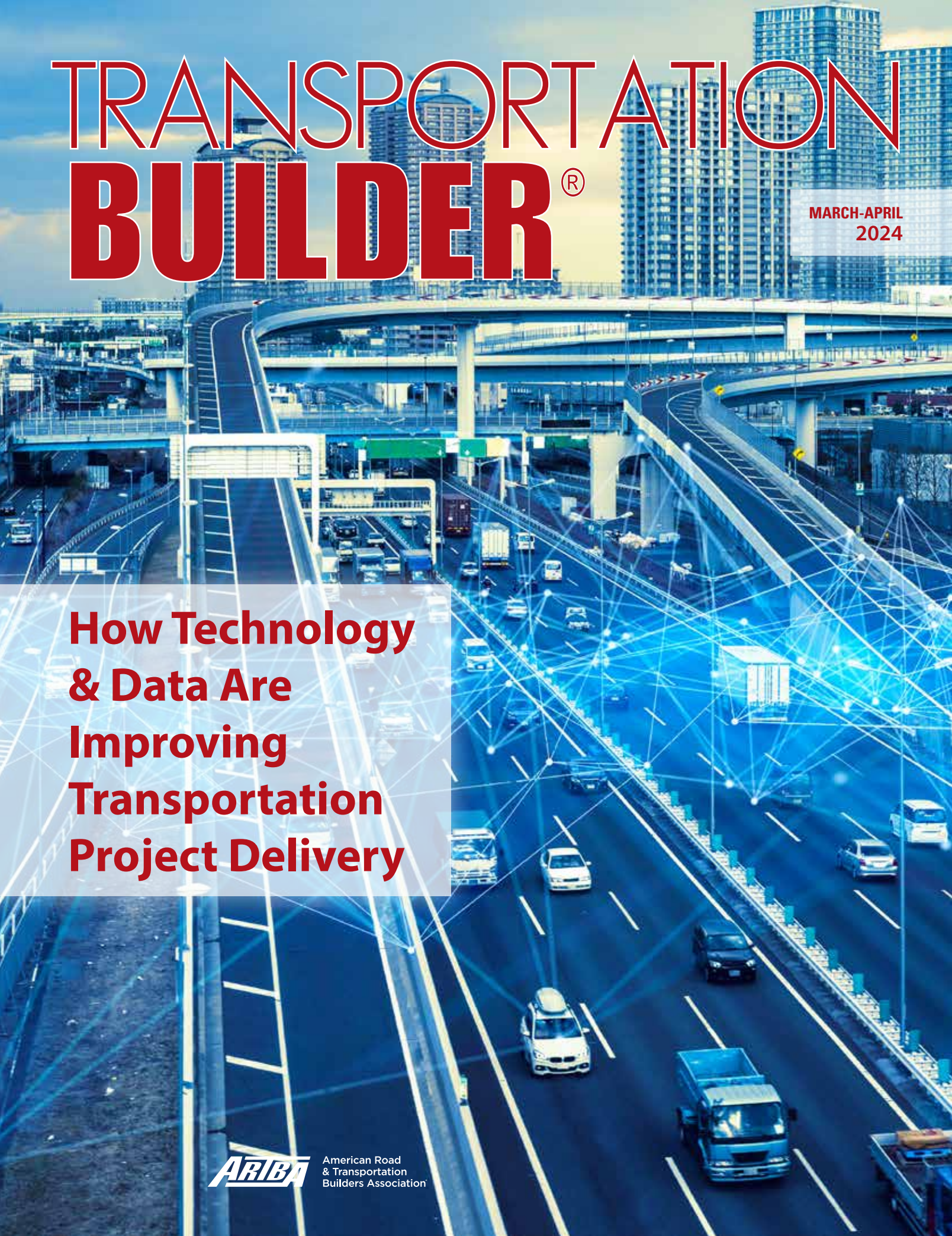


TRANSPORTATION BUILDER®

MARCH-APRIL
2024

How Technology & Data Are Improving Transportation Project Delivery

ARTBA American Road & Transportation Builders Association

TYING REBAR IS FASTER

WITH A TWINTIER®

- 5,000 TIES PER CHARGE
- HALF A SECOND PER TIE

FROM THE MANUFACTURER OF THE WORLD'S FIRST BATTERY POWERED REBAR TIER.

RB441T

RB611T

RB401T-E

TIE WIRE

BUY AMERICA CERTIFIED
NOW AVAILABLE

STAND-UP TWINTIER

MAX

maxusacorp.com

SCAN TO VISIT
OUR WEBSITE

inside

MARCH-APRIL 2024 / VOLUME 36, ISSUE 2

Cover photo: Shutterstock

ON THE COVER

10-30 **5th Annual Smart Design & Construction**

Editorial Contributors:

- HaulHub, Inc.
- HCSS
- HDR
- HNTB
- Superior Construction
- Transurban
- Trimble

FEATURES

32 Prioritizing Roadway Worker Safety to Save Lives

34 Fostering a Skilled Highway Workforce for Georgia's Future

36 Q&A With Missouri Department of Transportation Director Patrick McKenna

40 # Infrastructure Investment Works: Alabama and Arizona Project Profiles

INSIGHTS

Chair's Corner, p. 6

Dave Bauer: The Arena, p. 8

Eye on Economics, p. 42

ARTBA On the Road, p. 45

AEM Corner, p. 47

TransOvation Tech, p. 49

ADVERTISER INDEX

GOMACO Corp., p. 51

Hill & Smith Inc., p. 29

IHG Hotels & Resorts, p. 46

MAX USA CORP., p. 2

National Work Zone Safety Information Clearinghouse, p. 21

Plexscape: Plex-Earth, p. 19

Reconstruct Inc., p. 27

Rogers Group Inc., p. 15

RSG International, p. 5

Stalker Radar / Street Dynamics, p. 38

Strawser Construction Inc., p. 43

Valtir, LLC, p. 9

Wirtgen America Inc., p. 52

ARTBA:

Advertise With Us, p. 50

Interactive ARTBA Dashboards, p. 48

Membership, p. 39

National Workshop for State & Local Transportation Advocates, p. 23

P3 Conference, p. 26

Safety Center, p. 31

Transportation Construction Market Intelligence Service, p. 44

ADVERTISE WITH US

Promote your company's products and services in Transportation Builder. Contact Dave Weidner at 202.683.1026 or **adsales@artba.org.** See our 2024 Media Kit under the "News" tab at **artba.org**.

"ARTBA reserves the right, at its discretion and without liability of any nature whatsoever, to reject, cancel or suspend any advertising in whole or in part, in which case any fees paid in advance shall be refunded to the advertiser on a pro-rata basis."

TRANSPORTATION BUILDER®

"Transportation Builder"(TB) is the official publication of the American Road & Transportation Builders Association (ARTBA). We bring together all facets of the transportation construction industry to responsibly advocate for infrastructure investment and policy that meet the nation's need for safe and efficient movement of people and goods. ARTBA also offers value-added programs and services that create an environment where our members thrive in a competitive world. TB is the primary source of business, legislative, regulatory, safety and economic news that matters most to transportation development professionals.

STAFF

PUBLISHER
Dave Bauer

EDITORIAL DIRECTOR
Beth McGinn
bmcginn@artba.org

GRAPHIC DESIGNER
Carrie Halpern
chalpern@artba.org

CONTRIBUTORS

Brad Sant
ARTBA Senior Vice President of Safety and Education

John Schneidawind
ARTBA Vice President of Public Affairs

Transportation Builder® (ISSN 1043-4054) is published bi-monthly by the American Road & Transportation Builders Association (ARTBA). Postmaster: Send change of address to Transportation Builder®, c/o ARTBA, 250 E. Street, S.W., Suite 900, Washington, D.C. 20024. Phone: 202.289.4434, Fax: 202.289.4435, artba.org; klott@artba.org. Periodicals postage paid at Washington, D.C., and additional mailing offices. Subscriptions are $105/year for ARTBA members, which is included in the dues; $120/year for non-members; and $200/year non-U.S. mailing addresses.

Visit us: transportationbuilder.org

EXECUTIVE COMMITTEE

BETH McGINN | Editorial Director

Harnessing Data

Beth McGinn
Editorial Director
bmcginn@artba.org

The other day I mentioned to my husband that our TV was on the fritz. He suggested it might be time for a new one. Not too long after, and as many of you can relate to, an app on my phone displayed the latest 65-inch Samsung QLED.

Are they listening to us? The answer is unquestionably, "yes." Companies are continuously collecting our data. It is unsettling, for sure, but that is the world we live in. Everything is a data point that can be harnessed. In the case of transportation construction, such data can help build safer, stronger, more efficient, and environmentally friendly infrastructure.

In this issue, our members share how they are embracing the digital age. Technology company Trimble and design firm HNTB explain how data and machine learning tools help assess pavement conditions. Safety company HaulHub shows us how the Delaware Department of Transportation uses connected work zones to enhance safety. Software company HCSS explains how AI-enabled tools can serve as a virtual assistant on the jobsite. And design firm HDR provides a thoughtful piece on how companies and agencies can unlock the potential of this rapidly evolving tool.

These and the many other tech-focused articles in this issue of *Transportation Builder* demonstrate the beneficial side of the digital age. They help us see that "big data" should not be feared—it should be harnessed. Unless you have an online shopping addiction and your apps are tied to your credit card. Then, it should be feared.

CHAIR'S CORNER

TIM DUIT | President, Duit Construction Co., Inc.

Transportation Makes America Work Powers Advocacy Initiatives

"What is TMAW?"

That is a good question that ARTBA President Dave Bauer, his colleagues, and I have gotten from members over the years.

In simple terms, Transportation Makes America Work (TMAW) is ARTBA's advocacy program aimed at building and protecting the transportation construction market.

I tell ARTBA members that their dues help support things like our D.C. office rent and operations, along with our top-notch professional staff. By comparison, TMAW contributions—which are over and above dues—are invested in advancing the industry's legislative, legal, regulatory and safety agenda at the federal level, and at the state level through the association's Transportation Investment Advocacy Center (TIAC).

TMAW's primary focus is not the public; rather it is elected officials and policymakers. It operates like a political campaign, using tactics such as coalitions, issue advertising, consultant support, social media, videos and publications, public opinion polling, economic research and analysis, media outreach, and events.

In 2024, TMAW resources are helping:

1. **Engage in the congressional appropriations processes for Fiscal Years 2024 and 2025**, pushing for fully authorized surface transportation investment levels in the bipartisan infrastructure law (BIL) and additional funding when possible.

2. **Expand the industry's legal and regulatory advocacy program**. ARTBA is currently active in several notable cases: 1) the Biden administration's continued regulatory overreach of roadside ditches despite a 2023 U.S. Supreme Court ruling in the Waters of the United States case (aka *Sackett*); 2) a legal petition to the Office of Management and Budget seeking improvements to "Build America, Buy America" rules; and 3) supporting 22 state attorneys general suing the Federal Highway Administration over new greenhouse gas emissions performance measures for state departments of transportation—an action well beyond congressional intent in the BIL.

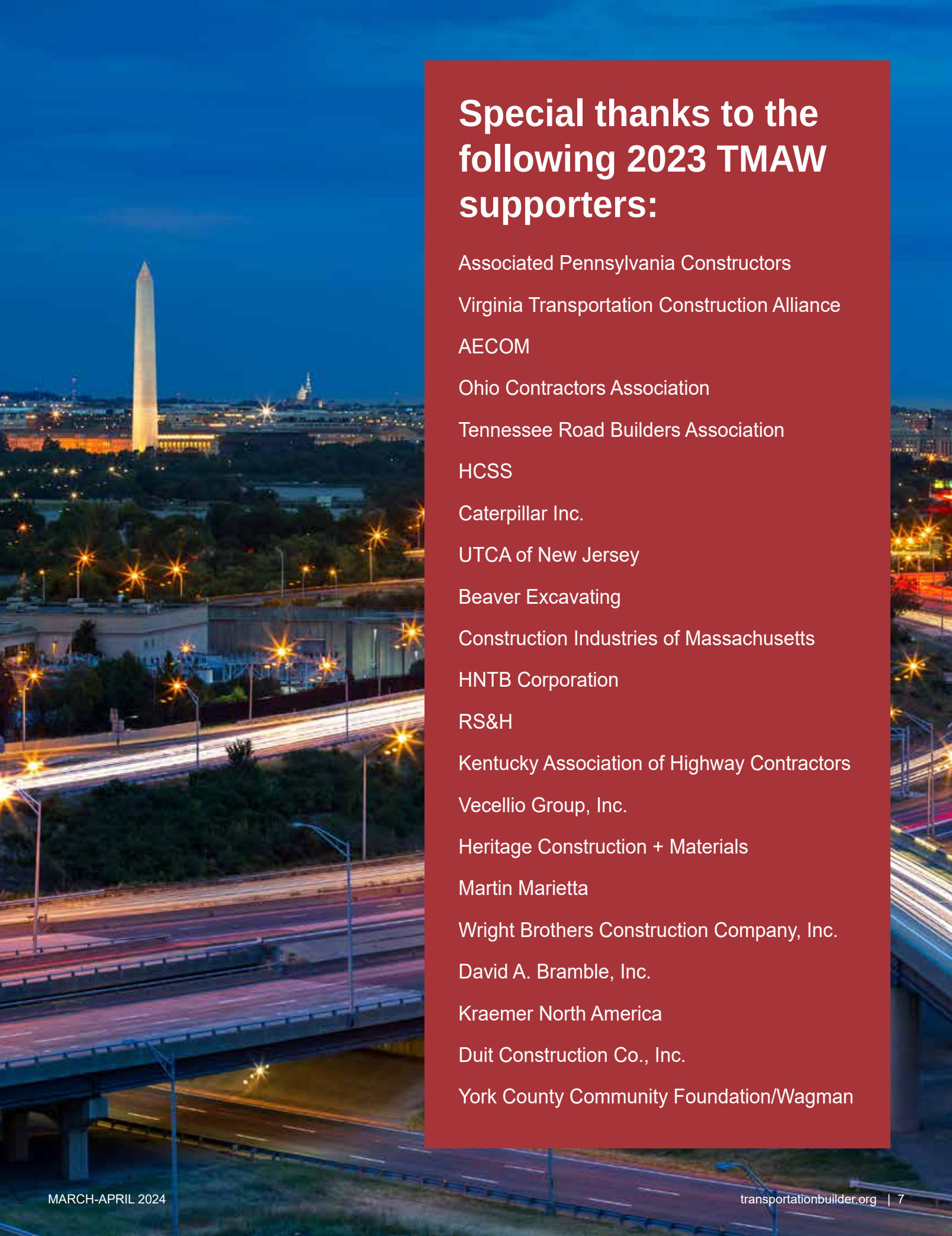
3. **Bolster election year activities of TIAC** (**transportationinvestment.org**), including: research to address transportation funding myths; analysis of how state fees are impacting adoption of electric vehicles; and a report on state lawmakers who voted for and against transportation revenue increases, including road usage charges and electric vehicle fees. The Center will also monitor and report on hundreds of ballot initiatives during this busy election year.

