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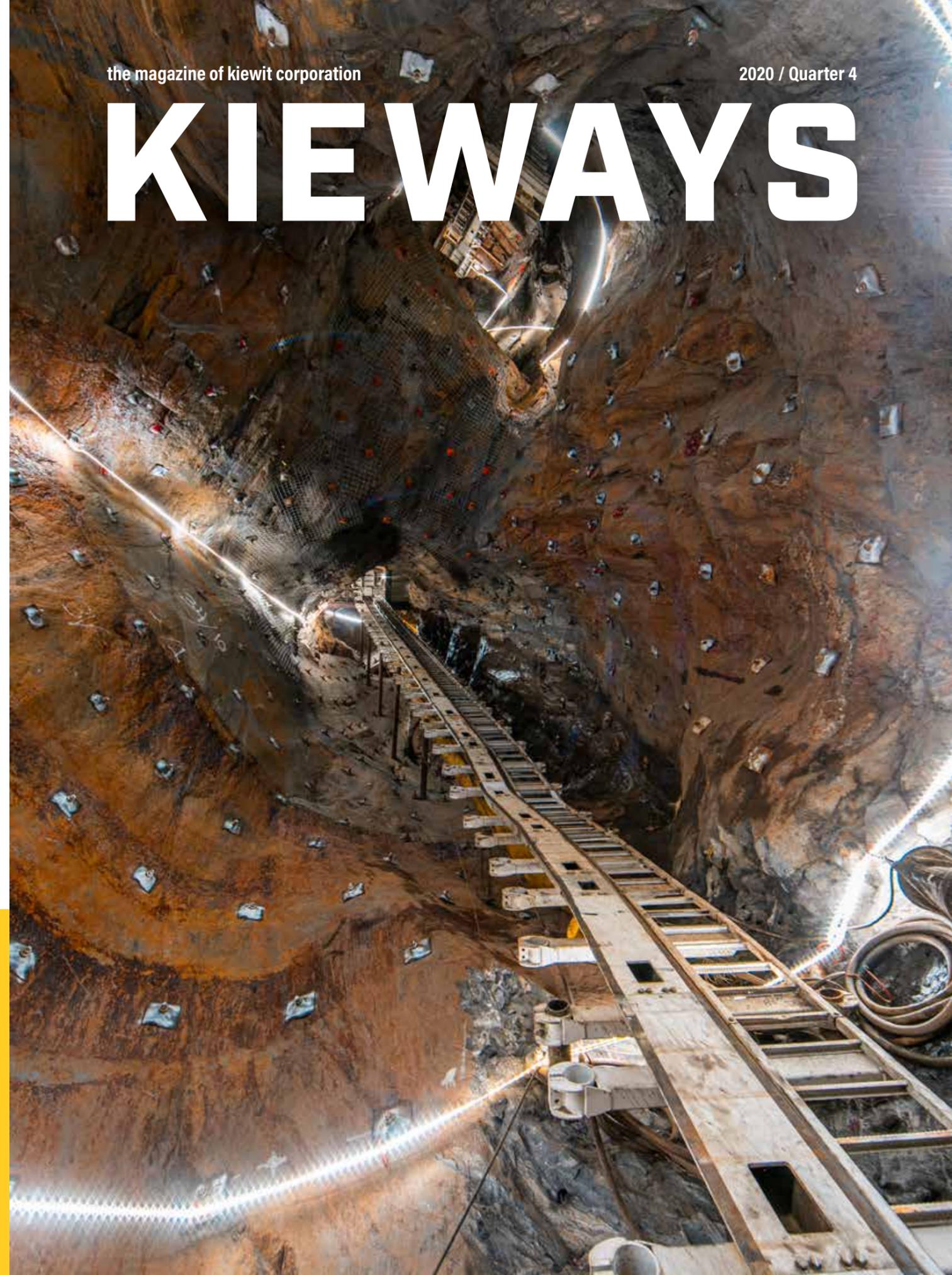


SINCE 1884

the magazine of kiewit corporation

2020 / Quarter 4

KIEWAYS





REPLACING CRITICAL INFRASTRUCTURE

Kiewit/Manson JV demolished an old 159,000-square-foot timber structure to make room for a new and improved concrete pier at the Military Ocean Terminal in Concord, California. Read about it on Page 20.



Kiewit is one of North America's largest and most respected construction and engineering organizations. With its roots dating back to 1884, the employee-owned organization operates through a network of subsidiaries in the United States, Canada and Mexico. Kiewit offers construction and engineering services in a variety of markets including transportation; oil, gas and chemical; power; building; water/wastewater; industrial; and mining. Kiewit had 2019 revenues of \$10.3 billion and employs 23,000 staff and craft employees.

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KIEWAYS

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AMAZING PEOPLE, AMAZING PROJECTS

As we close out 2020, I want to say Happy Holidays and wish you all a safe and prosperous New Year. While it's been a formidable year, I am extremely proud of our performance in 2020.

Thanks to an amazing workforce, Kiewit continues to deliver projects for our clients. Our teams remain focused and committed to working safely and productively, and it shows in our work.

In this issue of Kieways, read about some of the amazing projects the team is working on, including a project that is laying the groundwork for the largest physics experiment ever performed in the U.S. It's called the Deep Underground Neutrino Experiment (DUNE), and it involves hundreds of scientists from across the globe. Read about it on Page 10.

