substances (PFAS) treatment is the EPA's Maximum Contaminant Level, set for certain PFAS. Best available technologies (BAT) to remove PFAS in drinking water include Granular Activated Carbon (GAC), Anion Exchange (AIX), and membrane filtration (Reverse Osmosis (RO) or Nanofiltration(NF)). All of these technologies create either a solid or a liquid that requires further handling.

Spent GAC and AIX are typically incinerated or landfilled. Landfilling is a concern because PFAS is likely to leach from these solid materials requiring retreatment. Generally, testing of the incineration process shows that most of the PFAS is destroyed, but only at certain facilities that operate at the temperatures required to achieve destruction.

NF/RO reject can be discharged to a receiving stream, sent to Publicly Owned Treatment Works (POTW), or deep well injected currently. However, PFAS regulations in surface water may limit the ability to discharge directly or to a POTW. In addition, discharging to a POTW is likely to increase the PFAS content in biosolids, which is starting to be regulated in certain states. Regulation of PFAS as a hazardous waste would limit deep well injection.

Because the BAT for PFAS have drawbacks discussed above, Kiewit is evaluating developing technologies that are more sustainable and reduce liabilities. These technologies include regenerable AIX and a novel corn-based media. The use of regenerable media produces a concentrated PFAS stream, which can be incinerated today and destructed once those technologies reach commercial scale. The presentation will cover treatability testing as well as a comparison between BAT and novel media including criteria of cost (capital and operating) as well as sustainability. This presentation will also cover promising PFAS destruction technologies.

WHERE THE RUBBER HITS THE ROAD—FISH GETTING 6PPD-Q'd... SINCE THE 1960's

AMBER ASHENHURST, JARED NIELSON, DANELLE MCMORROW

1:45 PM – 2:45 PM

"Urban runoff mortality syndrome," a phenomenon responsible for salmon deaths in urbanized Pacific coast watersheds, is linked to a tire preservative compound known as 6PPD. As tires degrade and interact with ozone, they form 6PPD-Q which is a toxic byproduct that settles as small roadside dust particles. The first flush of rainfall mobilizes this debris, carrying 6PPD-Q into waterways where fish "breathe" in the toxic 6PPD-Q and die.

The isolation of 6PPD-Q was first published in the journal Science in 2020. Since then, guidelines have been implemented to reduce the impact on salmon. In February 2025, the province of British Columbia introduced 6PPD-Q into their Water Quality Guidelines for the Protection of Aquatic Life, which subsequently required transportation projects to prevent the introduction of the chemical into fish-bearing waters.

During the Highway 11 Interchange Design-Build RFP, KIE environmental and drainage teams got creative in designing "treatment ponds" that would not only satisfy highway water runoff and retention capabilities but also ensure water quality treatment and 6PPD-Q expectations were addressed. With no prior highway project precedence anywhere to follow, Kiewit had to be at the forefront of environmental design innovation for the future protection of water quality, fish and other aquatic species.

Attendees of this discussion can expect to learn how changes to transportation corridor designs will impact future construction projects and save a few fish along the way.

SAFETY & OPERABILITY UTILIZING DYNAMIC ANALYSIS

SANJAY GANJAM, AYESHA PATEL, AIRA FERNANDEZ

1:45 PM – 2:45 PM

Dynamic simulation offers a powerful approach for designing, operating and safeguarding complex industrial systems by modeling their behavior over time. Unlike steady-state models, which assume constant conditions, dynamic simulation captures transient phenomena such as start-up, shutdown and upset scenarios. This time-dependent modeling enables engineers to evaluate control strategies, predict system responses and enhance safety and performance. It is particularly valuable in industries like power generation, LNG, and gas pipeline operations, where process dynamics significantly impact reliability and risk.

In Kiewit, dynamic simulation is used in equipment design such as pressure relief valve sizing, system depressuring, design and verification of complex control, verification of effectiveness of safety interlocks. In this presentation we will show different use cases.

For a large Liquefied Natural Gas (LNG) project, dynamic simulation was utilized to evaluate pressure control and overpressure protection strategies in high-pressure gas systems. The study focused on identifying potential failure scenarios and assessing the response of safety system to prevent downstream overpressure for different failure scenarios, simulate response time of safety systems.