On the opposite page, you will see the list of companies and state chapter organizations that supported TMAW in 2023. Our gratitude to them.

We need your help to advance the advocacy goals outlined above.

Join me in making a financial pledge to TMAW this year. Contact ARTBA's Vice President of Communications Beth McGinn at **bmcginn@artba.org** for details on how to give.

Together, through TMAW, we will continue to spotlight the value and economic benefits of strong federal transportation investment as we prepare for the next reauthorization bill due in 2026. Thanks for your continued support.



Special thanks to the following 2023 TMAW supporters:

Associated Pennsylvania Constructors

Virginia Transportation Construction Alliance

AECOM

Ohio Contractors Association

Tennessee Road Builders Association

HCSS

Caterpillar Inc.

UTCA of New Jersey

Beaver Excavating

Construction Industries of Massachusetts

HNTB Corporation

RS&H

Kentucky Association of Highway Contractors

Vecellio Group, Inc.

Heritage Construction + Materials

Martin Marietta

Wright Brothers Construction Company, Inc.

David A. Bramble, Inc.

Kraemer North America

Duit Construction Co., Inc.

York County Community Foundation/Wagman

DAVE BAUER | President & CEO, ARTBA

Hard Truths from an Infrastructure Tragedy

The collapse of Baltimore's Francis Scott Key Bridge was a heartbreaking reminder of the unique hazards road workers face daily—and the second tragedy that has shaken the Maryland transportation construction community in the past year.

We remember: Miguel Luna, Dorlian Ronial Castillo Cabrera, Alejandro Hernandez Fuentes, Maynor Yassir Suazo-Sandoval, Jose Mynor Lopez, and Carlos Hernandez. We grieve the loss with their families, as we do with each roadway worker lost in accidents every year.

Such events capture national attention in the short-term, but the stories soon fade from the headlines, as recovery work continues. This pattern is unsurprisingly familiar to construction professionals—recent infrastructure failures outside of Pittsburgh and in Philadelphia brought a few news cycles devoted to "aging infrastructure," before moving on to the next story.

The Key Bridge reminds us that the nation's infrastructure network requires constant attention and should never be taken for granted. Meanwhile, states and communities across the nation, are proactively advancing thousands of transportation improvements that will strengthen the U.S. economy and enhance the quality of life for all Americans.

These tangible solutions demonstrate that, through the commitment of energy and resources, progress is possible. This fundamental truth underscores the strategic importance for ARTBA, its members and other allies to continue raising awareness of the extraordinary work our industry does every day--not just in the aftermath of disasters.

As the halfway point of the bipartisan infrastructure law nears, telling these stories remains an integral part of our advocacy program. Through project profiles, site visits, media tours, and congressional visits, we will continue to drive home how we build better and safer routes to work, school and home, while simultaneously boosting economic productivity.

The efforts to restore access to the Baltimore Harbor and construct a new Key Bridge will be a historic feat made possible with federal investment. At the same time, other inspirational examples of how new infrastructure improvements are positively transforming every American community should also be persuasive to policymakers, so that the argument for the 2026 renewal of the highway and public transit program is irrefutable.

MATT™
Median Attenuating TREND® Terminal

- INNOVATIVE
- DOUBLE-SIDED
- ONE ANCHOR CABLE

INTRODUCING THE SHORTEST MASH TESTED MEDIAN TERMINAL

MATT™ is a tangent, double-sided, redirective/gating and energy absorbing attenuator/end terminal, for use with various longitudinal highway barriers in either unidirectional or bidirectional traffic applications – to include roadside, shoulder, median and gore installations.

MATT™ is tested to MASH-2nd Edition (with 2020 Errata) Test Level 3 criteria and may be used in Test Level 1, Test Level 2, and Test Level 3 applications – when installed at the full Test Level 3 system length of 34' 4-1/2" [10.48 m]. Uses only one anchor cable.

Now Available. Request a Quote Today!

WWW.VALTIR.COM
888.356.2363

VALTIR

Scan for More Info

In our 5th Annual “Smart Design & Construction” issue, ARTBA members share their insights and experiences using new technologies to deliver safer, stronger, more efficient and environmentally friendly transportation infrastructure.

This special section includes two insightful pieces on the application of artificial intelligence in construction—its uses, limitations and how the industry should apply this exciting and seemingly limitless tool.

Revolutionizing Construction: The Rise of Advanced Technologies and Materials

BY BRIAN McGARITY
bmcgarity@superiorconstruction.com

Much like a weather-worn, overloaded and aging superstructure, the construction industry would collapse without the innovative technologies sustaining it.

In recent years, the equipment that contractors use to build our nation's infrastructure has significantly benefited from rapid advancements in artificial intelligence (AI), 3D printing, augmented and virtual reality, building information modeling (BIM), construction robotics, and other technologies, as have the materials procured for each project.

Construction companies increasingly utilize these innovations to improve efficiency, durability, sustainability, and profitability. In some cases, they can even help contractors protect their most valuable resource—their workforce.

Prioritizing Safety

Construction recorded the most deadly workplace injuries of any industry in 2022, according to the United States Bureau of Labor Statistics.

Maintaining a reputation as a heavy civil construction safety leader is crucial to business development and a moral imperative. Contractors can leverage technology to proactively address safety hazards, reduce risk, and improve safety metrics.

Work zone crashes account for a large percentage of construction workplace deaths. One way to mitigate this risk in high-traffic areas is to employ newer traffic management systems like Lindsay's moveable barrier wall, the Road Zipper System®, which Superior used to complete the Indiana Department of Transportation's R-43062 (I-80/94) preventative maintenance pavement restoration project. It was the first time a contractor in that region had employed the system.

A portion of the Wekiva Parkway Section 6 in Florida was completed using the TyBOT system to reinforce steel connections. The design-build team's choice of a segmental bridge eliminated work in water and protected the environment using top-down balanced cantilever construction. Photo courtesy of Superior Construction.

Also known as the Borman Expressway, I-80/94 is one of Northwest Indiana's deadliest roads, claiming 71 lives on the Lake County stretch and another 19 in Porter County between 2006 and 2018, according to the *NWI Times*.

The project team utilized the Road Zipper System® to reconfigure the expressway in real-time, opening the maximum number of lanes for peak traffic periods and providing workers and motorists with the security of high-level positive barrier separation at all times. However, employing these newer systems requires flexibility and rigorous training.

"We had to maintain four lanes of traffic at all times and adhere to stringent overnight restrictions, which meant our team could only work between 9 p.m. and 3 a.m.," said Superior Mid-South Division Manager Tim Koster. "That gave crews six hours to stage 16 miles of barrier walls, mill, clean and sandblast pavement patches, pour and cure the new concrete, and remove the barrier walls, or we would incur substantial fines."

To ensure someone was always available to operate the barrier transfer machine, Koster had Lindsay host a training session for his team. Two operators are needed to run the machine; both must wear headsets and communicate as they drive simultaneously. The manufacturer taught 30 operators and laborers how to perform this complicated task safely and efficiently.

The project team executed this strategy during its overnight shifts, effectively patching 10,000 square yards of pavement without a single recordable safety incident.

Construction Robotics

Construction robotics allow companies to automate tasks that can be tedious, like rebar ironwork, thereby reducing ergonomic stressors.

Superior utilized Advanced Construction Robotics's TyBOT system to minimize the risk of back injuries on its multi-award-winning Wekiva Parkway Section 6 project in Sorrento, Fla.—the state's first major use of that particular technology.

Manually tying rebar requires fast, repetitive and forceful motions and can compromise ironworkers' posture. It also requires laborers to work in elevated areas for extended periods, which can be hazardous.

The TyBOT system uses lasers and cameras to reinforce steel tie connections, speeding up production and reducing the likelihood of injuries from a fall or straining one's back.

Despite how far this emerging technology has come in the last decade, there is still much room for growth and improvement. Cost and machinery durability are two significant roadblocks to widespread robotics applications.

Robotics is currently more prominent in building construction, where tools like the Baubot MRS12 and Hilti's JaiBot can perform laser leveling, bricklaying, milling, sanding, site monitoring, and 3D printing and reinforcement. Highway construction requires more robust all-terrain robots that can withstand the rugged elements craft laborers endure.

Some existing products highway contractors can use provide three-dimensional jobsite scanning using AI. For instance, ULC Robotics and SGN's Robotic Roadworks and Excavation System (RRES) contains utility mapping technology that can improve excavation by identifying and locating exposed assets.

Meanwhile, Built Robotics manufactures AI-autonomous construction equipment to replace traditional pile driving methods. However, many available robots still require an operator and are not cost-effective, particularly for smaller companies.

The Arlington (Fla.) Expressway Project team utilized ultra-high-performance concrete to interconnect existing precast bridge slab panels, obtaining 15,500 psi within 24 hours. Photo courtesy of Superior Construction.

Current technological limitations may stall the digital transformation, but they likely will not obstruct the industry's automation trajectory and future implementation of smart technologies.

Ultra-High Performance Concrete

In recent years, there has been a remarkable surge in construction material advancements, with one standout innovation being ultra-high performance concrete (UHPC), a highly optimized class of materials with higher durability and increased strength properties compared to conventional concrete.

"UHPC-class materials do not use coarse aggregate; instead, they contain non-organic fine materials, sized with a modified particle packing and mixed with a low water-to-binder content, which provides a low permeability matrix," said Anthony Ragosta, P.E., director of engineering and operations at ceEntek North America.

UHPC increases abrasion resistance, is castable, self-consolidating, and can withstand ultimate capacities of 21,000 pounds per square inch (psi). Its high content of discrete fibers provides additional strength and serviceability even after it cracks, meaning it maintains a structure's load-carrying capacity.

Another benefit of using UHPC is its decreased rebar development length and rapid cure times. Superior Construction is currently using UHPC on its Arlington Expressway bridge remediation project in Jacksonville,

*See **Technology**, 14*

***Technology**, from 13*

Fla., and has used it on three projects along I-10 in the Florida Panhandle.

In each case, the UHPC was used to interconnect existing precast bridge slab panels, and the bridge plan required the concrete to reach an ultimate capacity of 21,000 psi.

“We reached 15,500 psi within 24 hours,” said Arlington Expressway Assistant Project Manager Jenny Ferman.

A major challenge contractors often contend with when using conventional concrete is gaining sufficient capacity in time to release traffic onto freshly poured concrete to minimize travel disruptions.

“A conventional concrete might take 28 days to reach 9,000 psi strength. UHPC can reach that strength in 10 to 14 hours,” said Superior Assistant Project Manager Aaron Kidd, who employed the material on the company’s I-10 projects in Florida.

UHPC also possesses substantial environmental benefits since it extends a bridge’s service life, stretching the existing embodied carbon and minimizing the emissions associated with construction maintenance. There are some challenges to working with UHPC, including cost and a learning curve for first-time users.

“If you misplace it or it doesn't hit the strength you want because it was mixed incorrectly, it's much more difficult to remove,” said Ferman.

A cubic yard of concrete averages $100-200. UHPC costs $3,000 per cubic yard on average. However, most UHPC vendors provide on-site training to avoid costly mistakes.

Construction Data

Automated data collection is transforming the industry. The Florida Department of Transportation (FDOT) recently built the only full-scale concrete testing facility in the Southeastern United States—the U.S. 301 Concrete Test Road, a field laboratory testing concrete pavement and base designs under live traffic loads.

Composed of 52 experimental concrete pavement sections, the project utilizes innovative technologies to collect real-time data on the efficacy of various concrete

The U.S. 301 Concrete Test Road is FDOT's only full-scale concrete testing facility in the Southeastern United States. It serves as a field laboratory for testing concrete pavement and base designs under live traffic loads. Photo courtesy of Superior Construction.

types, thicknesses and base types available for use on Florida roads. These concurrent experiments examine the roads’ structural integrity, drainage and calibrate road fatigue and cracking.

To complete the project, Superior Construction poured 36,500 square yards of concrete pavement, embedding it with advanced instrumentation, including strain gauges, thermocouples and moisture gauges to monitor the road conditions continually. The data FDOT collects will inform future projects and help the state create resilient transportation corridors.