This issue also includes a story about the Kiewit/Manson joint venture that successfully rebuilt critical infrastructure at the historic Military Ocean Terminal in Concord, California. On Page 20, read about improvements made to the only ship-loading and offloading complex on the West Coast that handles munitions for the U.S. military.

On Page 18, learn about how Kiewit designed and built a new culvert and streambed to provide a fish-friendly habitat for migrating fish in northwest Washington's Trafton Creek.

Finally, this issue marks the 75th anniversary of Kieways magazine. This publication has successfully chronicled the company's efforts and achievements over many decades and continues to be an important catalog of our history. For a look back, see Page 6.

In closing, I'd like to thank our clients, partners and employees for all they have done to keep Kiewit moving forward through these challenging times. Stay healthy and safe.

RICK LANOHA

President and Chief Executive Officer



FISH-FRIENDLY HABITAT

Crews replaced an old concrete culvert on Trafton Creek in northwest Washington with this steel culvert to preserve an area fish run. It is one of more than 800 sites in the area with culverts slated to be replaced in the next 10 years. Read more on Page 18.

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KIEWIT NEWS

What began in 1884 with two hard-working brothers has grown into a construction and engineering industry leader. As a multi-billion dollar organization, Kiewit can tackle projects of all sizes, in any market. Here's a brief collection of recent news and information from around the company.

OUR MARKETS:

-  BUILDING
-  INDUSTRIAL
-  MINING
-  OIL, GAS & CHEMICAL
-  POWER
-  TRANSPORTATION
-  WATER/WASTEWATER

OUR VALUES:

-  PEOPLE
-  INTEGRITY
-  EXCELLENCE
-  STEWARDSHIP

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HISTORIC PROJECT FOR HAWAII'S HARBORS

The Hawaii Department of Transportation (HDOT) awarded Kiewit Infrastructure West Co. a \$350 million contract for its Kapalama Container Terminal Phase 2 project. This is the largest capital improvement project in the history of Hawaii harbors. An HDOT news release stated the project "will increase operational efficiency, provide better resiliency of critical maritime infrastructure, and significantly reduce traffic on surrounding roadways."



A TOP PLANT

Competitive Power Ventures (CPV) Fairview is a POWER Magazine Top Plant award winner in the natural gas category. The 1,050-megawatt natural gas-fired facility in Pennsylvania was completed ahead of schedule. More than 600 craft worked 2.6 million man-hours without a lost time incident.

OLYMPIC CITY USA'S SIGNATURE BRIDGE

In October, Kiewit crews set a 250-foot, 11 million-pound pedestrian bridge at the Olympic & Paralympic Museum and Hall of Fame in Colorado Springs, Colorado. The operation took just over four hours to complete and set the bridge over 11 railroad tracks. The bridge is scheduled to open to the public in the spring of 2021 and will connect America the Beautiful Park to downtown Colorado Springs.



HONORING VETERANS AND ACTIVE SERVICE MEMBERS

In recognition of Kiewit employee veterans and active service members, Kiewit made a \$10,000 donation to Semper Fi & America's Fund. This organization provides resources and support for combat wounded, critically ill and catastrophically injured members of the U.S. Armed Forces and their families.

Lenexa, Kansas-based Kiewit employees honored local veterans and their service to our country by partnering with local non-profit Heart to Heart International. Sixty volunteers assembled more than 450 hygiene kits and donated them to Hope Faith Ministries for distribution to homeless veterans across the Kansas City area.

ENGINEERING NEWS-RECORD HONORS KIEWIT PROJECTS

Several Kiewit teams recently earned Engineering News-Record Best Project Awards.

ENR California

- Kiewit Power Constructors Co.: Alamitos Energy Center, Best Project, Safety
- Kiewit Power Constructors Co.: Huntington Beach Energy Project, Award of Merit, Safety

ENR MidAtlantic

- Kiewit Power Constructors Co.: Birdsboro Power Plant, Best Energy/Industrial Project
- Kiewit Power Constructors Co.: CPV Fairview Energy Center, Award of Merit Energy/Industrial Project

ENR Midwest

- Kiewit Building Group Inc: HDR Corporation Headquarters, Office/Retail/Mixed-Use, Award of Merit

ENR Mountain States

- Kiewit Infrastructure Co.: U.S. 85/Duckwood Road Improvements, Best Highway/Bridge Project

ENR Southeast

- Kiewit Infrastructure South Co.: I-240 MemFix 4, Award Of Merit Highway/Bridge
- TIC – The Industrial Company (TIC): Naheola Mill Biomass Project, Best Energy/Excellence in Safety