In another application, dynamic simulation was used in fuel gas transient analysis for gas power projects. A gas turbine trip results in a very rapid change in the supply gas pressures. The model simulated pressure fluctuations during turbine trip events, enabling the development of mitigation strategies to maintain system stability and reliability. These case studies demonstrate the broader value of dynamic simulation in supporting safe, efficient and resilient process design.

SMALL MODULAR REACTORS & THE NEW NUCLEAR INDUSTRY

RAWAND HWAYYIZ

3:00 PM – 4:00 PM

Nuclear Energy is a unique source of power. To some, it heralds thoughts of disastrous accidents and expensive overruns. To others, it is the catalyst for a cleaner future where energy is cheap and abundant. However, these perceptions mean little if nothing is done to move Nuclear out of stagnation, where it has been in the United States for years. But not anymore.

This session will go over the advantages of existing designs, market potential, and the influence of Small Modular Reactors (SMR) on the future of the energy market as we race towards Net Zero. Nuclear energy has received a worldwide boost not seen in decades as energy prices rise, geopolitical conflicts highlight supply chain risks and reactors become safer if not totally meltdown-proof.

The development of SMR's and their recent design approval for use in the United States will be the path forward for the vast majority of Nuclear Projects, especially those that Kiewit will want to capture. This session will also cover where there is the prime environment for SMR deployment.

In Idaho and Ontario, Kiewit projects are moving forward with these SMR's, ranging from 35 MW to 300 MW with the latter. This session will also highlight, through detailed models, how just a handful of these reactors could power cities and factories for mere billions.

Kiewit has the opportunity to tap into this market with our existing Nuclear expertise and, with enough time, become a major player in the Nuclear Renaissance.

DESIGNING WITHIN LIMITS: ENGINEERING SUCCESS FOR A BROWNFIELD EPC PROJECT

CARLOS ZAMORA, EMILY ZETZ

3:00 PM – 4:00 PM

For an EPC contractor like Kiewit, greenfield projects often present fewer constraints—design flexibility, generous equipment spacing and minimal concerns about pipe routing clashes. But what happens when the project is brownfield? How does a contractor committed to excellence navigate a century-old facility where space is limited, tie-in points are fixed and the facility depends on uninterrupted steam for heating and cooling?

This session will explore how Kiewit addresses the engineering, construction, commissioning and operational challenges of a combined heat and power project in such a complex environment. We will highlight strategies, lessons learned and Kiewit's unwavering commitment to delivering excellence for clients and partners.

ABSTRACTS

PRESENTATIONS FOR **FEBRUARY 25, 2026**

DRINKING WATER SUPPLY USING DIRECT POTABLE REUSE OF WASTEWATER IS NOW

JAMES SCHOLL, JOSEPH SCHULER

10:00 AM – 11:00 AM

As water availability and supply challenges intensify, municipalities are increasingly considering advanced treatment to secure long-term water resilience. Direct Potable Reuse (DPR), the process of treating municipal wastewater to drinking water standards and introducing it directly into the water supply without an environmental buffer, is now a viable solution. Though still relatively uncommon, advanced technologies have demonstrated reliable public health protection and will significantly advance a circular water economy for meeting supply limitations.

This presentation will review the history of municipal reuse programs beginning with purple pipe systems to support irrigation demands progressing to the testing and development of advanced water treatment, reviewing regulatory pathways, public acceptance, design, construction and the operations that enable safe and reliable potable reuse. The presentation will also examine the market forces driving interest in DPR and the substantial growth potential facing chronic water scarce regions.

Implementing a greenfield DPR facility presents technical and regulatory challenges. The process requires a multi-barrier treatment approach, considering technologies such as microfiltration, reverse osmosis, activated carbon, advanced oxidation, UV Disinfection and robust monitoring systems. Additionally, regulations typically mandate extensive testing and pilot programs to support design and permit approvals.