“The more resilient the materials we use, the longer they last, reducing our maintenance costs and construction times, limiting the congestion travelers feel in active work zones,” said FDOT Secretary Jared W. Perdue, P.E., when the project was first announced.

Driving the Industry Forward

Ongoing research and development efforts will further refine construction innovations, making them more sustainable, cost-effective and globally accessible. These emerging technologies are poised to revolutionize construction methodology, whether or not contractors are prepared. While innovation comes with learning curves and iterations, early adopters will set themselves apart from competitors and redefine what is possible in the heavy civil industry.

---

*Brian McGarity is the Northeast Florida division manager for Superior Construction, a fourth-generation, American, family-owned infrastructure contractor specializing in design-build and transportation construction. Learn more at **superiorconstruction.com**.*

ROGERS GROUP INC.

BUILDING COMMUNITIES FROM THE GROUND UP

Founded in 1908, Rogers Group is the largest privately owned construction aggregate (graded stone, sand and gravel) company in the United States. We also offer hot mix asphalt and heavy construction services.

YOUR LOCAL ALTERNATIVE DELIVERY AND PUBLIC/PRIVATE PARTNER

With over 3,000 skilled employees and more than 85 quarries and 55 asphalt plants.

LOCATIONS

Alabama | Arkansas | Illinois
Indiana | Kentucky
Mississippi | Ohio
South Carolina | Tennessee | Texas

WWW.ROGERSGROUPINC.COM

Using Data to Improve the Design and Management of Transportation Infrastructure

BY ERIK ZUKER, CRAIG TOTH, AND ED SHAPPELL
ezuker@hntb.com; ctoth@hntb.com; ed_shappell@trimble.com

Increased data availability and powerful analytical techniques are enabling more resilient design solutions and proactive infrastructure management. With the emergence of more data generated than at any previous point in history, the transportation industry can leverage it to provide actionable insights like never before.

These datasets provide a more granular understanding of the demands on our roadways, their actual capacity and how the system experiences the impacts of external forces, allowing for more proactive maintenance strategies.

Assessing Pavement Conditions
For many agencies, it is critical to accurately plan and fund both bridge and roadway maintenance efficiently to minimize the impact for the road user. Access to a vast amount of data and data resources can increase an agency's ability to quantify pavement conditions and assist with short and long-term planning.

New technologies, which include detailed freight data, high-quality weather metrics and LiDAR scans for an entire state, may be used to create data models that agencies can utilize for asset management and decision-making. Leveraging this data is critical to navigating this new environment.

Leveraging Enhanced Weather Data
While many transportation agencies already use detailed weather information to forecast near-term risk and plan post-event logistics, there are also significant applications of weather information that may support long-term planning and understanding damage at the asset level.

The National Oceanic and Atmospheric Administration (NOAA) has made significant investments in recent decades to collect and forecast a wide array of environmental factors. Because of advances in cloud computation and storage, it is possible to access and effectively analyze scenarios like never before. One program that allows cloud access to vast amounts of information is NOAA's Open Data Dissemination (NODD) program. It provides public access to NOAA's open data on commercial cloud platforms through public-private partnerships. With this expansive amount of data, it is

Case Study: Freight Operations eXchange

While weigh in motion (WIM) has been utilized for decades, its increased precision and widespread deployment has changed the ways some departments of transportation (DOTs) operate. Beyond WIM, states are also using license plate readers, traffic cameras, telematic (onboard) systems, vehicle size scans, thermal brake imaging and tire anomaly detectors to increase operational efficiency and improve safety.

A great example of this is the Freight Operations eXchange (FOX), a centralized repository and exchange of aggregated data related to freight movement in Florida. By utilizing these new technologies and the data collected, the Florida DOT has been able to make decisions on size, weight, and other credentials, allowing compliant trucks to bypass conventional weigh stations altogether while also increasing the resolution of data used throughout the agency. (*Photo credit: Jeff Frost)*

crucial to have subject matter expertise to develop accurate climate scenarios.

A pavement's service life is affected by numerous environmental factors, including temperature fluctuations, UV exposure and freeze-thaw cycles. Changes in soil saturation, estimated by precipitation metrics, have shown to reduce a pavement's subgrade resilient modulus.

Because the datasets collected and maintained by NOAA are provided in a GIS-ready, location-based format, it is possible to filter down to the conditions experienced by an individual segment of roadway. Significant advances in machine learning now enable gathering insights from massive datasets that can be performed at scale. The investments made by NOAA to collect weather data are a perfect example of how datasets that already exist may be repurposed for other beneficial uses.

LiDAR Collection and Analysis at Scale

LiDAR surveys, which include pavement scans—supplemented with high-resolution photos and analyzed using artificial intelligence—can now be performed to provide quantitative metrics on pavement damage and wear with increased efficiency. The ability to perform these scans on a recurring basis allows damage analysis and projections at a scale and granularity that was not feasible even a few years ago. This may lead to a significant decrease in overall costs for hardware by leveraging mobile mapping, as compared to the cost and time required for traditional data capture.

At the same time, the industry has seen a similar increase in performance and accuracy of the data captured. There has never been a better time for DOTs to consider these new technologies and approaches to improve their asset life cycle management workflows. Advances in this technology—and the automated approaches to analysis they enable—may allow transportation agencies to do more frequent pavement evaluations at a lower cost, especially for areas of heavy truck traffic or adverse environmental conditions that experience accelerated damage.

Photo credit: CalTrans Division of Construction and Division of Land Survey

Comparing cost and time of mobile mapping to traditional data capture

Kilometers	Cost Savings (ratio)	Time Savings (ratio)
1	3.2x	1.3x
10	7.7x	5.5x
100	10.3x	9.4x
1000	10.6x	11.3x

Source: Trimble Digital Services; based on historical cost data and workflow time data from multiple DOTs to capture project data, asset positioning and asset extraction data from traditional methods versus LiDAR and images.

The Takeaway

There is a growing movement across all portions of transportation systems to utilize data at scale and in turn gain meaningful insights. This increased data availability and analysis means that charting a path forward into an uncertain future can be navigated with more confidence.

These advances could not have come at a better time. With the funding available through the Infrastructure Investment and Jobs Act, there is a significant opportunity to apply new technology and innovative thinking to advance the efficiency and cost-effectiveness of the planning, design, and maintenance of public infrastructure.

Erik Zuker is a senior project engineer at HNTB. Craig Toth is a group director at HNTB. Ed Shappell is the director of Trimble Digital Services.

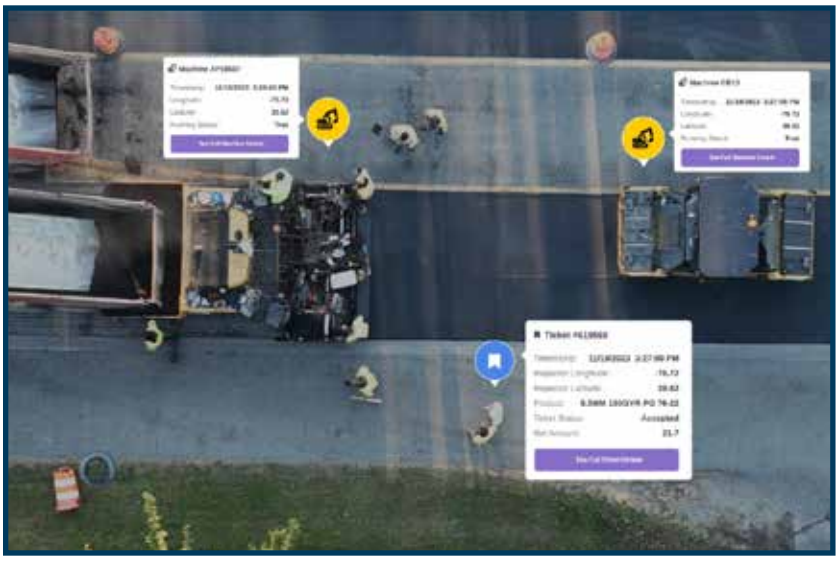
Case Study: Pavement Condition Prediction Model

The Tampa Hillsborough Expressway Authority (THEA) recently completed a pavement condition prediction model using pavement distress measurement performed with LiDAR. The predictive pavement performance was determined using software that included climate, traffic and pavement section and material properties inputs to create a pavement degradation curve over time.

This predicted performance curve was coupled with pavement condition index (PCI) ratings from inspections in the field using LiDAR. PCI ratings were converted to International Roughness Index values, which were compared to the predicted performance curve to determine the remaining service life and estimated age of the pavement.

Pioneers of Progress: DelDOT's Groundbreaking Approach to Connected Work Zones

BY JOEL VANDUSEN
vandusenj@haulhub.com



This aerial drone view illustrates the advancements in digital inspection practices through real-time data synchronization. Courtesy of HaulHub.

The Delaware Department of Transportation (DelDOT), along with peer agencies in Louisiana, Iowa, and Nebraska, are leading a digital revolution in highway construction, transforming the industry with a visionary approach to work zone safety. It's called the "Accelerating Digital Inspection Practices with Connected Machinery" project, and it's paving the way for safer, more efficient, and data-driven project management.

At the heart of this transformation lies the concept of connected work zones, where machinery, materials, and personnel are linked through advanced digital technologies. By leveraging the capabilities of modern pavers and milling machines, DelDOT aims to enhance safety procedures, optimize operations, and provide real-time information to all stakeholders, including the traveling public.

Traditional construction project management relies on paper-based processes and manual reporting, often resulting in delays, inefficiencies, and potential safety risks. Recognizing the need for a paradigm shift, DelDOT set off to harness the power of digital technologies to create a more dynamic, interconnected system that thrives on real-time data and seamless communication across the planning, design, construction, and asset management phases of a project.

Collaboration is Key

The success of this initiative hinges on collaboration, and DelDOT has found a vital partner in Greggo & Ferrara Inc., a forward-thinking construction company that has embraced the challenge of digital innovation. By opening access to their diverse fleet of digitally connected machinery and sharing their invaluable field expertise, Greggo & Ferrara has accelerated the project's timeline, enabling real-world testing and system enhancements well ahead of schedule.

The demonstration phase, conducted in November 2023, showcased the power of connected work zones. Geolocated machine activity, material deliveries, and potential safety hazards were monitored in real-time, with data instantly shared with navigation apps like Waze and the Federal Highway Administration's (FHWA) Work Zone Data Exchange (WZDx) to automatically alert drivers of active work zones and reroute traffic as needed.

Additionally, DOT inspectors and contractors were provided with real-time digital insights of the flow of equipment and materials across the project. Aerial drone footage (see photo above) captured the synchronization of pavers, rollers, and inbound material loads as the data was flowing to project stakeholders, illustrating the system's ability to provide a comprehensive, holistic data-

*See **Connected**, 20*

plex earth

Geospatialize your CAD Design Today!

Google Maps

AIRBUS

MAXAR

AUTOCAD®

HEXAGON

nearmap

inflights

Get premium data worth up to $2,500 for your first project, for FREE!

Schedule a meeting now:
goto.plexearth.com/artba

We are making geography easy for every engineer and architect in the world.

Imagery
Aerial & Satellite

Aerial & satellite imagery from the best providers worldwide

Terrain
Modeling & Analysis

Elevation data and advanced terrain analysis for any place on earth

Visualization
in Google Earth

Create KML/KMZ files and showcase your 2D and 3D designs in Google Earh

***Connected**, from 18*

driven perspective of the jobsite and start the process to create on demand digital as-builts used by both the DOT and contractor.

Empowering Better Decision Making

This real-time data integration also marks a significant shift in workforce development within the construction industry. By equipping workers with advanced tools and a comprehensive, data-driven perspective, DelDOT is creating a more modernized, sophisticated jobsite that resonates with a digitally native workforce. The immediate availability of synchronized data empowers teams to make timely, informed decisions that bolster both efficiency and safety.

This demonstration has not only validated the effectiveness of connected work zones but has also provided valuable learnings for ongoing system enhancements. DelDOT is continuously refining the technology to optimize work zone creation for its field crews and traffic management center, integrate activity-based notifications with manual road closure feeds, and support both types of feeds simultaneously.

The meticulous analysis of data from connected machinery, safety feeds, e-Ticketing, and other sources is driving prioritization in areas such as worker presence coverage, machine status collection intervals, automation of machine-to-project connectivity, as-built and digital inspection opportunities, and user experience enhancements.

To help provide a robust framework for scaling this innovation across the construction sector, Iowa State University and WSP are working with the project team to perform data analysis and align with larger digital construction efforts across the nation.

A New Era

DelDOT's pioneering initiative is not just about technology; it is about creating a safer, more efficient, and more responsive construction industry. It is about harnessing the power of digital innovation to drive positive change and set new standards for excellence. The adoption and adaptation of connected work zones by partner agencies signify the beginning of a new era in construction project management—one that prioritizes integration, data-driven decision-making, and safety.

DelDOT is not only reaping the benefits within its own operations but also sharing insights and learnings with its partners, contributing to the collective advancement of the industry.

As we move forward, the collaborative efforts of DelDOT, Louisiana DOTD, Iowa DOT, Nebraska DOT and their numerous private sector contractor partners and state contractor associations, will be instrumental in driving the adoption and refinement of these groundbreaking technologies. The lessons learned from each project and the insights gained through continuous data analysis will pave the way for even more sophisticated and efficient connected work zones in the future.

Learn more about this project and the innovators making this a reality at: **tinyurl.com/deldotdigitaldelivery**.

Joel VanDusen is HaulHub Inc.'s director of government solutions.