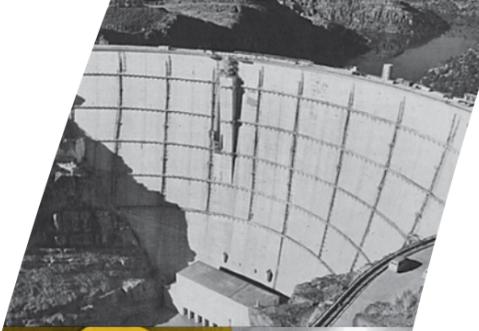
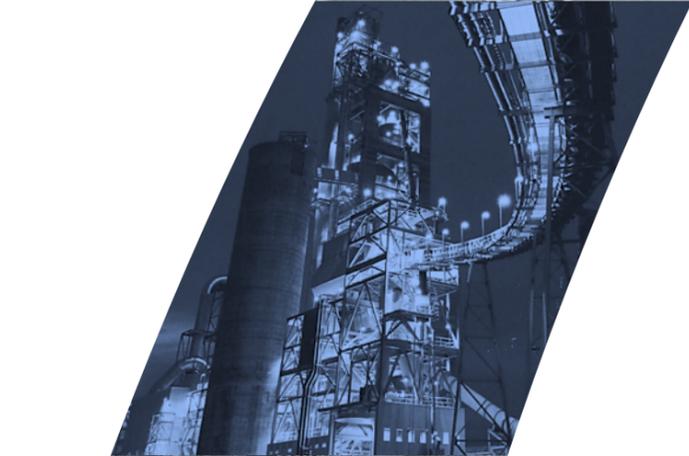
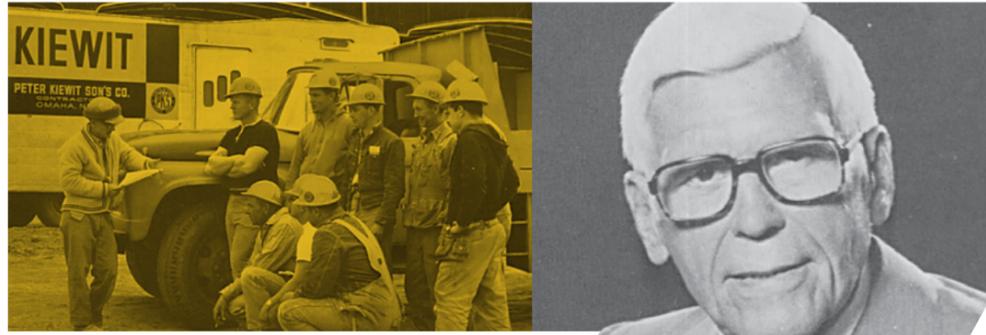
ENR Southwest

- Sundt/Kiewit, a Joint Venture: I-10 Ina Road Traffic Interchange, Best Project and Excellence in Safety, Award of Merit

SPECIAL ADDITIONS TO THE KIEWIT EQUIPMENT FLEET

Kiewit recently added two Liebherr LR 11000s to its equipment fleet to support growing work in large wind turbine erection, which included five major projects in 2020. Pictured here is blade installation work on EDP Renewables' Rosewater Wind Farm project in Indiana.





YEARS OF KIEWAYS

Today you're reading Vol. 75. No. 4 of Kieways Magazine. As 2020 comes to its end, the Kieways editorial board celebrates 75 years of Kieways, The Magazine of Kiewit Corporation.

Vol. 1 No. 1 was released on July 1, 1945. The original issue didn't have a name, and was instead published with a giant question mark on the cover. When the second issue came out in September 1945, the cover said Kie-ways, and the employee who suggested it earned \$25.

The Kieways name has remained — except for losing its hyphen in the mid '90s — for the past three quarters of a century. And so have many other things. Like the very first issue, Kieways continues to feature articles about company projects and messages from leadership.

Some things about the publication have changed. Originally a magazine for employees only, Kieways is now shipped across North America to current employees, retirees, recruits, clients, subcontractors and other business partners. Anyone in the world with an interest in the company, construction or engineering, and an internet connection can read featured articles online at Kieways.com.

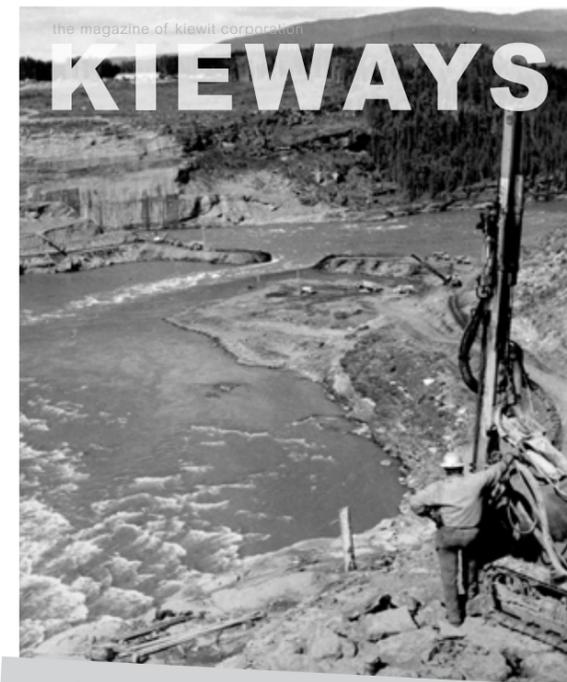
Looking back, the Kieways archive offers an informative company history. Some issues document important milestones such as the death of Peter Kiewit in 1979, Kiewit's centennial in 1984 and its 75th year in Canada in 2016. Others document the company's place during a universal moment in time. In the second issue, published only days before the end of World War II, Peter Kiewit discussed the company's contributions during the war, and opportunities that would arise after its conclusion, including expansion of manufacturing plants and highways. Chairman and CEO Ken Stinson reflected on the Sept. 11, 2001, terrorist attacks in the September-October issue of that year. Earlier this year, President and CEO Rick Lanoha shared his thoughts on the COVID-19 pandemic.

The pages of Kieways have featured articles on thousands of the company's projects, large and small. They've detailed

important initiatives and advancements in safety, training and technology. They've highlighted the adoption of new contract models, expansion into new markets, and Kiewit's evolution from a leading contractor to a leading construction and construction-focused engineering firm.