Drawing on Kiewit's experience with complex water infrastructure, including a number of recent projects, this presentation will highlight key lessons learned from relevant projects that mirror the technical rigor required for DPR. With these insights, Kiewit is well-positioned to play a leading role in the growing DPR market.

CLIENT NEEDS DIGITAL TWIN: REINVENTING REQUIREMENTS FOR SMARTER PROJECT DELIVERY

PIERRE YVES PONSONNET

10:00 AM – 11:00 AM

Across infrastructure projects and beyond, teams struggle to translate complex client needs into coordinated, traceable delivery. Requirements are often fragmented across specifications, contracts and informal communication; leading to disconnects, rework, and risk. What if we could capture it all in a living model of client intent; structured, traceable and ready to drive smarter decisions?

Without fully realizing it, we have already taken the first step; the Requirements Variability Traceability Matrix (RVTM). While it currently includes only a subset of formal specifications, the RVTM already functions as a shared source of truth; helping teams track requirements, clarify compliance, define scope and responsibilities, and align decisions across the project lifecycle. We build the RVTM using a combination of automation, custom Python scripts and machine learning models allowing us to extract, standardize and classify requirements efficiently and at scale.

But the real opportunity lies ahead; the RVTM is just the first step toward a Client Needs Digital Twin. The goal is to evolve it into a responsive, intelligent model that goes beyond documented requirements; capturing lessons learned, historical gaps and unwritten client expectations. Imagine testing submittals or design scenarios against the twin and receiving a simulated client response; What is missing? Is it risky? Compliant?

This is not just about improving Requirements Management or mitigating risks. It is about empowering smarter engineering, estimating and proposal decisions, proactively and with purpose. By building a digital twin of client needs, we enable more confident delivery, deeper alignment and faster insight, across the entire project's lifecycle.

INTEGRATING AI INTO DESIGN ENGINEERING: AUTOMATING WORKFLOWS & EXPANDING ENGINEERING SCOPE

NICHOLAS FEDERIZO-JIMENEZ, MARC MORGAN

11:15 AM – 12:15 PM

Generative AI is rapidly becoming an asset in engineering workflows, particularly within simulation-driven projects and design research. The Advanced Computer Modeling team is using prompting tools like ChatGPT Enterprise and Copilot to simplify complex tasks, avoid repeated work and speed up the creation of scripts, models and reports. The continued development of generative AI and Kiewit's skills in AI prompting is changing how engineers work with modeling tools, documentation, solve problems during design and project completion.

The team have used AI prompting in integral parts of the Computational Fluid Dynamics (CFD) workflow for modeling both tunnel ventilation and data center cooling projects. For example, automating the generation of Python scripts that streamline the creation of CFD input files helping to reduce development time by as much as 90%. By accelerating our ability to conduct feasibility studies, AI prompting has supported the development of our capabilities into projects that involve data centers, anaerobic digesters, power converting facilities and heat exchangers. The continued AI integration into project workflows is expected to accelerate delivery timelines and support more robust, data-informed decision-making across disciplines.

This presentation demonstrates how the team is using AI prompting to improve documentation, support design validation, and automate repetitive modeling tasks. The successful integration of AI prompting into simulation and documentation workflows highlights the potential for substantial efficiency gains, accuracy and technical improvements. Other Kiewit teams could use similar AI tools to simplify complex tasks, make results more consistent and improve how projects get done.

BUILDING A SUSTAINABLE FUTURE: KIEWIT'S PROGRESS & OPPORTUNITIES AHEAD IN THE ENGINEERING & CONSTRUCTION SECTORS

LINETH SALAZAR

11:15 AM – 12:15 PM

The construction sector is one of the largest contributors to global environmental impact. It generates over 30% of solid waste. It consumes more than half of all extracted materials globally. And it accounts for over 39% of CO_2 global emissions, of which 8% stem from concrete and steel usage alone. As a leading contractor, Kiewit has an opportunity to enhance its sustainability. This presentation advocates the creation of a Best Practice Guide for Sustainable Construction. It would serve as a foundation to create a standard for existing efforts, expand technical solutions and highlight continuous improvement across all projects. It would also help align sustainability goals with measurable actions, ensuring that every decision from design to execution contributes to building smarter, cleaner and more resilient infrastructure.