IIJA Grant Helps States Adopt and Adapt

DelDOT's initiative is enabled by the 2021 Infrastructure Investment and Jobs Act (IIJA), which included the Advanced Digital Construction Management Systems (ADCMS) grant program, aimed at promoting adoption of digital construction technologies on a national scale. The Federal Highway Administration recently awarded $34 million in grants to 10 projects in 10 states, with several more rounds to come.

ARTBA's Innovation and Technology Policy Forum members played an instrumental role in advocating for the inclusion of the ADCMS program in the IIJA, recognizing the transformative potential of these technologies and the need for federal support to accelerate their deployment across the construction industry.

NATIONAL WORK ZONE SAFETY INFORMATION CLEARINGHOUSE

The World's Largest Online Work Zone Safety Information Resource

USE IT... SAVE LIVES!

This material is based upon work supported by the U.S. Department of Transportation under Cooperative Agreement No. 693JJ32350033. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the U.S. Department of Transportation.

TDF Transportation Development Foundation
American Road & Transportation Builders Association

U.S. Department of Transportation
Federal Highway Administration

North to South and Back Again:
How America's Longest Reversible Road Advances Safety Technology

SUBMITTED BY TRANSURBAN'S COMMUNICATIONS TEAM

It takes a lot of technology to safely operate the longest reversible road in the United States. Twice every day on I-95's Express Lanes, Transurban employees harness cutting-edge innovations to reverse the flow of traffic on 49 miles of high-speed lanes for hundreds of thousands of drivers in Northern Virginia.

The lanes run northbound in the mornings and southbound in the evenings to provide much-needed congestion relief to D.C.-area commuters. The switch takes two hours and involves 298 gates, 22 gantries and 349 detection points.

At the heart of it all lies a state-of-the-art control room that hosts some of the transportation industry's most sophisticated technologies, pulling in 2,000 data points per mile of road. The data comes from sensors strategically placed throughout the corridor that gather information on real-time traffic conditions. They include a variety of technologies such as inductive loop sensors embedded in the road pavement, radar detectors mounted on gantries or roadside poles, and video cameras for visual monitoring. This allows the team to monitor traffic conditions, identify congestion or incidents, and implement responsive measures such as adjusting toll rates, activating variable message signs, or deploying emergency services as needed.

"The control-room is monitored 24/7 by our dedicated team of safety specialists," said Beau Memory, president, Transurban North America. "The unique system seeks to prevent crashes and, in the case of an incident, enables a fast response from our Express Assist fleet and dedicated Virginia State Police troopers."

Looking Down the Road

But guaranteeing a safe and efficient commute for today's drivers is not the company's only focus. Since 2017,

The I-95 Express Lanes in Virginia run northbound in the mornings and southbound in the evenings. Photo courtesy of Transurban.

Transurban has been studying how our roadways can support cars of the future—connected and automated vehicles (CAVs), aka "self-driving vehicles."

"Mobility needs do not stop when today's cars become obsolete," said Memory. "We must stay flexible and keep innovating to get people where they need to go both today and 50 years from now."

Just last year, the 395 Express Lanes—part of the I-95 Express Lanes reversible network—played host to a CAV operated by the Virginia Tech Transportation Institute (VTTI). During the demonstration, the CAV communicated directly with the control room through the myriad of technologies already in place on our smart roadways.

Thanks to smart road technologies, the CAV navigated a series of obstacles to demonstrate why connectivity to the roadway can be indispensable to maintain safety

with more self-driving vehicles on the road. From getting around debris to navigating a construction zone, the 395 Express Lanes augmented the CAV's ability to "see" down the road and respond appropriately keeping everyone in the vehicle and on the road safer.

In it For the Long Haul

Public safety is always top priority, but facilitating safe and efficient commerce is another area where Transurban hopes to contribute.

"Now, we are looking toward what is next for autonomous vehicles," Memory added. "With road freight projected to grow steadily in the coming decades, self-driving trucks have the potential to transform the movement of goods by reducing congestion and improving road safety."

The company recently partnered with Silicon Valley's Plus, a leading provider of self-driving truck technology, to conduct automated freight trials in Melbourne, Australia. Building on its first-ever automated trucking trials in Melbourne last year, this study will explore how Plus's autonomous driving technology can pair with smart road infrastructure to make trucking safer, more efficient, and more sustainable.

"Unlocking the future of safe travel is beginning with the mobility solutions of today," added Memory. "Transurban's smart roads like the I-95 Express Lanes are ready for the ways people will travel in 10 years' time, pioneering solutions that improve safety across our networks and ensuring safe, reliable travel down the road."

An entrance ramp to the I-95 Express Lanes. Photo from the VA Express Lanes X/Twitter page.

CONTACT
Jaqueline Woodbridge
Corporate Communications Manager
Transurban
jwoodbridge@transurban.com

Unlocking the Promise of AI in Transportation

JIM HANSON
Jim.hanson@hdrinc.com

PEDRAM OSKOUIE
Pedram.oskouie@hdrinc.com

Artificial intelligence (AI) and big data are revolutionizing our understanding of transportation systems, empowering leaders to make better informed decisions than ever before. The growth of AI is also providing new efficiencies for project teams by undertaking tedious tasks previously either done manually or not at all.

Over the past decade, new data sources have dramatically increased available information, opening the potential for transportation engineers and planners to better plan, design, operate, manage and maintain transportation infrastructure and systems. However, because of the sheer volume of data, transportation professionals have struggled to extract meaningful insights. Now, the added tool of AI can be used to efficiently process this tremendous amount of information and gain meaningful insights in a timely manner.

Artificial intelligence has already begun to unlock the potential of data by enabling insights previously too labor-intensive or complex to achieve cost-effectively. This holds great promise for improving how transportation projects are designed, constructed, maintained and used, with benefits for project management, construction safety, traffic management, parking solutions, infrastructure maintenance and more.

How Are These New Capabilities Being Applied?
We're already seeing examples of how AI and data are leading to more proactive transportation decisions. Google Green Light applies AI and crowd-sourced data from Google Maps to model signal operations and provide recommendations to optimize traffic flow. Similarly, Axilion X Way uses AI to assess traffic data and provide recommendations to optimize signal operations based on user-selected priorities. And Rekor Command assesses multiple real-time data feeds using AI to enhance traffic management and incident response.

These capabilities are being tested and rolled out across the country. Multiple states are improving their traffic management by using cloud-based software to process feeds from CCTV cameras and identify incidents, or to reduce congestion. This applies to work zones and established roads.

One state department of transportation, for instance, is using AI and machine learning to predict traffic flow through construction areas and investigating how to prepare work zones for connected and automated vehicles. Owners are also using AI and computer vision in conjunction with inspections to monitor the condition of their assets and predict what maintenance is needed by analyzing images and videos from IoT sensors, cameras and edge devices.

The new capabilities also hold promise for projects still in design and construction. Major design software offerings such as Autodesk and Bentley are introducing AI integrations to improve their workflows, particularly in the management of digital twins. Powerful machine learning processes are helping detect assets from LiDAR data.

For example, on the 10-mile Ontario Line subway project through downtown Toronto, we used LiDAR to collect more than 15 billion data points aboveground and underground. This data was then processed to automatically detect and isolate asset classes such as vegetation and powerlines.

On a massive project such as the Ontario Line, AI is also used to improve efficiency in communication. There are more than 900 design models on the project and thousands of staff who have been involved in some way. A natural language modeling-based AI chatbot powered by large language models provided an efficient way to access information about the project.

Rather than send emails back and forth, a cognitive AI bot can answer questions such as, "Where can I find an

updated org chart?" or "What's our contract scope on segment 4?" or even "How do I create a pipe network from imported GIS data?" Over the course of the project, the bot is expected to eliminate thousands of hours of manual and repetitive emails, chats and phone calls by providing information quicker and easier.

How Should the Industry Respond?

1. **Keep your eye on the goal.** Companies and solutions are popping up everywhere to solve every conceivable problem. While AI holds tremendous promise, it is important to identify the outcome you're hoping to achieve and prioritize that. Will the AI-based solutions proposed or considered make a meaningful contribution to achieving that benefit?

2. **Start with better data.** To result in the best insights, AI must have access to the right data. While there are many cloud-based data sources available, they all have limitations. Supplementing this data with traditional data sources such as detector-based data can result in better insights. Once data is gathered, accurate and meaningful AI-driven analytics also requires standard formatting. This formatting, combined with sharing public data through a standard exchange, will make it much easier for actionable insights to be generated.

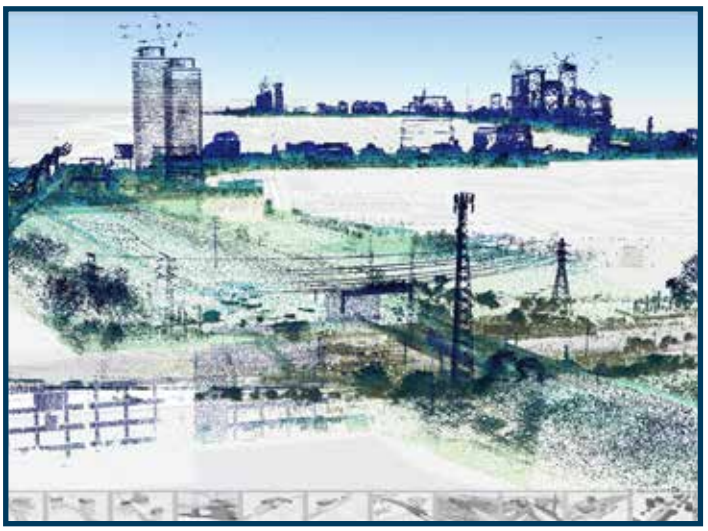
3. **Rethink how data is obtained and analyzed.** Traditionally, it has been the practice for organizations to collect, own and analyze their own data. New big data sources, easy access to the cloud, and various entities developing AI applications to analyze the data are resulting in changes to how information and insights are accessed. Organizations will have to rethink practices for obtaining data to capitalize on opportunities with third parties. At the same time, standards for those aggregating and analyzing data will need to be in place to ensure quality, as their outputs are increasingly relied upon to operate and maintain critical infrastructure.

4. **Develop new job responsibilities.** AI demands a new skillset for employees to get meaningful results. Staff will need to be trained on how to prompt AI systems to get relevant responses, or new hires specialized in these skills will be needed. It will also be important for technical staff to review AI-generated responses with prompters and their teams to make sure responses are accurate and to determine if and how they should be included in projects.

5. **Maintain flexibility and adaptability.** In the rapidly evolving landscape of AI and big data, the industry must cultivate a mindset of agility and continuous evolution. Design your data architectures, collection methodologies, processing frameworks and AI-based solutions with adaptability at the forefront. Prioritize modularity, open standards and scalable systems that enable seamless integration of new technologies or workflow adjustments. This forward-thinking approach will prevent technological stagnation and empower enterprises to capitalize on emerging opportunities.

*See **Promise**, 26*

The 10-mile Ontario Line subway project through downtown Toronto. Photo courtesy of HDR.



LiDAR was used to collect more than 15 billion data points aboveground and underground for the Ontario Line project. Photo courtesy of HDR.

***Promise**, from 25*

The integration of AI and big data presents a transformative opportunity for the transportation sector, but navigating this landscape requires a strategic and forward-thinking approach. Enterprises need to prioritize solutions that directly drive value and efficiency in design, construction and operation, recognizing that AI's true power lies in delivering tangible benefits.

Investing in historical data warehousing, new data collection, cleansing, standardization and collaborative sharing practices is essential, as high-quality data remains the bedrock upon which meaningful insights, secure systems and reliable information are built. Embracing flexibility and agility by designing adaptable data architectures and systems is key. This empowers enterprises to seamlessly integrate emerging technologies and capitalize on new efficiencies without falling prey to technological stagnation.

Lastly, adopting a proactive stance on regulatory compliance and ethical considerations in AI applications is crucial. As AI becomes more integral to design and construction in transportation, staying ahead of legal frameworks and ethical guidelines ensures not only adherence to regulations but also builds trust with public communities and stakeholders. The coming decade promises to reshape the way we design, build and operate transportation systems.

By exploring the potential of AI with enthusiasm while investing judiciously and cautiously, and prioritizing these aspects, the transportation industry can fully unlock the power of AI and big data, driving significant improvements in efficiency, safety and travelers' satisfaction.

Jim Hanson is a senior transportation technology lead for HDR, focused on smart mobility, data and automated vehicles. Pedram Oskouie is HDR's digital delivery AI services lead, working on automation efforts in data acquisition, digital delivery and construction.

Reconstruct

The Leader in Remote Project Monitoring & Quality Control

Turn all job site footage, including smartphone pictures and 360 videos, into a measurable and immersive 3D walkthrough of your construction project.

- Combine any and all job site footage, including footage you've already captured
- Walk through, measure, and inspect your project remotely
- Overlay plans and drawings to compare what's been planned to what's been built
- Keep all stakeholders aligned with a single source of project truth
- Slash travel, speed up payment applications, streamline OAC meetings, and spot errors long before they turn into costly rework

Learn how easy it is at http://reconstructinc.com/ARBTA, or scan the QR code

Why AI is Essential to the Future of Heavy Construction

KISHAN PATEL
kishan.patel@hcss.com

One of the brightest minds in history, Albert Einstein, was famously questioned about how many feet are in a mile. His reply was, “I don’t know, why should I fill my brain with facts I can find in two minutes in any standard reference book?”

Much of what humans perceive intelligence to be is the memorization of facts. Similarly, whenever you meet people who come across as incredibly sharp, this is usually due to their quick-witted nature and ability to recall information without delay.

This is an exciting time to be alive, with so much info constantly being thrown in our direction that it can be difficult to shift gears and recall certain details at the drop of a hat. This is where artificial intelligence (AI) has the potential to enhance our abilities rather than replace them.