Most importantly, Kieways has routinely showcased the spirit of Kiewit people and what they're capable of. Kiewit staff and craft of the past and present have delivered projects that provide safe transportation, reliable power, clean water, accessible health care and much more to millions in communities across North America. We're proud to feature a few of their stories each year and hope you've enjoyed learning about them.

Thanks for reading. **K**



In 2016 Kieways celebrated Kiewit's 75th year in Canada with a throwback cover using an image included in a 1963 issue. The cover featured Portage Mountain Dam — now W.A.C. Bennett Dam — in British Columbia.

BY THE NUMBERS

Through the years Kiewit's story has been told and documented in the pages of Kieways.

421 total issues

2,300+ projects featured

11,896 total pages of content

9,130 times safety has been mentioned

12,775 digital and print subscribers

IMPORTANT MOMENTS

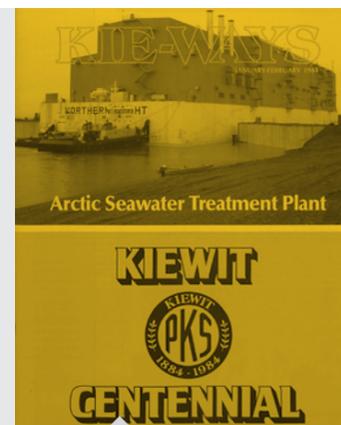
1945

After a call for entries in the first issue, the second issue debuts the name Kie-Ways and the magazine's first masthead. The employee with the idea was awarded \$25.



1979

The full issue following Peter Kiewit's death is dedicated to his life, work and philanthropy.



1996

The San Joaquin Hills Toll Road project is featured on the cover of the magazine. San Joaquin Hills Transportation Corridor in Orange County, California, becomes the company's first large design-build transportation megaproject.



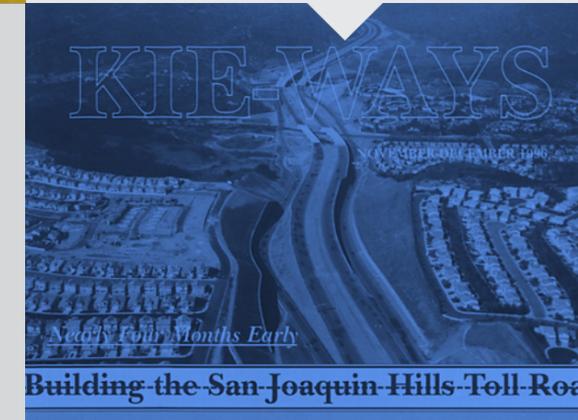
1959

The issue features a look at the company's first 75 years. The "Since 1884" sketch above debuts and has since been modernized. Check out the back cover of this issue for the current version.



1984

Kieways covers the company's 100th anniversary all year with a special focus on historical perspectives in each issue.



2015

Kiewit constructs a new stand-alone gravity-based structure (GBS) for the Hebron oil platform in Newfoundland Labrador, one of the company's largest projects to date. The project is featured on the cover.



DIGGING DEEP FOR SCIENCE

Three massive caverns nearly a mile underground. Scientific equipment that stands four stories tall. Hundreds of scientists from across the globe determined to find answers to fundamental questions about the nature of matter and the evolution of the universe. No, this is not the next blockbuster science fiction movie — it's a project currently underway in South Dakota.

In Lead, South Dakota, a small town about 50 miles from Mt. Rushmore, construction crews are laying the groundwork for the Long-Baseline Neutrino Facility (LBNF), which will serve as home to the Deep Underground Neutrino Experiment (DUNE) hosted by the U.S. Department of Energy's Fermilab. DUNE represents the largest physics experiment in U.S. history.

The South Dakota portion of the LBNF construction takes place at the Sanford Underground Research Facility, also called the Sanford Lab, which makes use of a former gold mine operated by the Homestake Mining Company. The mine closed in 2002 after a more than century-long run as one of the largest gold producers in the U.S.

The existing infrastructure of the mine, which includes shafts, caverns, hoists and a large open pit, is well-suited for the LBNF. However, there is still substantial rehabilitation, repair and refurbishment required to accommodate DUNE, which will involve more than 1,000 scientists and engineers from 30 countries.

The cornerstone of the project is an array of four, four-story particle detectors, each containing 17,000 tons of liquid argon, which will be located roughly a mile underground. To accommodate the detectors, approximately 800,000 tons of rock will be excavated to create three massive caverns. Before excavation can begin, however, substantial pre-excitation work was necessary.

In November 2018, Kiewit-Alberici Joint Venture (KAJV) was selected by Fermi Research Alliance LLC as the contractor for the pre-excitation work for the LBNF. Using a Construction Manager/General Contractor (CMGC) approach, KAJV was responsible for the development work of all underground infrastructure, restoration of a rock-crushing system and the construction of a skip loader and conveyor system.

A "SHIP IN A BOTTLE"

Before digging into construction work, KAJV invested a significant amount of time and energy into planning and coordination.

"We knew that there would be unknowns related to the underground infrastructure and condition of the mine," said Scott Lundgren, project manager for Kiewit. "We also knew that getting construction work done was dependent on coordination with multiple stakeholders."