FREQUENCY SUPPORT IN INVERTER-BASED RESOURCES: PFR, FFR & FRT

ARJUN SUNDARARAJAN, JOHN HUFFMAN

12:30 PM – 1:30 PM

As we tie more and more renewable inverter-based resources (IBRs) to the grid, frequency stability has become a critical challenge for grid operators. Primary Frequency Response (PFR) in solar plants relies on droop control through the Plant Power Controller (PPC), typically responding within a few seconds to frequency deviation events. In conventional droop control, there is a linear relationship between frequency and active power, and between voltage and reactive power. For example, if we configure a 1% frequency droop in the PPC, the plant allows a 0.01 per unit (pu) frequency change for a 1.0 pu change in active power. This means the plant adjusts output proportionally as frequency shifts, increasing during underfrequency events (if already curtailed) and curtailing during over frequency events.

Since inverter-based resources lack the physical inertia of synchronous generators, even this short delay in response can exacerbate the frequency disturbances, risking frequency-related instabilities or blackouts.

Furthermore, Battery Energy Storage Systems (BESS) add Fast Frequency Response (FFR) capability, injecting active power within 250 milliseconds while also providing traditional PFR. This layered response allows BESS to arrest the frequency nadir early, thereby supplementing the droop-based PFR response of the inverters. Additionally, under PRC-029-01 NERC guidelines, future IBRs are required to remain connected and provide Frequency Ride-Through (FRT) support during and after frequency excursions.

This poster/presentation illustrates how PFR regulates active power during overfrequency and underfrequency conditions. It examines control strategies, response times, ISO requirements and NERC standards. By analyzing different plant operating conditions, we demonstrate how PFR, FRT and FFR work in tandem to stabilize grid frequency and enhance grid reliability.

FROM IMPLOSION TO EXPLOSION: THE HIDDEN RISKS OF LOW-PRESSURE STORAGE TANKS

SHAHAR TORAM, DAVID REDMAN

12:30 PM – 1:30 PM

We all know the consequences of poor low-pressure tank design — or do we?

Awareness of the risks and vulnerabilities of low-pressure tanks has increased in recent years — but much of this insight has been reactive, forged in the aftermath of catastrophic system failures.

And despite improved standards and industry knowledge, preventable failures continue to occur. These costly, devastating incidents can result in the loss of lives, destruction of assets, disruption of energy production, and long-term damage to corporate reputation. The environmental repercussions may resonate for decades.

In this presentation, we will examine key design considerations aimed at reducing the vulnerability of various low-pressure storage tanks. Drawing on Kiewit's extensive experience with both non-refrigerated (crude oil, fuel, water) and refrigerated (ammonia, LNG) tanks, we will highlight engineering strategies and protection methods that help prevent overpressure and underpressure upset events.

We will also discuss Kiewit's involvement in industry codes and standards development, as well as advancements from ongoing research into tank protection. Finally, we will introduce in-progress, in-house tools that enhance the assessment and reliability of pressure protection systems for low-pressure tanks.

DEWATERING & DRYING ALTERNATIVE FOR BIOSOLIDS VOLUME REDUCTION

STEVEN GRESETH, GARY NEUN

1:45 PM – 2:45 PM

Municipal biosolids are the product of wastewater treatment residuals after the solids are stabilized per the US EPA 503 rule. Even though those solids are stabilized so the pathogens are eliminated or dramatically reduced, land application sites are diminishing and landfill disposal costs are climbing rapidly due to PFAS, micro plastics and other concerns. Wastewater utilities can decrease their cost risk by reducing the volume of biosolids going to disposal. This presentation will review the primary methods wastewater utilities have for biosolids volume reduction, anaerobic digestion (with pretreatment alternatives), dewatering and drying (solar, belt, fluidized bed, and drum drying), plus another process formerly disqualified due to strong odors - wet air oxidation known as Zimpro.