Improving Day-to-Day Operations in the Office and the Field

As AI revolutionizes industries worldwide, the construction sector is certainly not an exception. This isn’t just a one-size-fits-all tool to pick up and apply the same way to any industry. AI programs can and should be unique, even built specifically for construction with its exact users in mind.

From preconstruction through the completion of jobs, the help of AI in construction can enable any company with tools to plan and manage workloads more efficiently. For example, AI-powered technology can analyze vast amounts of data in an instant—and that includes both historical production data as well as data generated in real time. This results in accurately projecting timelines, identifying potential risks, and recommending strategies to optimize what you are working on.

Everyone in construction knows the extent to which details are more important than ever. If you’ve won bids by narrow margins, you’re aware of how competitive the construction landscape is—and it will only get more competitive. Additionally, challenges like workforce shortages, supply chain issues, and skyrocketing material prices are forcing everyone to go back to the drawing board and figure out how to do more with less. Fortunately, the recent advent of AI technology is perfectly poised to help alleviate some of these challenges in the industry.

Nix Risk, Control Costs, and Predict Problems

This old mantra often rings true: while consumers pay to fix problems, businesses pay to prevent those same problems before they even happen. AI-driven maintenance systems for equipment and machinery can utilize all of that real-time data to predict potential failures before they ever occur. This is an unprecedented way of preventing costly downtime, unplanned repairs, and last-minute equipment rentals that can easily blow budgets.

Another massive benefit of AI could be a drastic reduction of accidents and near-misses, boosting the overall safety of companies that adopt this technology. The power of automation looks to identify systemic safety hazards and suggest corrective measures that help workers do their jobs smarter, cultivating safer jobsites.

The solution of AI is so simple that it’s understandable how this game-changer can feel too good to be true. Much like a brain operating at 100 percent where every shred of information is perfectly accessible, AI can interpret past performance, market conditions, and regulatory requirements. What better way is there to help assess and mitigate the numerous risks faced every day of the year?

At the 2024 HCSS Users Group Meeting, the VP for Johanesen Construction, Shane Webley, shared his thoughts on the technology. Keep in mind, he is an expert in utilizing construction software after benefitting from the HCSS platform for over 20 years.

*See **Future**, 30*

ROADSIDE SAFETY

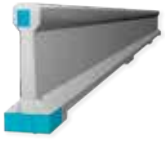
ACCIDENTS DON'T WAIT UNTIL YOU'RE READY.

ZONEBLOC+® & ZONEBLOC® TL5 GET YOU READY QUICKLY!

As the saying goes, accidents happen. What we don't know is when. With either of our ZoneBloc® concrete barrier systems, you're prepared. They're both portable. Both feature a unique coupling system that installs to maximize protection with minimum impact on travelers — easily, quickly, and safely.

It's what you've come to expect from the leading manufacturer of transportation safety products that combines Integration + Intelligence to solve problems and increase passenger and worker safety.

HILL & SMITH
Travel Safe. Work Connected.™



ZONEBLOC+®
licensed by REBLOC®

ZONEBLOC® TL5
licensed by REBLOC®

***Future**, from 28*

"We have to continue to look to what's the next thing that's going to continue to set us apart with our company and technology," Webley commented, echoing how so many successful construction professionals feel today. "I do see the opportunity for some great value there and continue to keep overhead lean and be able to be more effective and efficient as well at our jobs. And so I'm optimistic about its utilization and I think that we'll definitely be looking into how that could be an asset to us."

The First AI Software to Hit the Construction Industry

Since HCSS has never lost sight of its mission to be a leader in technological innovation, 2024 marks the launch of a new powerful AI tool that no one else in the industry has yet to offer. Just take a second to imagine your own virtual assistant that can comprehend context, detect intent, answer queries effectively, analyze data rapidly, and offer insights—all instantly.

You are picturing an assistant that can automate repetitive tasks so you can focus on complex and value-added work instead. This tool is already fully familiar with the intricacies of heavy construction and can help put an end to uncertainty and reduce the likelihood of delays and disputes. Better yet, the software provider is SOC 2 compliant, adhering to strict security and privacy standards to give every customer peace of mind regarding their data protection and privacy.

What you are picturing is known as HCSS Copilot.

"HCSS has always been a pioneer of new, cutting-edge tools, and HCSS Copilot is the latest to carry that torch of innovation," commented Steve McGough, the company's president and CEO. "Built with confidentiality at the forefront, HCSS Copilot will harness large amounts of data to reveal insightful information no other construction software on the market can match."

In the past, what took you hours and days can now take you mere seconds.

"This next-gen AI technology will help transform your business," continued McGough. "There is enormous potential that will only be improving from here on out. Many customers are already reaping the benefits of HCSS Copilot and we're excited to be pushing the limits of what is possible in this industry."

After successful beta testing with select customers, HCSS Copilot was rolled out in February 2024 as part of HCSS Chats. Hundreds of construction companies on the HCSS platform are now leveraging this powerful program daily.

"We want the information at the users' fingertips," said HCSS Product Portfolio Manager Adam Black. "No more looking for it. It should be instantly accessible just by asking for it. The best part is that this is only the beginning. We'll be expanding HCSS Copilot further this year to include intelligent predictive analysis and task automation."

The value of AI in construction is undeniable. Construction companies can improve project planning and management, optimize resource allocation, enhance safety and quality control, and sit in the driver's seat of innovation in construction.

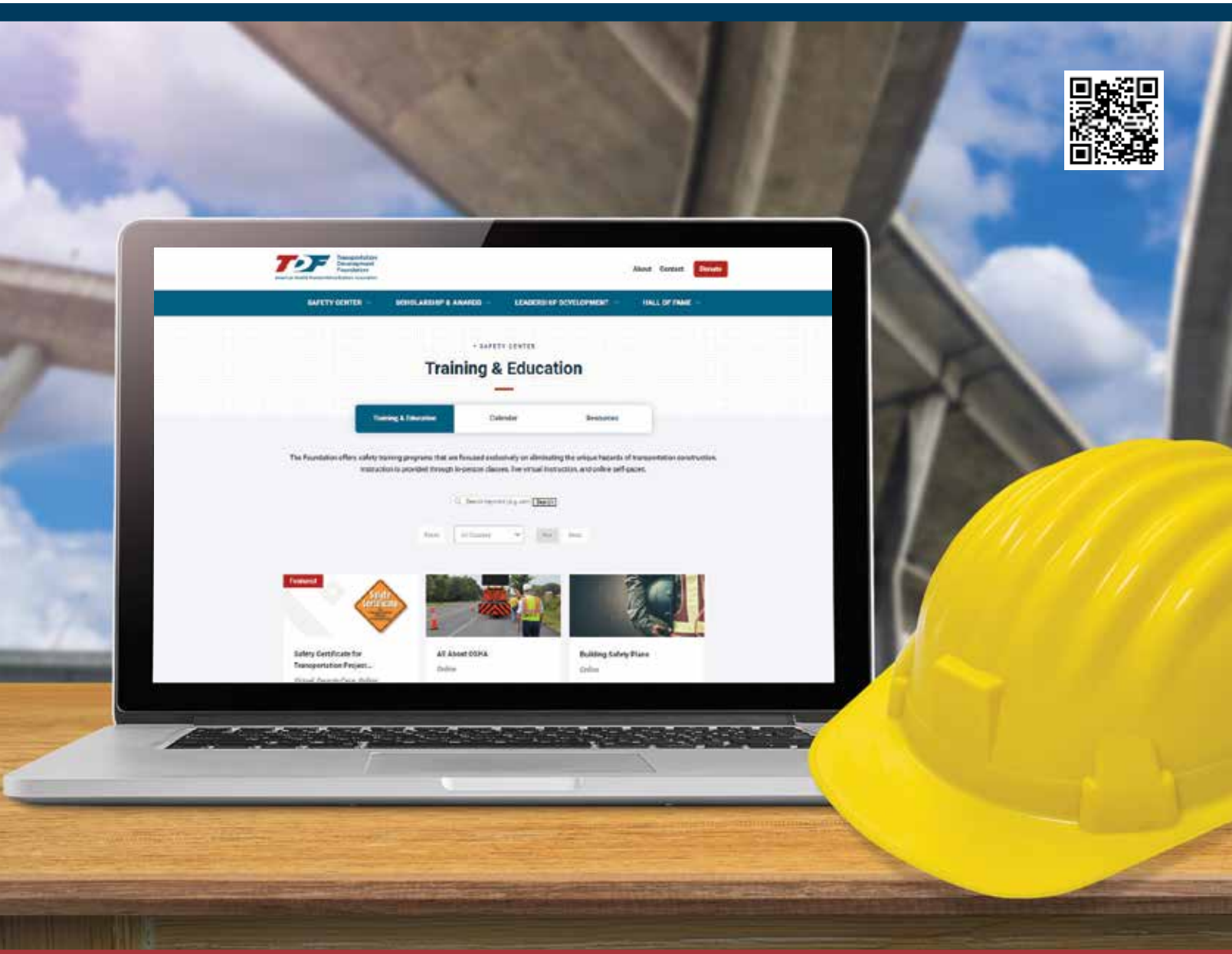
The possibilities for transformation and growth are limitless, and the power is now in our hands. It's time to embrace the future and unlock the full potential of AI. Are you in?

Kishan Patel is vice president of product at HCSS.

Transportation Development Foundation
American Road & Transportation Builders Association

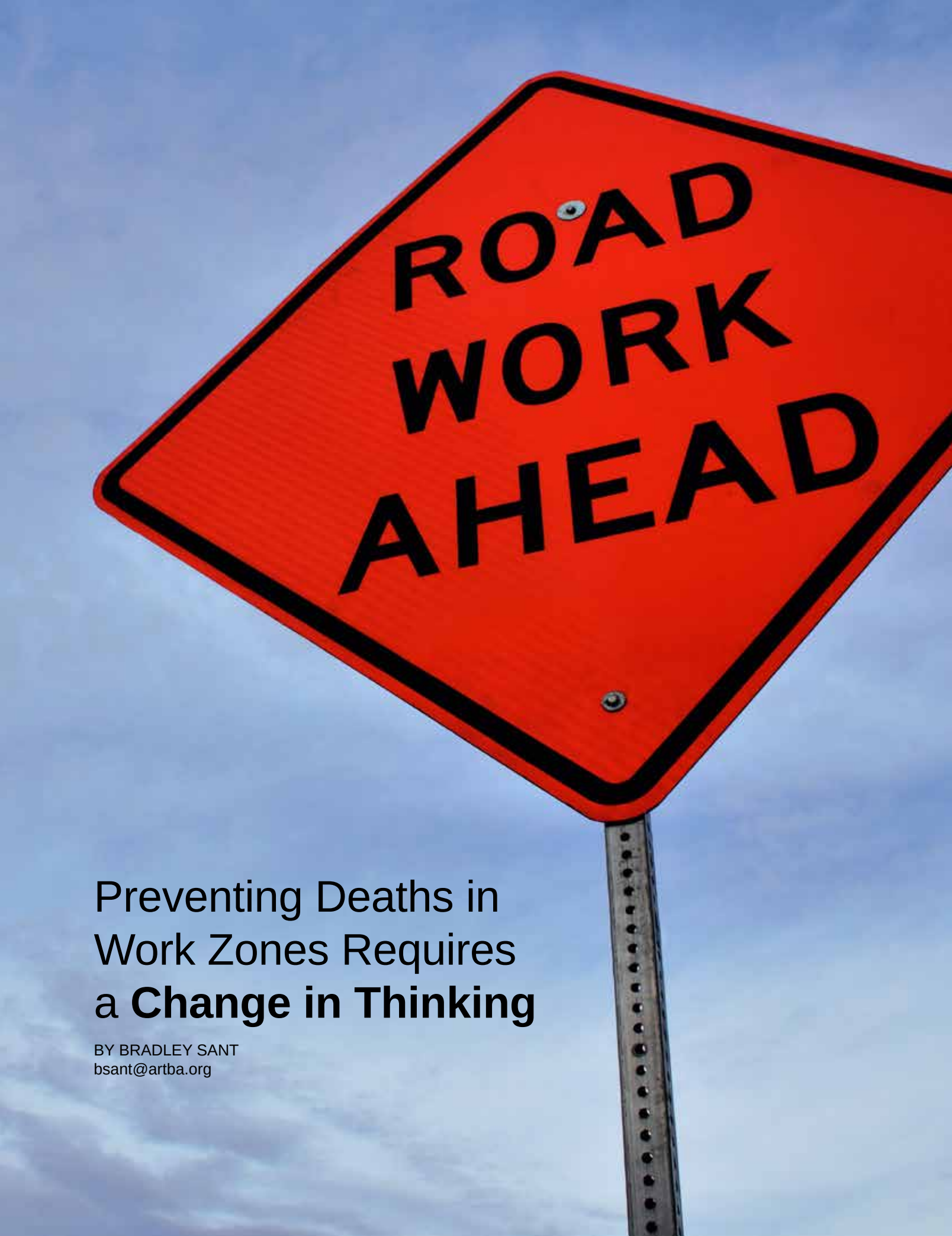
SAFETY CENTER

- Enroll in the Safety Certificate for Transportation Project Professionals Program
- Register for a live, virtual, or online class
- Explore 15 free industry-specific training toolkits



artbasafetycenter.org

Training and information to improve the safety and well-being of workers, motorists, cyclists, pedestrians, and their families by making project sites worldwide zero-incident zones.