One of the first tasks was to construct the final steel set in the shaft and build a concrete sump below that, which was located at the bottom of an existing 5,000-foot shaft. Commonly referred to as the 5000 Level, the main operation was then to remove the old existing skip loader and construct the new skip loader system.

In order to access the 5000 Level and other below-grade work areas, crews relied on hoists that were operated and maintained by the South Dakota Science and Technology Authority, which manages the Sanford Underground Research Facility. The hoist system, which was originally installed in the 1930s, provided the only mode of transport to deliver equipment and materials underground.

"Our construction operations were a little bit like building a ship in a bottle," Lundgren added. "Everything we did, everything we had to use underground or remove from underground had to go a vertical mile, and it had to fit in a 600-cubic-foot cage."



Pre-excitation scope of work

The Kiewit-Alberici Joint Venture (KAJV) was responsible for the following pre-excitation activities, which paved the way for the main excavation of the underground caverns.

- ▶ Reinforcing the existing headframe above the Ross shaft
- ▶ Renovating the floor of the Ross shaft where excavated rock will be loaded into skips and brought up to the surface
- ▶ Excavating drifts and chambers for early ventilation pathways
- ▶ Rehabilitating ore passes, including the removal of old equipment and debris
- ▶ Installation of new rock-crushing equipment
- ▶ Rehabbing an existing tramway tunnel
- ▶ Building and installing a conveyor system
- ▶ Installation of electrical and fiberoptic infrastructure
- ▶ Incorporating six blast doors to protect existing science areas



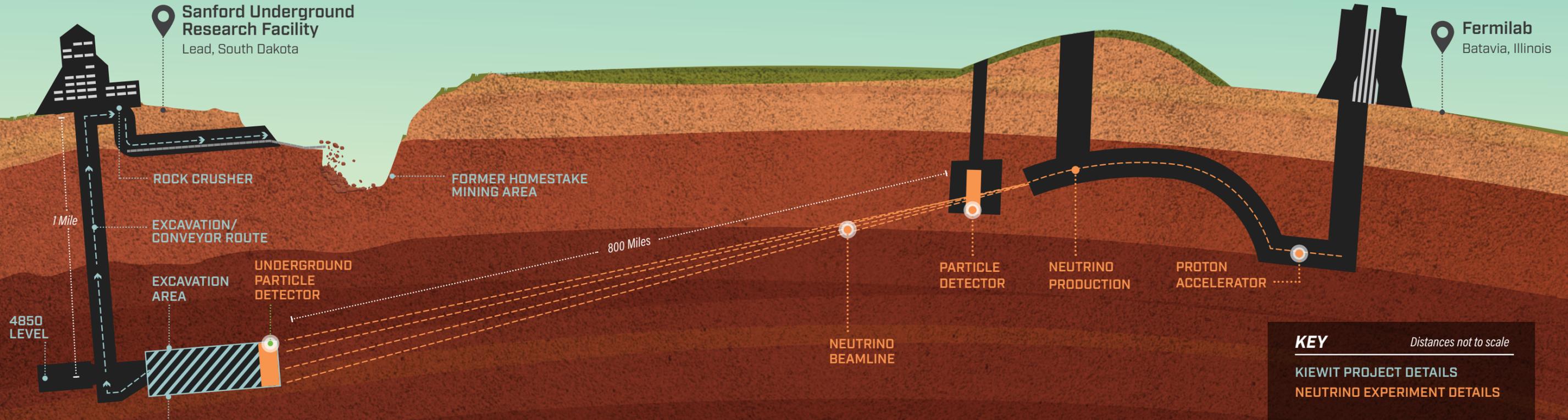
1. The project team engineered new equipment that could move on an incline, in a horizontal direction, within the existing ore pass. 2. Six blast doors were installed to keep air pressure, air flow and blast effects away from an existing laboratory on the 4850 level. 3. Many pieces of equipment were disassembled to fit in the hoist system and later reassembled underground.



What is the Deep Underground Neutrino Experiment (DUNE)?

The Deep Underground Neutrino Experiment (DUNE) is a leading-edge, international experiment for neutrino science and proton decay studies. Discoveries over the past half-century have put neutrinos, the most abundant matter particles in the universe, in the spotlight for further research

into several fundamental questions about the nature of matter and the evolution of the universe — questions that DUNE will seek to answer. For more information, visit lbnf-dune.fnal.gov.

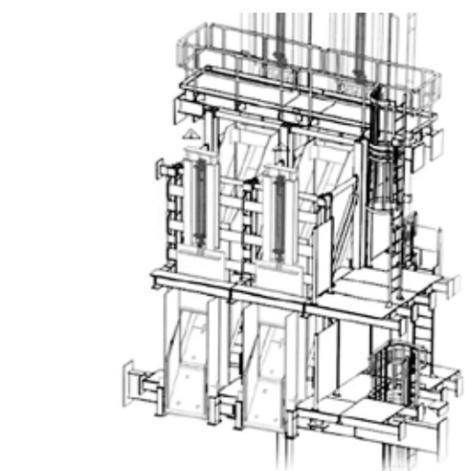


The excavation of the LBNF/DUNE caverns requires the transport of approximately 800,000 tons of rock from a mile underground to the surface, and then transporting it to its final resting place in a former mining area known as the Open Cut.

KEY Distances not to scale

KIEWIT PROJECT DETAILS

NEUTRINO EXPERIMENT DETAILS



A meticulously designed skip loader system was constructed that will eventually remove approximately 800,000 tons of excavated rock.