OPTIMIZING LIQUEFACTION FOR ENHANCED PROJECT COMPETITIVENESS

JAVIER CHAVARROMONTE, NEGAR DAVANI

1:45 PM – 2:45 PM

To improve the economic viability and reduce the environmental footprint of liquefied natural gas (LNG) production, the industry consistently focuses on optimizing liquefaction energy consumption. Since a train's capacity is often limited by main compressor driver size, power savings typically lead to increased capacity. This drives developers and contractors to seek innovative solutions that reduce the specific installed cost and/or specific power consumption per tonne of LNG produced.

This paper details recent successful strategies Kiewit has applied on developing projects. This includes;

- **ALTERING REFRIGERANT MIXTURE COMPOSITION |** Tuning the blend of refrigerants in the liquefaction unit optimizes heat transfer and reduces energy consumption. The component concentration is tailored to operating conditions and product quality requirements to maximize liquefaction efficiency.

- **ALTERING LIQUEFACTION PRESSURE |** Operating pressure significantly impacts compressor power and overall cycle efficiency. Selecting the correct pressure requires balancing equipment size, cost, and operational complexity.

- **REBALANCING POWER CONSUMPTION |** Strategically shifting power consumption across different units within the liquefaction train can maximize throughput, minimize energy costs, or reduce the number of required compressor drivers. This is particularly effective when electrical grid power pricing or availability fluctuates, or when maximizing production from equipment within their proven capacity limit.

- **COMBINING STATIC EQUIPMENT |** Integrating or optimizing static equipment like heat exchangers and separation vessels reduces plot space, material costs, and pressure drops. For example, combining multiple heat exchangers into a single, more efficient unit can yield significant capital and energy savings.

The appeal of these strategies depends on a project's specific focus. For instance, projects with strict greenhouse gas emission targets might prioritize power reduction, even with higher initial capital expenditure. As an example, 1% reduction in power by the cryogenic refrigeration system translates into approximately 15,000,000 kWh of power savings. Conversely, projects in remote locations with limited utility access might favor solutions that simplify logistics and minimize installed cost.

Evaluation of each possible optimization in early engineering can be completed by the developer and an experienced contractor such as Kiewit. However, for firm pricing, a collaborative team approach involving the developer, engineering, procurement and construction (EPC) contractor, technology providers, and equipment manufacturers is often required. This ensures all aspects, from the process design to long-term operational costs, are thoroughly considered to achieve the most impactful and sustainable LNG efficiency improvements. The ultimate goal is to implement the most effective combination of these strategies, customized to each project's unique demands, to ensure the LNG facility's long-term competitiveness.

BUILDING INFORMATION MODELING: IMPLEMENTATION FOR THE UNION STATION ENHANCEMENT PROJECT

AMIRMAHMOUD MOEINI, ROBERT BOTTICCHIO, FRANCISCO REYESARACE

3:00 PM – 4:00 PM

As infrastructure projects grow in complexity and scale, the integration of Building Information Modeling (BIM) has become a cornerstone for delivering coordinated, efficient, and high-quality outcomes. This session will explore the practical implementation of BIM on the Union Station Enhancement Project (USEP), highlighting the strategies, workflows, and technologies that enable a seamless transition from design to construction.

The presentation will focus on BIM implementation and the coordination necessary for aligning multidisciplinary teams, managing data-rich models and supporting real-time decision-making in highly complex infrastructure projects. Key topics will include the development of a clash-free model, building the job from the BIM, and the integration of latest technologies. Attendees will gain insights into how BIM was leveraged to enhance constructability, reduce rework and improve project team performance.

Through real-world examples and lessons learned, this session will provide a roadmap for project teams seeking to implement BIM effectively, from early planning through to field execution. Whether you're a design manager, construction lead, or digital delivery specialist, this session will offer actionable strategies to elevate your BIM practice and project delivery outcomes.

COMPRESSOR MACHINE INTEGRATED MEGA-MODULE STRUCTURAL DESIGN

ANIL SHELAR, FNU WITARTO, MEHDI ZOMORODIAN

3:00 PM – 4:00 PM

At the 2025 Technical Summit, KOE engineers presented an analytical study assessing the feasibility of supporting a 30,000 kW compressor unit on a conventional modularized steel Process Assembly Unit (PAU). The study determined that the baseline configuration—utilizing a traditional wide-flange modular steel frame—was inadequate in meeting the required strength and vibration criteria, primarily due to the dynamic characteristics and significant magnitude of the compressor loads. This finding aligns with ongoing global efforts within the structural engineering community to advance the integration of large rotating equipment into modularized designs.