Preventing Deaths in Work Zones Requires a **Change in Thinking**

BY BRADLEY SANT
bsant@artba.org

Miguel Luna, Dorlian Ronial Castillo Cabrera, Alejandro Hernandez Fuentes, Maynor Yassir Suazo-Sandoval, Jose Mynor Lopez, and Carlos Hernandez. These are the names of the six construction workers killed March 26 while repairing pavement on the Francis Scott Key Bridge in Baltimore when it was struck by an errant container ship. They were husbands, fathers, brothers, and sons, leaving behind family and friends who will grieve for years.

Although their deaths made headlines around the world, they were not alone. On March 29, a worker was struck while repairing potholes in West Virginia. On March 25, three workers in Oklahoma were struck. One died instantly, and two others were seriously injured. In February, a worker was struck and killed in Alaska. Also in February, a worker, then later the same day a state trooper in Georgia, were killed on a road construction site. Similarly, workers have been struck and killed in Mississippi, North Carolina, and Texas so far in 2024.

The loss for these families is devastating. We all feel it too, since they are a part of our roadbuilding community.

Every April, the industry commemorates National Work Zone Awareness Week and the National Stand-Down to Prevent Struck-by Incidents. Both are aimed at bringing attention to the need to better protect the lives of workers and all roadway users when navigating construction zones. While these are important events, true progress can only be made by changing our safety culture to place more value on human life and dedicating more resources to protecting it.

The Federal Highway Administration (FHWA) recently announced it will create a new rule that, among other things, would promote expanded use of positive protective devices to separate workers from motorized traffic. If approved, roadway owners and contractors would be required to use concrete, metal, or other heavy duty

protective devices to protect workers in situations where they are exposed to oncoming traffic with no other way to get out—such as tunnels and bridges. Currently there is no requirement or incentive to do so. And in some cases, workers are only shielded by cones. This action by FHWA would undoubtedly save lives.

Another answer lies in the Infrastructure Investment and Jobs Act (IIJA), which requires state departments of transportation (DOT) to place greater emphasis on protecting “vulnerable road users.” States must describe how these people will be better shielded from harm in their strategic safety plans. While DOTs are looking carefully at how to protect the disabled, pedestrians, and other non-motorized users, many have forgotten to include some of the most vulnerable users—our roadway workers.

Unlike pedestrians, bicyclists, and other passing roadway users, these men and women spend eight hours or more building and repairing our nation’s roads. Given their prolonged exposure to traffic hazards, our workers are perhaps the group in greatest need of improved protection, as evidenced by the numerous deaths so far this year.

We have the tools and resources to fix this problem. The IIJA provided states with funds to enhance work zone safety measures and gave them clear authority and direction to do so. Our collective goal should be to tirelessly work to develop a national culture that demands greater respect and responsibility for protecting life on our roadways. Together, we must never cease our efforts to eliminate the preventable deaths of fathers, mothers, sisters, and brothers who were simply working to provide a life for their families and a better transportation network for all of us.

Bradley Sant is ARTBA’s senior vice president of safety and education.

Photos courtesy of GHCA

Building a **New Generation** of Skilled Highway Workers in Georgia

BY ABBY PORTER
aporter@GAHCA.org

Ongoing workforce challenges in the highway construction industry are reaching a critical state as the sector faces a double-edged sword: a rising wave of retirements among seasoned employees and the pressing need to complete extensive roadwork across the nation. Industry forecasts indicate the construction sector must attract nearly half a million new hires to meet the demand expected by 2025.

“There is plenty of road work ahead and we are committed to ensuring there will be plenty of workers,” said David Moellering, president & CEO of the Georgia Highway Contractors Association (GHCA). “We are tackling this issue head on with two initiatives that are attracting a new generation of talented people to our industry.”

The first—the Georgia Road Jobs Campaign—was launched in 2017 and helps existing job seekers understand the diverse career paths available within the highway construction sector. The cornerstone of this digital initiative is a dynamic website where potential candidates can learn about the industry through career exploration tools, view testimonials from employees, and fill out an online questionnaire that serves as a bridge to connect them with hiring contractors. The campaign also organizes annual job fairs across Georgia, facilitating direct engagement between contractors and job seekers.

In 2023 alone, the campaign successfully linked over 8,000 individuals interested in the industry to contractors looking to hire. This success highlights an increasing trend in the effectiveness of the campaign and a rising public interest in exploring career opportunities within the highway construction industry.

Targeting the same goal but a different population, the second initiative—the Heavy Equipment Operator (HEO) Program—helps spark interest in high school students across Georgia. Launched in 2022, it initially rolled out in six schools across the state. By the fall of 2023, it expanded to include nine additional high schools and one technical college.

Supported by state, GHCA, and contractor funding, the HEO Program is a Career, Technical, and Agricultural Education (CTAE) Pathway that blends two key elements: academic curriculum and practical simulator training. The curriculum segment of the program complements the simulators, offering students a deep understanding—the "WHY"—behind their practical tasks. During the simulator training, students engage in various modules, such as Machine Walkaround, Bench & Truck Loading, Trench Box & Pipe, and Trenching, among others, providing them with a hands-on approach—the "HOW"—to operating heavy machinery. Students not only learn from simulators but also gain practical experience by operating actual heavy machinery.

“This hands-on training ensures they accumulate significant ‘seat time’ on equipment—a level of exposure that many industry professionals did not have upon entering the field,” Moellering explained. “Most importantly, students leave the program with both an understanding and newfound interest in the highway construction industry, setting a solid foundation for their future careers.”

The unique industry-education partnership unfolds in three different ways: contractor-led classroom visits, jobsite visits, and the students’ final evaluation or “Capstone Project.” Every participating school is partnered with a dedicated team of contractors from their local area, guaranteeing ongoing and structured interaction.

Moellering notes that the commitment from industry partners in the HEO Program extends beyond just classroom involvement. GHCA has committed significant resources as well, including the allocation of a full-time staff member dedicated to support and coordination. Likewise, the association’s member companies have taken similar steps by assigning full-time employees specifically to high school outreach and recruitment efforts. Additionally, GHCA and its member companies host an annual training program specifically designed for all HEO teachers, further enhancing the educational quality and relevance of the program.

A student in the HEO program practices newly learned excavating skills on Cat Simulators systems.

A Georgia student shows off his excavator certification after completing his "Capstone Project" on real equipment in the field. Students who successfully complete the program and project walk away with seven or more industry recognized credentials.

The HEO program attracted 90 students in its inaugural year. Impressively, 45 percent of the graduating seniors in the program went on to accept jobs within the industry. Furthermore, 63 percent expressed interest in pursuing a career as a heavy equipment operator. With the addition of the nine new schools, enrollment in the second year increased to 232, and based on current trends, is projected to climb to 354 students across the existing 16 programs.

“This is the most comprehensive, state-wide operator training program ever undertaken by anyone in the United States. We're eager to see the new opportunities it brings for high school students and the industry,” Moellering concluded.

The Georgia Road Jobs Campaign and HEO Program mark a significant step towards nurturing a new generation of skilled professionals—and one that can serve as model for other state contractor organizations. Together, these strategies demonstrate a comprehensive approach to cultivating workers ready to meet the industry's demands.

Abby Porter is Georgia Highway Contractors Association's marketing and engagement director.

Editor’s Note: This is the second in a series of stories about how ARTBA members are tackling workforce shortages. To share your own workforce development success story, please email Carolyn Kramer Simons at **csimons@artba.org**.

Q & A With Missouri Department of Transportation Director

PATRICK McKENNA

A New Transportation Look for the Show Me State

Since becoming director of the Missouri Department of Transportation (MoDOT) in 2015, Patrick McKenna has put his deep financial expertise to full use. A graduate of Bentley College with a bachelor of science in Finance and a master of science in Management and Finance from the University of Maryland University College, McKenna presides over one of the nation's largest state transportation budgets. The hallmark—a $2.8 billion project to expand I-70. But it wasn't always that way.

McKenna's background includes stints as the deputy commissioner of New Hampshire's Transportation Department, 13 years in the Nation's Capital serving as chief financial officer of the U.S. Senate, and a one-year term as president of the American Association of State Highway and Transportation Officials (AASHTO).

He sat down recently with ARTBA Vice President of Public Affairs John Schneidawind to discuss Missouri's unique transportation climate, and how the Infrastructure Investment and Jobs Act (IIJA) is helping shape it.

Q: Can you give us an overview of the transportation landscape in Missouri?

A: In Missouri, the last time a significant initiative was passed for transportation revenue was in 1996. We literally had 30 years of deferred maintenance and a backlog of work and a condition deficit that was growing.

To give you a sense of what that was, I walked into an annual capital plan over a five-year basis of $325 million a year with the seventh-largest transportation network of roads and bridges in the country. Assets valued at about $160 billion, with $325 million a year to operate.

So, the real task at hand was to build public consensus. It's very common to have concerns about the operating efficiency of a state DOT as a kind of red herring for avoiding revenue increases. We "right-sized" the department about 15 years ago, down by about 2,000 employees... But that wasn't sufficient even to draw public consensus to increase revenues, and inflation was just eating our lunch. So, the plan I walked into was to abandon 26,000 miles out of 34,000 miles of roadway for maintenance on an estimated basis, and close between 150 to 200 bridges a year.

Q: How did you turn that around? How did the I-70 project finally get rolling?

A: Obviously I-70 was the first segment of the Eisenhower Interstate that was constructed here in Missouri—just west of St. Louis—and that hadn't been modernized or upgraded since that time. We were patching it together, keeping it running, but a two-lane Interstate with heavy freight traffic led to really considerable concerns.

So, we started building the public outreach and created what we called the "Citizen's Guide for Transportation." We went around the state explaining how transportation funding works. How it wasn't general revenue, it's user fees. We started doing this in 2016. We explained how we use a local planning process with regional planning commissions; and how we have 1,200 volunteers at transportation advisory committees. If a community doesn't bring a project through that process, it really doesn't get recognized. So, everything comes spread out bottom up, prioritized by available funding and need, and then built into the hopper.

There was a lot of pent-up demand because we just weren't at the level of funding needed. We were barely keeping up with basic maintenance.

Q: What else helped you in your effort?

A: I think the single biggest ingredient in a state to really make progress is to have a governor who understands the issues and really supports them and is willing to put political capital into the process. And Governor Mike Parson came in five years ago and made infrastructure investment and workforce development the two pillars of his early tenure. He has been very consistent throughout. He came in with the notion that if we get those two things right, everything else will start getting better, and we'll start digging out of this hole.

Q: How did the resurrection of Missouri's transportation network begin?

A: We had a really unique thing happen in 2019. We had a little bit of money left in the budget, and the Governor came and said "what can we do with this?"

We came up with a bridge plan and it became the governor's focus. It was the first time general revenue had ever been used for transportation projects. We were able to advance 250 bridge repairs and replacements all over the state. These were smaller bridges but real impactful for communities. We just cut the ribbon on the last of them in December. The program is completely done, and we'll have paid off the bonds in 18 months from now.

That was a turning point as well as getting a federal grant, an INFRA grant, for our Rocheport Bridge project on I-70. Those two things were linked. We got the bonding ability from the General Assembly only if we got the grant from the federal government. It was a real inflection point.

Q: What happened next?

A: With that, in the 2020 legislative session, the legislature passed a motor fuel tax increase for the first time since 1996, and we talked about how the federal bill was on the horizon. The increase here was 2.5 cents a year for five years, so a 12.5 cent increase on what was a 17-cent base—a pretty significant increase.

We passed the bill, and it went into effect before the Infrastructure Investment and Jobs Act (IIJA). But we timed it perfectly because we saw that coming. I think we were one of the first states in the country to allocate every single penny for road and bridge investment in the infrastructure law. We did it within six months of its passage. We had 18,103 projects funded on an estimated basis over five years, fully utilized the state revenue to pair those together, and we came out of the blocks fast with it.

Q: Now that we are in year-three of the IIJA, how have the historic levels of new investment helped shape your state program?

A: I think the historic levels of funding were in the discretionary areas and some of the areas that really hadn't seen funding increases. So, when you're talking about public transit, when you're talking about rail, when you're talking about those on the highway side, you know it was about a 21 to 22 percent increase over the five years, which is in line with some of the other surface transportation bills. Frankly, a lot of that got chewed up by inflation. But we had programmed the whole thing before inflation hit. So, we're holding to those commitments. We're adjusting as we're going and we're killing it.

Right now, I have $3.8 billion of road and bridge contracts that are active, with $2.1 billion of unfinished work still going on. And we're adding to that, on average, about $200 million a month. So, we're at a clip that we haven't ever seen, and our team is just responding beautifully, and industry's doing a phenomenal job.

The other thing we did is toured the state with the governor...We'd open a bridge, and he'd slap a big yellow sign on—"completed as promised." We're kind of a project delivery machine here... In a 10-year period, we completed 4,206 projects, for an $11.1 billion program estimate, and we completed at $536 million under budget—and that's just work done. We've averaged 460 completed projects a year.

Q: How are you balancing demands for new capacity with the need to maintain and improve existing facilities within your system?

A: When we do long-range planning, the very first thing—and it's been consistent over the last 30 years—is fix what we have. If you go back over that 30-year stretch, you always have political pressure for economic development work. And that's part of what we have to do, is to build the economy.

But we were building out road capacity that we couldn't maintain. It was creating a real disjointed construct. On average—in about the 10 years before I came here—we were adding about 40 lane miles of highway; and in my first six years here we subtracted 40 miles a year. We're trying to balance it. We do a rolling 10-year asset management plan, and we have goals for what the conditions of the different roadways should be.

Q: How indispensable is the IIJA to all of this?

A: It's the biggest criticality, in that every time we get a medium or long-term authorization at the federal level, it enables me to take risks at the state level financially because then we can commit to more substantial work. We have right now actively under construction the five biggest projects in the last 15 years. They're all on track, they're all on budget and they're all on schedule.