It also required additional consideration by designers and engineers. For example, the steel pieces and beams for the new skip loader system were designed and fabricated specifically to fit into the cage. In addition, the pre-construction team ensured that material and supplies were sized, shaped and packaged accordingly.

In regard to equipment, though, items typically could not be custom-sized to fit the cage. As a result, many pieces of equipment had to be taken apart above ground and re-assembled below, which needed to be taken into account when planning construction schedules.

"We always had to be efficient with cage time," said Joe Caggianelli, general superintendent for Kiewit. "We could only carry 6,000 pounds of material, and it took 15 to 20 minutes to get to a work station. Crews really needed to

plan ahead to make sure they had everything they needed for their shift."

Given the challenging logistics of transporting crews to work, it was an advantage to have a highly skilled, multi-disciplinary crew, many of whom had previous mining experience and were accustomed to working underground.

"For the construction of the skip loader, crews were sized to efficiently rotate between multiple tasks, including structural steel, piping, ground support and concrete," said Aaron Heckmaster, field engineer at Kiewit. "Our crews have really excelled at everything that needed to be done."

A STRAIGHTFORWARD APPROACH

Regarding the above-grade work, which included the design and installation of a new conveyor system, the

project team successfully tackled major challenges.

The new conveyor system, which spans an impressive 4,216 feet, will be used to transport excavated rock from underground caverns to the Open Cut, where the rock will be stored. The system is designed to operate 10 hours a day with the capacity to transport up to 4,000 tons of rock daily.

A portion of the system, specifically the foundations, were designed by Kiewit's in-house engineering team.

"Working with our in-house engineering team helped maximize efficiencies," said Ben Seling, construction manager at Kiewit. "Regardless of a few last-minute changes, they were flexible and accommodating, which ultimately prevented any design-driven construction delays."

With limited laydown space, any deviation from the plan



1. The new conveyor system was installed over U.S. 85. 2. When complete, the conveyor system will have the capacity to move 400 tons of rock per hour. 3. The reclaimed and rehabilitated ore pass from the historic mine works will now be used to transport excavated rock to make way for massive underground caverns.

would have resulted in a ripple effect of delays. The installation of the bent foundation had to run according to schedule, which meant the design had to be final and accurate.

"Overall our approach was very straightforward: get it off the truck, bolt it and fly it," added Seling.

Unfortunately, the installation of the conveyor system at the Open Cut was not as straightforward. In order to effectively deposit excavated rock, the system cantilevers over the open cut, which is nearly 1,200 feet deep at its center. Two cranes were used to complete the majority of the installation. A 450-ton crane set the first section of the conveyor at a 105-foot radius, which exceeded 90 percent of the crane's capacity.

"There were a lot of reviews of slope stability as well as making sure that we understood how much load we could put on the rock at the edge of the cut," Seling explained. "Additionally, an access path was cut out of the rock to accommodate the crane and this operation."



Two chutes are used to help meter and load excavated rock that will be hoisted to the surface.

A 250-ton hydraulic crawler crane was used as well, operating at a 38 percent grade, up a very steep access road.

"We started with a tree-covered hillside and had to pioneer the new road, which provided access for both the concrete and steel crews. It all came down to having a watertight plan," Seling added.

Detailed planning was also crucial in installing the conveyor system over U.S. 85, a well-traveled, two-lane highway. The process began with the removal and setting of the bents, which required several nighttime highway closures.

The most visible and impressive operation involved the placement of the enclosed conveyor onto the bents. A crane lifted and set two bolted halves of an enclosed truss with a combined length of roughly 120 feet across the highway. Since the trusses already had all of the conveyor components installed, the project team was able to avoid any additional highway closures.

"The community was pretty excited the night we erected the truss over the highway," Seling commented. "We had quite the crowd watching on their blankets and lawn chairs. The conveyor was similar to the one used for the

Homestake mine so it brought back special memories for some."

TEAMWORK AT ITS BEST

While the next phase of the project — the excavation of approximately 800,000 tons of rock from underground caverns — is on the horizon, the project team is proud of the work that has been completed thus far.

"It's been an awesome project," said Heckmaster. "We are fortunate to have a team that works really well together toward our common goal. And that makes work much more enjoyable."

For Caggianelli, who coordinates and supervises the "below the collar" work and has been with Kiewit for more 30 years, this project provided a valuable opportunity to share his knowledge and expertise with less experienced employees.

"I get a lot of satisfaction in training our young builders, whether engineers or superintendents," he added. "Many of our employees have never worked underground like this. It may have been an eye-opening experience at first, but they were all up for the task and have done an excellent job." **K**



1. The old concrete culvert was replaced with this 26-foot diameter multi-plate round steel culvert. 2. To keep traffic moving, crews built a 180-foot-long temporary bridge to span the creek. 3. This photo shows the nearly-completed project. Trees and shrubs were planted in the stream banks, and will eventually create a more natural look.

TRAFTON CREEK FISH PASSAGE

New culvert and streambed provide a fish-friendly habitat

If the fish could, they'd likely be applauding the recent improvements made at Trafton Creek.

The migratory and resident species that inhabit this stream that runs under State Route 530 in northwest Washington are finding it easier to navigate the waterway, thanks to a new water-crossing structure and streambed designed and built by Kiewit.

Earlier this year, the team completed work for the Washington State Department of Transportation (WSDOT) that included replacing a concrete culvert and building a natural habitat for Coho salmon, steelhead, and resident bull and sea-run cutthroat trout.