Driven by the recognized advantages of modular construction—such as reduced site labor, improved quality control, and enhanced schedule certainty—KOE engineers have pursued a follow-up study to explore potential solutions. This continuation effort evaluates an alternative PAU structural configuration that incorporates tubular steel members. Renowned for their multi-directional strength, superior stiffness and excellent performance under dynamic and fatigue loading, tubular sections offer a compelling alternative to conventional wide-flange systems.

The study presents a comparative analysis between the baseline and tubular configurations, with a focus on dynamic response, structural efficiency, and modular constructability. While challenges remain—particularly in connection detailing, fabrication, and transportation logistics—the investigation identifies promising structural steel design pathways that uphold modular construction principles and broaden the applicability of modularization in the energy sector.

This work aims to guide future design strategies for mega-modules, encourage industry collaboration and drive innovation in addressing the complexities of integrating large-scale equipment into modular systems.

ABSTRACTS

PRESENTATIONS FOR **FEBRUARY 26, 2026**

CHIEF ENGINEERS PANEL
DESIGNING TOMORROW: AI & THE FUTURE OF ENGINEERING
MIKE MARTELLO, RYAN TERRELL, COLIN DAVIS, DAN LUMMA
10:00 AM – 11:00 AM

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Whether you're testing your first AI script or managing a project team adapting to new tech, this session offers grounded insights from those leading Kiewit's engineering future.

KIEWIT ENVISION EXPERIENCE & APPROACH FOR SUSTAINABLE DESIGN & CONSTRUCTION
JAMES SCHOLL, PAULINA GONZALEZ PICHARDO
11:15 AM – 12:15 PM

Envision is an industry standard process with optional verification to apply and measure practices for the sustainable design and construction of infrastructure projects, similar to the way LEED is used for building projects. The Envision program was developed with an expressed purpose "to provide a holistic guide for creating sustainable, resilient and equitable physical infrastructure." Kiewit has 28 Envision Sustainability Professional (ENV SP) staff and completed ten twelve projects having Envision awards (seven Platinum, two Gold, one Silver) with four other projects pending award. With this increasing popularity of Envision certification, this presentation will cover examples of standard Kiewit practice and case studies of solutions used on Kiewit projects to satisfy key Envision certification targets across five categories Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Resiliency. Learning objectives include a primer of the framework, identification of existing sustainability practices at project sites, exploration of owner interests, lessons learned and discovery of value-add opportunities for future projects.

LNG RUNDOWN & LOADING: THE FINAL LINK IN THE LNG VALUE CHAIN

DOOHWAN CHA, SHAHAR YORAM

11:15 AM – 12:15 PM

The configuration and operation of LNG rundown and loading facilities are vital to the safety, efficiency and continuity of the LNG value chain. These systems transfer liquefied natural gas from liquefaction trains to storage tanks and from tanks to LNG carriers for marine transport.

This presentation offers a practical overview of key operational modes: rundown, loading, ship cooldown, holding and transitional states. Each mode introduces unique process and control challenges that demand thoughtful and precise engineering solutions.

Technical considerations include boil-off gas (BOG) management, cooldown recirculation to reduce ambient heat ingress, insulation selection and overpressure protection.

Safety-critical components such as emergency shutdown (ESD) systems and powered emergency release couplers (PERCs) are also discussed. To manage surge events due to ESD and PERCs identified by surge analysis of peak pressures and structural loads, mitigation techniques like surge drums, dump valves and non-slam check valves are explored.

LNG loading infrastructure is more than pipelines and pumps. It must endure extreme thermal and pressure transients, and strict regulatory demands. Drawing on design experience and practical insights, this presentation highlights engineering challenges and best practices that support safe, reliable LNG terminal operations.