*See **Q&A**, 38*

And with the Interstate 70 infusion that is very unique—that is $2.8 billion of Missouri general revenue without an expectation that we're drawing federal funds to match that. And because there was some great economy here, and the governor did an extraordinary job managing through the pandemic—the coffers were filling up—we decided to make a generational kind of investment. It is unique to have a 200-mile Interstate expansion project borne solely by the state.

Q: What are some ways that you stay in touch and work with the industry in your state?

A: To give you a good sense of the relationship—I think if you asked the industry groups, they would say we are very demanding owner operators because we have to bring value to the taxpayer. And they are very exacting contractors, and they're trying to make their margins. We recognize that they have to make money to stay in business. And so we try to move some of the bureaucracy out of the way so that we can work together... Every time we have an uncompetitive bid, we go back and talk to the prospective bidders and ask—what did we do wrong? We assume that if we put something out that industry didn't respond to—that's our fault. We really work collaboratively.

Q: When you started out in your career, did you envision yourself running a state DOT someday or did you take an unexpected path to your current position?

A: Well, considering I have two degrees in finance, I would say that no, I did not envision myself running a state DOT to start. I got an undergraduate degree in finance, and I grew up in New Hampshire and put myself through college doing construction. So I've always been involved in that, always worked and been fascinated by it.

I figured I'd be an investment banker on Wall Street. I got a job offer when I was graduating, and I spent three weeks in New York and hated it. So I said, well, what am I going to do next?

A bunch of friends were political science majors, and they all wanted to go to D.C. and work on the Hill. I went along for the ride, and none of them got jobs on the Hill. I got a job on the Hill. I worked as a staffer in the Senate for 13 years at the beginning of my career. It turned out that with the finance background, I ended up being the chief financial officer in the Senate.

I got very involved in that and then started having a family. And I wanted to raise the kids in a small town environment, and so did my wife. We moved back to New Hampshire, and I ran my own business and operations of several nonprofits for a few years.

But then the CFO job at the New Hampshire DOT popped up and I thought, wow, that sounds interesting. I took on the deputy commissioner role, was there for about five years and got recruited to come to Missouri—pretty much because of the financial aspects of what I was doing.

The funding situation here was dire, and so it was really a turn-around opportunity. For a position in government, it's been one of the most rewarding places.

Oklahoma Contractor Tim Duit joined ARTBA because of its singular focus.

For 120 years, the American Road & Transportation Builders Association (ARTBA) has worked exclusively to build and protect the U.S. transportation construction market.

Highway, public transit, airport, rail, port and waterway design, construction and maintenance generates $650 billion in annual economic activity and sustains 4.4 million U.S. jobs.

ARTBA and its members:

- Led the industry charge resulting in 2021's Infrastructure Investment and Jobs Act—the largest federal surface transportation funding law since the 1956 Interstate system.
- Have helped advance $58 billion in approved, yet challenged, U.S. transportation projects via strong regulatory and environmental legal advocacy programs.

To meet today's business challenges, you need an organization singularly focused on your interests.

Contact **Allison Klein** at **202.683.1036** or **aklein@artba.org** to learn more about membership.

ARTBA
American Road
& Transportation
Builders Association

Transportation Construction Market Development & Protection is Our Mission

Infrastructure Investment Works

Sixth in an ongoing series highlighting the real-world benefits of the Infrastructure Investment and Jobs Act (IIJA).

Huntsville is Ready for Takeoff

Challenge: Newspaper *Bamma Buzz* says Huntsville, also known as Rocket City, is "rocketing in growth" citing a new report naming it the fastest growing city in Alabama. But more people means more traffic, which means local drivers are not exactly "rocketing" to their destinations. As Huntsville's popularity and economy are starting to take off—capacity on local roads is struggling to keep pace. The intersection of North Memorial Parkway (which is a major commuting route from the north part of the county and south Tennessee) with Mastin Lake Road is one area where motorists experience lengthy delays and backups.

Solution: With help from the federal bipartisan infrastructure investment law, the city of Huntsville and the Alabama Department of Transportation are teaming up to build a new overpass that will carry traffic on the North Memorial Parkway over Mastin Lake Road. The project is part of Huntsville's Restore Our Roads initiative which aims to reduce congestion. For long-time residents and those flocking to live in this beautiful city—a faster, more reliable commute is on the way.

What They're Saying: "In the long term you're going to have improved traffic flow for everyone both those using the service roads who are going to see improved access to the areas along here and those using the main line through traffic that will be able to bypass this intersection," Seth Burkett of the Alabama Department of Transportation told News 19. (News 19, 06/19/23)

Estimated Cost:
$34 million

IIJA Funds:
$34 million

Designer:
N/A

Contractor:
Rogers Group

Start Date:
June 2023

Estimated End Date:
2026

A New "Broadway Curve" Takes Shape

Challenge: Economic growth and mobility in Phoenix have been thrown a curve ball due to traffic congestion. More than 300,000 vehicles pass through the city's I-10 Broadway Curve on an average weekday. Traffic through the corridor, which provides access to 4,600 businesses, including 50 of the region's largest employers, and the Sky Harbor International Airport, spikes during rush hour and is expected to increase 25 percent by 2040.

Solution: With help from the federal bipartisan infrastructure investment law, the I-10 Broadway Curve Improvement Project will widen the highway to six general purpose lanes and two high-occupancy vehicle (HOV) lanes in each direction between U.S. 60 (Superstition Freeway) and I-17. A fourth general purpose lane will be added in each direction between Ray Road and U.S. 60. The project also includes adding collector-distributor roads, replacing bridges and rebuilding a key interchange. The result—reduced travel times during peak hours and less gridlock. Phoenix commuters, travelers and businesses will get a safer, more efficient freeway, eliminating 2.5 million hours of driving and $130 million annually in time savings.

What They're Saying: "This project will improve safety and efficiency for hundreds of thousands of drivers who travel through the Broadway Curve each weekday and generate $658 million in new economic activity," said Phoenix Mayor Kate Gallego. "It is delivering on a promise made to voters in Proposition 400 to improve our transportation system and reduce congestion." (Arizona Department of Transportation press release, 11/2/21)

Estimated Cost:
$676 million

IIJA Funds:
$440 million (IIJA and FAST Act funding)

Designers:
TYLin International Group, Stanley Consultants, and Aztec Engineering

Contractors:
M.A. Deatley Construction, Pulice Construction Inc., FNF Construction Inc., and Flatiron Construction Inc.

Start Date:
July 2021

Estimated End Date:
Late 2024

If you have an IIJA project that should be featured, please contact ARTBA's Beth McGinn at bmcginn@artba.org.

When it Comes to Women in Construction, **We Have Some Work to Do**

ARTBA Releases Benchmark Report on Employment

BY BETH McGINN
bmcginn@artba.org

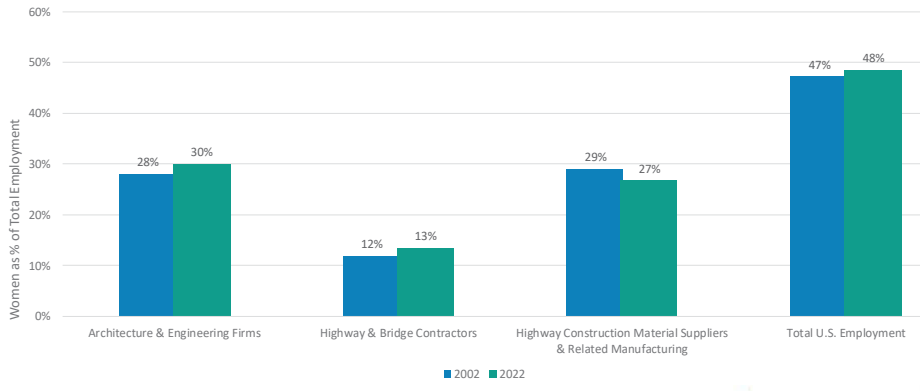
The other day, while stopped in a roadway work zone, my daughter noticed a female bulldozer operator. “Look mom, the driver is a lady,” she said with excitement. I was happy she noticed a woman performing this task. It opens her mind to what is possible in her own life, and it demonstrates that no job—no matter how hard—is out of reach.

While I was glad she had this opportunity, the truth is, female construction workers are too often the exception. The same can be said in many engineering firms, quarries, factories, and agencies. Although the transportation construction industry has made great strides toward diversifying its workforce, we still have work to do.

Data Tells the Story

ARTBA recently released a report, authored by its Chief Economist Dr. Alison Premo Black, underscoring the point. It reveals that while women accounted for nearly half (48 percent) of total U.S. employment in 2022, their share of key segments in transportation construction was significantly lower. Female employees made up 30 percent of the architectural, engineering, and design workforce; 27 percent of transportation supplier and manufacturing workforce; and only 13 percent of the highway and bridge contractor workforce. Further underscoring the point, women as a share of employment in these key industries has been relatively flat or declining since 2002.

Women as % of Total Employment, by Industry 2002 and 2022



Source: ARTBA analysis of U.S. Census Bureau Quarterly Workforce Indicators for key industries related to highway and bridge construction.

Despite this national trend, ARTBA’s analysis did find some bright spots. Eight states have a share of women employees significantly higher than the national average. Top states for women in transportation construction are Washington, D.C. (36.5 percent); Rhode Island (31.5 percent); Massachusetts (29 percent); New Jersey (28.9 percent); California (28.9 percent); New York (28.8 percent); Illinois (28.7 percent); and New Hampshire (28.2 percent).

“We need to do some follow-up to understand why some states are seeing larger employment gains and a growing share of women in the industry,” Dr. Black says.

Looking for Solutions
Many in the industry believe increasing the number of women in transportation construction jobs means reaching them early in their career development and showing them the different paths and career opportunities available.

"We are always looking to attract women to Wagman through our recruiting efforts, and promoting the success of women in construction, but we are also looking to build a pipeline for the future," said Lisa Wagman, president of Pennsylvania-based contractor Wagman, Inc. "We have women from different operational roles, including engineering and estimating, share stories of success and challenges and let girls know that there are opportunities for women in construction."

John Derr, executive vice president at planning and design firm Gannett Fleming, agrees. "Finding qualified staff for construction projects can be a challenge in the current labor market," says Derr. "We can show a clear path of career advancement to our female job applicants and provide new employees with mentors who have successfully advanced their career while at the firm—and this has been critical towards recruitment and growth."

With the construction sector still struggling to fill jobs and thousands of new projects coming online thanks to the bipartisan infrastructure law, the time is right to address the issue.

"It's a good time to take stock of where we are and chart a course to where we want to be 20 years from now," added Black. "We hope the report will start a conversation and serve as a benchmark to measure progress."

Increasing the number of female job applicants will help address workforce shortages. It will also provide more career opportunities to people who have been traditionally overlooked for these roles. With a little work, female bulldozer operators can be the norm rather than the exception.

Beth McGinn is ARTBA vice president of communications.

Editor's Note: The "Women in Transportation Construction Careers: 2024 Benchmarking Report" was a joint effort of the ARTBA Women Leaders and Workforce Development Councils. View the full report at **artba.org**.

Transportation Construction Market Intelligence Service

Empowering Smart Business Decisions

New Feature

The Missing Link: All 50 State DOT Budgets

- ✓ ARTBA has created the industry's first interactive tracking service of all 50 state DOT budgets.
- ✓ Data is updated regularly as new budgets are approved.
- ✓ Saves you time and big money.
- ✓ Subscription also includes:
  - State and Local Government Contract Awards
  - Construction Spending Trends
  - Federal Highway Funding Obligations
  - Materials Prices

For more information:

- ✓ Visit: **economics.artba.org**
- ✓ ARTBA members receive over 25% discount off $11,500 annual rate.
- ✓ Contact ARTBA's Dr. Josh Hurwitz (**jhurwitz@artba.org**) to schedule a demo.

ARTBA American Road & Transportation Builders Association

ARTBA On the Road

Two hundred members and partners of the Construction Industries of Massachusetts (CIM) gathered March 21 in Quincy to honor **John Pourbaix** (second from left), who recently retired after 45 years of service to the association. Also shown from left are **Ross Rezendes** (K.R. Rezendes, Inc.), Past ARTBA Chair **Ken Rezendes**, CIM Chairman **Bob Pereira II** (Middlesex Corp.), and ARTBA's **Rich Juliano**.

ARTBA Vice President and Counsel for Regulatory Affairs **Prianka Sharma** gave a regulatory update March 8 at the Ohio Contractors Association (OCA) annual convention in San Diego. Pictured left to right: OCA President **Christopher Runyan**, **Ben Walnum** (Griffith Company), Sharma, **Brian Algren** (Security Paving), and **Sepand Minovi** (Caltrans).

ARTBA recently recognized AGC Arkansas for their ongoing affiliation. Members of the Highway Division posed with a plaque provided by ARTBA, which will be displayed at the association's Little Rock headquarters.

ARTBA Chair **Tim Duit** (Duit Construction Co., Inc.), center, visited the Alabama Road Builders Association's (ARBA) Board of Directors meeting April 3 in Montgomery, presenting a plaque to commemorate the 75th anniversary of their affiliation with ARTBA. He is flanked by chapter President **Brandon Owens** (Wiregrass Construction) and ARBA Executive Director **Skip Powe**.

Jeff Mahoney (left), new executive director of the Construction Industries of Massachusetts, visited the Nation's Capital March 18 for briefings with ARTBA team members, including General Counsel **Rich Juliano** (right), and meetings with his state's congressional delegation staff.