Trafton Creek is one of more than 800 sites in the northwest part of the state with culverts that are slated for replacement by WSDOT by 2030. The impetus for the upgrades was a legal request by 21 area Native American tribes to preserve fish runs, granted by the U.S. District Court.

'WORKING ON A POSTAGE STAMP'

To prepare for culvert construction, Kiewit first had to build another structure — an approximately 1,000-foot-long temporary bypass lane, which included a 180-foot-long temporary bridge to span the creek, diverting traffic for about four months.

Making room for the new structure in the creek, as well as the access road, meant removing about 60,000 yards of soil.

"We were working in a postage-stamp size area," said Construction Manager Mike Yedinak, which required some careful choreography of the landscape and the fish at the site.

Excavation could only go down to a certain elevation — the ordinary high-water mark — prior to the In-Water-Work window between July 15 and Sept. 30. At that point the existing creek could be diverted, and the concrete culvert removed.

To be able to work in a dry environment, Kiewit placed a diversion pipe to temporarily alter the flow of the water; a subcontractor was hired to remove and relocate the fish within the project limits.

PUTTING TOGETHER A PUZZLE

With a drop too steep for most fish to traverse, the old culvert measured 48 inches in diameter and was 290 feet long.

The new structure is a roomy 26-foot diameter multi-plate round steel culvert. At 135 feet, it's also shorter than the old one, which opens up additional streambed habitat and limits the amount of time the fish are in the culvert itself.

Assembling the culvert was like putting together a big puzzle, Yedinak said.

Crews started at the bottom to build the seven plates per ring that comprise the culvert. Each ring of plates — about 2 ½ feet wide by 8 feet long — required about 300 bolts for a total of 13,000.

"The tricky part was we had to build the culvert at the bottom of the excavation due to limited room both up top on the road and at the bottom of the cut," said Yedinak.

"With rock outcrop on one side of the excavation and a resident's driveway that had to remain accessible on the other, the overall footprint needed to stay as small as possible and still have the excavation maintain a certain slope for safety," he said.

BUILDING THE HABITAT

Communication with the Native American tribes was a key part of the project, said Chris Parshall, who served as lead estimator and design coordinator.

Kiewit team members frequently met with tribe

representatives to discuss the details of the project and also to understand their expectations.

While planning the design for the improved stream habitat, for example, the tribes said they preferred natural-looking features built out of wood, Parshall said.

"We buried logs and root wads in the stream, positioning them like a tree would be if it fell into the waterway and was either carried into the stream and stuck into the bank or just down into the stream."

The bioengineered stream banks were constructed out of jute mat and a variety of species of trees and shrubs were planted in it. To reinforce the banks — at a steeper grade because of site constraints — a sediment-type of aggregate was used for backfill along with some topsoil.

Native species sourced from the project, whether shrubs or trees, have created an authentic habitat. The idea, Parshall said, is that some of them are going to grow quickly, die and then fall into the stream to contribute to the natural process.

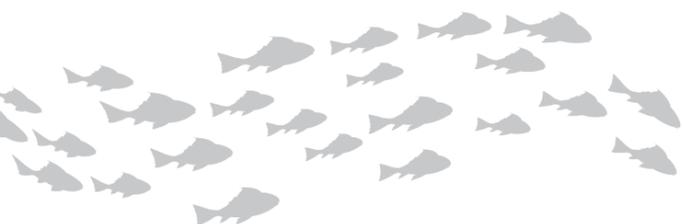
BRINGING TOGETHER OLD AND NEW

For Parshall, the project has been like a homecoming. He grew up six miles down the road in Arlington and was able to interact with people he remembers from childhood.

"Just down the street is the saw shop," he said. "My dad dealt with him when I was a three- or four-year-old kid. I was talking with folks who are in my history."

After serving as a superintendent for other Kiewit projects, this was Yedinak's first as a construction manager.

"I was always the one just getting dirty and putting stuff together," he said. "It's definitely been a different take on things. It's all new to me, so it's been fun." **K**





SETTING A STRONG FOUNDATION FOR THE U.S. MILITARY

For the historic military installation at MOTCO that serves the Indo-Pacific Command, Kiewit/Manson has rebuilt a critical piece of infrastructure.

It's not often your work is on the weekly discussion docket at the Pentagon. For the 22 staff and 90 craft charged with rebuilding Pier 2 at the Military Ocean Terminal in Concord, California (MOTCO), that's been a point of pride.

The Sacramento district of the U.S. Army Corps of Engineers (USACE), the project client, says the job is one of its most important national defense projects.

Located 30 miles east of San Francisco in Suisun Bay, MOTCO is one of only two ship-loading and offloading complexes in the country, and the only one on the West Coast that handles munitions for overseas military operations.

A Pivotal Moment in History



The Port Chicago Naval Magazine National Memorial is visible in the background, just north of the job site. Established in 1992, the memorial marks the final resting place of those unrecovered after an explosion on July 17, 1944.

About 200 yards from the new Pier 2 at MOTCO stands a poignant reminder of a pivotal event in the country's early civil rights movement.

The Port Chicago Naval Magazine National Memorial marks the site where on July 17, 1944, 320 sailors and civilians, 202 of them African American servicemen, were killed in an accidental detonation while loading explosives. It would cause the largest loss of life on the home front during World War II.