SCENARIO-BASED ANALYSIS & DESIGN OF A SEAWATER INTAKE CANAL IN A COASTAL AREA

CELIC RESENDIZ

12:30 PM – 1:30 PM

The hydraulic design of a seawater intake channel requires extensive analysis of multiple variables to determine a channel configuration that meets a wide range of design criteria and constraints. Terrain elevations and roughness coefficients account for local morphology and vegetation, while sea level variations add complexity due to tidal fluctuations ranging from average to extreme conditions. Additionally, several variables depend on multidisciplinary coordination for factors such as pumping rates, allowable depths, and intake geometry. Design revisions were also necessary during construction due to changes in alignment, further affecting the overall design.

The ability to model a broad range of variables makes hydraulic modeling a valuable tool in engineering design, enabling an iterative process to assess the impacts of various conditions on required water levels for the cooling water system. Using the applicable ranges for each variable, multiple scenarios were constructed, analyzed, and compared. These analyses were supported by a comprehensive hydraulic study of canal design and energy loss estimation.

The results served as key decision criteria, demonstrating optimal hydraulic performance under different scenarios and clearly illustrating how each design revision affected velocities and water levels within the proposed hydraulic structures. This detailed modeling approach can guide future projects in selecting robust designs where complex variables critically influence hydraulic performance.

MASTERING COMPLEX PROJECT DELIVERY: ONE KIEWIT'S EPC EXECUTION ON A LANDMARK UNDERGROUND TRANSMISSION PROJECT

WEI TU, NORMAN CHEN, FOREST RONG

12:30 PM – 1:30 PM

The Champlain Hudson Power Express (CHPE®) is a milestone project in the North America power delivery industry. This 339-mile HVDC transmission project will deliver 1,250 MW of renewable energy from Quebec to New York City. The terrestrial portion includes 108 miles of open trench ductbank installation, 306 horizontal directional drilling (HDD) crossings totaling more than 400,000 feet, and 558 cable installations for the 312-mile 400kV, 5000 kcmil HVDC cable. This presentation highlights the challenges and collaborative solutions that enabled successful execution, including environmental restrictions, right-of-way (ROW) access and traffic control constraints, geotechnical and geologic uncertainty, alignment complexity, and complexities of self-performing and logistics across the 147-mile terrestrial corridor. A hallmark of CHPE's success was the unified effort across multiple Kiewit districts and markets, leveraging in-house HDD expertise, trenching, civil and electrical capabilities and engineering and construction leadership to deliver under a single Engineering, Procurement and Construction (EPC) contract and the ONE KIEWIT model.

By integrating design, construction, and stakeholder coordination, the team advanced schedule, reduced risk, and maintained quality across varied terrains and regulatory environments. CHPE was named Trenchless Technology's 2025 Project of the Year, an industry recognition that marks a major milestone in sustainable infrastructure and trenchless innovation.

BESPOKE COMPUTATIONS & DESIGN TOOLS FOR UNDERGROUND ENGINEERING

EDEN ALMOG, MICHAN CONDRA

1:45 PM – 2:45 PM

Underground construction presents unique engineering challenges that often exceed the capabilities of commercial software, published solutions and standardized workflows. Our team responds to these demands by developing bespoke computational tools grounded in first-principles engineering—crafted specifically for the needs of each project—enabling advanced analysis and modeling that go beyond the limits of off-the-shelf solutions.

Rather than forcing projects to conform to generic, all-purpose tools and methods—often resulting in bloated costs, schedule overruns, and misplaced focus on the tool itself—we deliver lean, task-specific solutions that prioritize engineering value. Using a combination of coding and novel analytical methods, we create custom tools that can integrate seamlessly with commercial platforms. These tools enable sophisticated soil-structure interaction modeling, parametric design, construction sequencing and data processing, all while embedding rigorous engineering logic.

Our approach improves model fidelity, increases control over quality, reduces manual intervention and expands what can be analyzed and validated in complex scenarios such as tunneling, deep excavations, caverns and all aspects of underground engineering. Through targeted case studies, we illustrate how our tools unlock new modeling capabilities, improve decision-making, and support the delivery of higher-quality engineering outcomes.