Duit Feb. 22 delivered remarks at the Tennessee Road Builders Association annual conference in the Bahamas.

IHG® BUSINESS EDGE

Guaranteed hotel discounts for your business

Navigate the road to success with our award-winning program, IHG Business Edge. From new job sites to new projects, gain access to a guaranteed discount across more than 6,000 participating hotels.

- Flexible booking
- One-stop-shop portal
- Upgrade to IHG One Rewards Silver Elite status

Join today at businessedge.ihg.com

IHG® HOTELS & RESORTS

SIX SENSES · REGENT · INTERCONTINENTAL HOTELS & RESORTS · VIGNETTE COLLECTION · KIMPTON HOTELS & RESTAURANTS · HOTEL INDIGO · VOCO · HUALUXE HOTELS AND RESORTS 華邑酒店及度假村 · CROWNE PLAZA

IBEROSTAR BEACHFRONT RESORTS · EVEN · Holiday Inn Express · Holiday Inn · Garner · avid · ATWELL SUITES · STAYBRIDGE SUITES · Holiday Inn Club Vacations · CANDLEWOOD SUITES

IHG ONE REWARDS

AEM CORNER

AI: THE ROAD TO EFFICIENCY

At the recent World of Asphalt Show & Conference in Nashville, thousands of attendees took advantage of the show's education conference, aptly named the "People, Plants and Paving Conference" by the National Asphalt Pavement Association (NAPA).

In the People track, *AI: The Road to Efficiency, Insight, and Innovation in Asphalt*, was led by XBE CEO & Founder Sean Devine. XBE, an operations management software company for the horitzontal construction industry, developed "Hey NAPA," an artificial intelligence search engine. The platform has been trained on hundreds of NAPA publications and can provide answers and resources to a variety of asphalt pavement questions.

"It's good at technical things, business related things, and at giving management advice," said Devine during his presentation. "It's good at a lot of things and it's totally free."

Devine walked attendees through examples of how to engage with "Hey NAPA" to solve issues rising up on the job including:

- Creating a public information plan to soothe residents upset about the cost and disruption caused by a project; and
- Explain to an asphalt foreman the impact to cost and quality of mixing asphalt at too hot a temperature.

Devine also encouraged attendees to consider implementing AI platforms outside of "Hey NAPA" into their companies. He explained these tools can help managers and staff on a variety of topics, including:

- Safety plans;
- Advertising; and
- Streamlining payroll systems.

Devine shared AI platforms are constantly evolving and improving.

"I anticipate by summer of 2024, we'll see an entirely new generation of (AI) models released, enabling even more amazing things," said Devine.

He also urged company owners and leaders to consider developing AI policies and strategies to set clear expectations with employees.

"When running an organization, model behavior from the top," said Devine. "People are looking to you for permission and encouragement. If you show you're not afraid, they won't be afraid."

Education at World of Asphalt's People, Plants & Paving Conference and the AGG1 Academy totaled more than 120 sessions. Some of the most popular sessions included Best Practices for Milling & Profiling, Best Practices for Residential & Commercial Paving, and Relational Leadership.

Held every year except during CONEXPO-CON/AGG years, World of Asphalt is the leading trade show and conference focused on the asphalt and paving industries. The show features the best education, and latest equipment, products, services and technologies for the asphalt and paving industries.

Mark Your Calendar
The next World of Asphalt, co-located with the AGG1 Academy & Expo, will be held March 25-27, 2025, in St. Louis, Mo. World of Asphalt is majority owned by NAPA and partially owned by AEM, who produces the show.

For more information, visit **WorldOfAsphalt.com**.

Access ARTBA's Interactive Dashboards:

Deficient Bridges
Federal Highway Investment
National Materials

economics.artba.org

A Better Way for the **Rubber to Meet the Road**

BY JOHN SCHNEIDAWIND
jschneidawind@artba.org

Each day on major highway projects, construction engineers wrestle with a common challenge—how to keep a road stable while heavy trucks and machines roll over it.

This task is especially daunting during the actual building of a road, when heavy equipment may have to traverse over soft, unstable soil to get to the next area of a paving project. “Applied mechanical stabilization,” or the improved ability of a road to tolerate the weight of heavy-duty trucks hauling concrete and asphalt without buckling, is crucial to completing projects on time and within budget.

There are several techniques to achieve this stability in roadway construction. Tensar, the Alpharetta, Ga.-based division of CMC, is pioneering a unique approach it says gives road builders a more accurate picture of the stress and pressure a dirt road undergoes while providing a path to a construction site.

As Tensar defines it in a white paper entitled “The Lees Approach to Applied Mechanical Stabilization,” unpaved roads are those constructed of a layer of unbound aggregate laid directly onto the existing ground, or subgrade. According to the company, an unpaved road is one without a permanent surface such as flexible asphalt or rigid cement concrete. The wheels of construction vehicles roll on this aggregate.

“The Lees approach to applied mechanical stabilization is a new approach to the design of lots of applications with our products, including crane and piling platforms, unpaved roads, and rail,” said Andrew Lees, Tensar’s global application technology manager–geotechnics.

“We've changed the way these designs are done to improve them and make them more accurate, but also to allow us to incorporate our products and our applications more accurately,” Lees said.

The key to this improvement is determining tire contact area. “That came about when it was time to rethink how we design roads, but in particular unpaved roads,” Lees explains. “These are mining roads, haul roads during construction, even local unpaved roads—roads without a paved surface.”

“Some design methods still commonly used don't consider the tire contact area at all,” Lees said. “They consider only the axle load. So, the bigger the axle load, the thicker the section needs to be depending on the subgrade soil conditions. And that (approach) took no account of the tire size.”

But big trucks also have big tires, which can spread out the actual load a truck is carrying. “So, in actual fact maybe it’s a less onerous load than it is on a road-going vehicle,” Lees said.

“The state-of-the-art at the time when we started our work was the Giroud-Han design method, where that took as the contact pressure from the tire of the vehicle as a circular area and the pressure was equal to the tire inflation pressure,” Lees said. “So, if you knew what the axle load was, you divide that load between the tires, two tires—or four tires in a dual tire arrangement. And you calculate the area from that.”

But then Lees had an epiphany of sorts about whether the impression, or tire print left by the tire on a road was circular or another shape—or even if tire pressure alone was a sufficient measure on which to rely.

*See **Stabilization**, 50*

***Stabilization**, from 49*

"When we started to develop the new design method for unpaved roads, straight away we questioned—is it really a circular area?" Lees said. "Tire pressures are pretty high in trucks now, and they've been getting steadily higher. So can an unbound aggregate really sustain that sort of pressure without giving, without yielding?"

What followed was a series of tests with the U.S. Army Corps of Engineers in Vicksburg, Miss., to determine just what sort of imprint a truck's tires left. Thick brown paper was laid down over aggregate, and trucks with two different loads and two different tire inflation pressures were driven over it, with the tires spray-painted to reveal the impression's shape, like that of a fingerprint.

"It wasn't very high-tech, but it did the job," Lees said. "And sure enough, we found that the tire contact area was not circular, it was rectangular. And the area of the contact was much bigger than would be predicted by this assumption of tire inflation pressure, sometimes double the size, which meant that the average contact stress was actually half the tire inflation pressure, so a big difference."

The significance of this finding? While research exists on the effect of tire contact pressure on paved roads, not much was done on unpaved ones. So, using the 140-year-old Hertzian theory for contact stress, Lees developed an equation that accurately determines the contact area between the tire and the road, incorporating such additional elements as the radius of the tire, the axle load, and the tire's relative stiffness and width.

"Without this information you are going to—in most cases—overpredict the tire contact stress," Lees explained. "So, when you start your design, you are applying a much higher pressure than there is in reality—maybe double."

That, in turn, has a host of implications. "You end up over-designing a road," he says. "That means your section is too thick, which means you're using a lot more aggregate than is necessary."

"For a long road, that could mean hundreds of tons of aggregate that you didn't need to bring onto the site, which is going to take a lot longer to build, and you'll have a higher carbon footprint on your project." Or, conversely, with inaccurate tire contact area assumptions, road builders can wind up using less aggregate than needed, which leads to deep ruts and stalled trucks.

Tensar aims to convince road builders to adopt this new design method. "If we don't treat this properly by this new method, you're going to get inaccurate results in your designs," Lees said.

And lots of needless dead ends, too.

John Schneidawind is ARTBA's vice president of public affairs.

Pave WITH Pride

GOMACO®

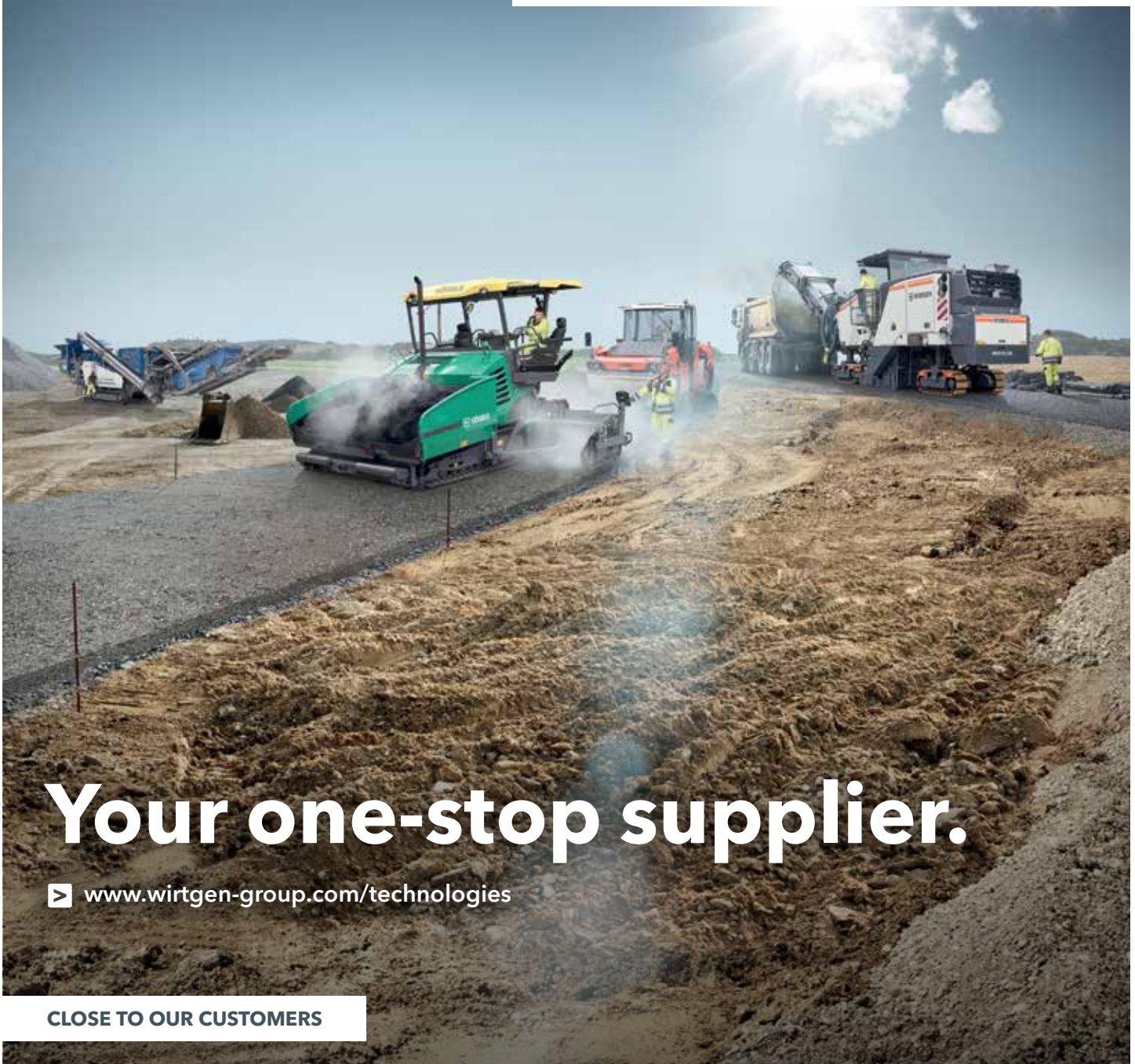
info@gomaco.com • www.gomaco.com

Contractors who ***Pave with Pride*** choose to pave with the latest concrete paving technology. The GOMACO GP4 slipform paver is completing paving passes 37.5 feet wide and 22 inches thick on the Indianapolis International Airport in Indianapolis, Indiana. The new GOMACO GP460, capable of placing 40 feet wide, is placing and spreading the concrete in front of the GOMACO paver. Call us today and learn about our latest slipform paving technology and how to put it to work on your upcoming concrete paving projects.

CONCRETE STREETS AND HIGHWAYS | AIRPORT RUNWAYS | CURB AND GUTTER | SIDEWALKS
RECREATIONAL TRAILS | BRIDGE DECKS | BRIDGE PARAPET | SAFETY BARRIER | IRRIGATION CANALS
GOMACO CORPORATION IN IDA GROVE, IOWA, USA | 712-364-3347

A JOHN DEERE COMPANY

WIRTGEN GROUP



Your one-stop supplier.

www.wirtgen-group.com/technologies

CLOSE TO OUR CUSTOMERS

ROAD AND MINERAL TECHNOLOGIES. With leading technologies from the WIRTGEN GROUP, you can handle all jobs in the road construction cycle optimally and economically. Put your trust in the WIRTGEN GROUP team with the strong product brands WIRTGEN, VÖGELE, HAMM, KLEEMANN.

www.wirtgen-group.com

WIRTGEN / VÖGELE / HAMM / KLEEMANN