African American servicemen responsible for loading munitions had little or no training for handling explosive materials. But after the event, the survivors were ordered back to work. Concerned another explosion was possible,

Built as a U.S. Navy facility during World War II, today the site provides ammunition and related supplies for Department of Defense operations in the Indo-Pacific Command.

INCREASING MOTCO CAPABILITIES

While the previous Pier 2 had undergone improvements in the 1970s, it was time for an upgrade to make operations more efficient.

The USACE is overseeing close to \$350 million of construction at MOTCO as part of a base modernization program. Projects include upgrades to waterfront infrastructure, such as the Pier 2 rebuild, road and railway



hundreds of African American sailors chose not to participate.

Fifty of the men were tried for mutiny and sentenced to up to 15 years. Two years later, 47 of the 50 were given clemency; some returned to loading ships. The events led to groundbreaking changes in the U.S. military, including mandated certification for munitions handling and a requirement that all munitions be redesigned for safety.

In June 1945, the Navy began desegregating its units. In July 1948, President Truman signed Executive Order 9981, the watershed legislation that called for desegregation of the Armed Services.

improvements, access control points, bridge repairs, and upgrades to utility infrastructure.

In December 2018, joint venture Kiewit/Manson began work on demolishing the old 159,000-square-foot timber structure, including removing 4,500 creosote-treated timber piles and 254 concrete square piles, in order to make way for the new all-concrete Pier 2.

Construction on the new pier required driving 793 new 24-inch octagonal pre-stressed concrete piles made by Kiewit subsidiary Kie-Con Inc., 134 square concrete piles, 11,000 cubic yards of concrete, and 3,300 tons of reinforcing steel.

By implementing a design that centrally locates operations on the base, Kiewit/Manson's work on Pier 2 will increase MOTCO's capabilities by about 25 percent.

GETTING CRAFT VETTED

One of the early challenges was the coordination required to get the materials, suppliers and subcontractors approved by the military, said Keith Boulton, who served as general superintendent and later as project manager.

"It's not like you can call the union hall on a Friday and say 'I need a carpenter on Monday' — you just can't do that."

Before an applicant could come on base, a stringent vetting process required gathering all the applicant's background information, submitting it and getting approval to begin work.



The Pier 2 job reunited two construction collaborators: Kiewit and Manson. The companies have worked together on several joint ventures to date, including removal of the old San Francisco-Oakland Bay Bridge. For Kiewit, the job was another success in a long line of projects for the USACE Sacramento District.



Besides adhering to COVID-19 regulations, the Kiewit/Manson team has clocked more than 800 days without a recordable safety incident.

"Kiewit/Manson was very good about getting all the documentation in early, asking questions, pushing things through on off-peak times," said Capt. Josh Olson, who was USACE project manager through June 2020.

"When it came to peak construction, everybody was set and there were minimal issues getting access on and off base."

CREATING OPTIMUM TRAFFIC FLOW

The team also had to perform some deft footwork to make sure traffic moved smoothly on the limited number of roads in and out of the base. That meant sharing the road with other contractors as well as the nearby MOTCO crews. "We were working five hundred feet away from the pier where they're loading and unloading all these munitions," said Matt DiCrescentis, project manager.

A big challenge was how to partner with the Corps and MOTCO to make sure the team didn't impede MOTCO operations while also limiting impacts to Kiewit/Manson's construction execution.

"It was just coordination, coordination, coordination," DiCrescentis said.

Kiewit/Manson helped deconflict the two by creating an additional pattern of traffic flow, with construction traffic going one way and operational traffic going the other.

"That was a huge deal from an operational standpoint to keep as many roads open so we had the least amount of impact possible," said Capt. Olson. "Kiewit/Manson was very good about working with the installation and USACE in deconflicting those traffic routes."

A LINEAR PIER POUR

More challenges were facing the team: How to install a 300-foot-long permanent approach trestle in shallow water without constructing a temporary standalone trestle, and doing the additional preconstruction concrete testing to achieve a minimum 50-year design life for the new pier.

Because the job permit didn't allow a temporary trestle to be built next to the pier in this environmentally sensitive area, Kiewit/Manson had to think creatively.

With an assist from Kiewit Engineering Group Inc., they came up with a solution to build the new deck and west trestle using a linear, schedule-driven model, said Joe Eiras, structures superintendent.

The crew drove the permanent piles and built a temporary trestle on the piles from the shore to where the trestle met the pier.

Coming back, they pulled two or three spans of the temporary structure at a time, then poured the concrete caps and set the precast concrete slab beams for the permanent structures.

Eiras noted the lack of drama on the project. "Uneventful is a good thing in construction a lot of times. I'm really proud of the crew that built it and really happy with how it turned out."

'A BEAUTIFUL PIER'

Achieving the necessary concrete strength with other critical concrete characteristics was also integral to the project's success, Boulton said.

"The concrete strength was a very specific requirement where they wanted a maximum strength and a minimum strength. So the supplier had a small window — between 5,000 and 6,200 psi at 28 days — where we had to hit those strengths."

One of the biggest accomplishments on the job, Boulton said, was placing 11,000 cubic yards of concrete to stringent specifications.

The team has many reasons to be proud of the finished product, from how it looks to how the crew performed.

"It's a beautiful pier," Capt. Olson commented. "The team did really, really great work from an aesthetic and structural standpoint. They were always willing to do whatever they could to keep the project moving forward and deliver on promises made." **K**

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USACE Project Manager