This work reflects a shift toward computational craftsmanship—where digital solutions are not mass-produced, but engineered precisely to match the complexity, constraints and innovation required by modern underground construction.

THE USE OF NOVEL HIGH POWER DC DISTRIBUTION IN PROCESS INDUSTRIES

MUHAMMAD OMER, ALI MALIK

1:45 PM – 2:45 PM

The “War of the Currents” - AC versus DC - has taken on new relevance with the advent of solid-state converters. Industries such as hydrogen production, metal smelting, carbon black manufacturing and any operation utilizing multiple variable frequency drives (VFDs) can benefit from high-power DC distribution systems. This presentation explores the advantages and challenges of implementing these systems, with a particular focus on electrolyzers used in hydrogen production and other processes requiring significant DC power. Electrolysis is a key method in producing hydrogen, chlorine, and aluminum, and traditionally relies on multiple small electrolyzers and high-voltage AC distribution stepped down to medium voltage (15–35 kV) before feeding rectifiers that supply DC to electrolyzers. However, this conventional design demands numerous transformers and switchgear, increasing both equipment count and facility footprint. By adopting high-power DC distribution, industries can significantly reduce infrastructure complexity, minimize equipment requirements, and optimize space utilization.

PLANT-TASTIC! A BIOGENIC CARBON PATHWAY TO POLYPROPYLENE

SCOTT WESTVEER, KIRAN CHAUDHARI

3:00 PM – 4:00 PM

Plastic from plants? The notion seems far-fetched, but that is exactly what will be covered in this presentation.

For those unfamiliar, polypropylene is one of the most widely used plastics in the world, with an estimated 70 million tons consumed in 2024. This compares to 113.2 million tons for polyethylene (the #1 plastic by production volume). Polypropylene is produced from propylene, a relatively reactive, light hydrocarbon. Today, the vast majority of propylene is derived from fossil resources in oil refineries and petrochemical facilities.

However, an alternative pathway exists for those interested in a “greener” product, which is how plants come into the picture. The carbon footprint of the production of polypropylene by the pathway to be discussed is not only much smaller than the traditional fossil based route but is also significantly smaller than those of many other types of plastics.

Polypropylene has additional “green” credentials; it biodegrades faster than other plastics (e.g. 20 to 30 years, compared to more than 500 years for polyethylene or polystyrene), is fully recyclable, and releases no toxic chemicals in the recycling process.

The intent is that at the end of this presentation, the audience will have a better understanding of polypropylene by seeing how it is currently produced and used, and to demonstrate how, starting with corn, polypropylene can be produced in a more sustainable manner.

SINK OR FLOAT: ENGINEERING THE IMPOSSIBLE AT PORTSMOUTH DRY DOCK

RILEY RUSKAMP, DANA PENDLETON

3:00 PM – 4:00 PM

Two new drydocks are being constructed at Portsmouth Naval Shipyard (PNSY) in Kittery, Maine, using 27 precast monoliths fabricated off-site and transported to the shipyard via two custom barges. In 2024 and 2025, the first nine monoliths were unloaded at PNSY with a stationary temporary lifting device (TLD) and floated into position, while the remaining 18 will be placed with a mobile TLD. Each of the first nine monoliths were lowered into the water, where buoyancy assist tanks (BATs) were attached to control inclination and draft after detachment from the TLD. The monoliths were then floated into position, ballasted and set onto drilled shafts. BATs were recovered and reused for subsequent placements.

Kiewit's Temporary Works group has been providing comprehensive construction engineering support for the project and was heavily involved during the planning and execution of the float-in operation. The team designed the BATs, developed ballasting plans for both BATs and barges and engineered lashing for transport. They also provided operational procedures for monolith handling, including barge loading and unloading, and BAT hookup, load transfer, recovery and reattachment. This presentation outlines traditional dry dock construction and innovative solutions to expedite the construction schedule. Then, in more detail, the transport, float-in, and setting of the first nine monoliths will be covered, highlighting the engineering team's key role in planning and execution. The project showcases innovative marine construction techniques and the value of integrated temporary works engineering in delivering complex infrastructure.