ISSUE TWO • 2023

ENGINEERING INC.

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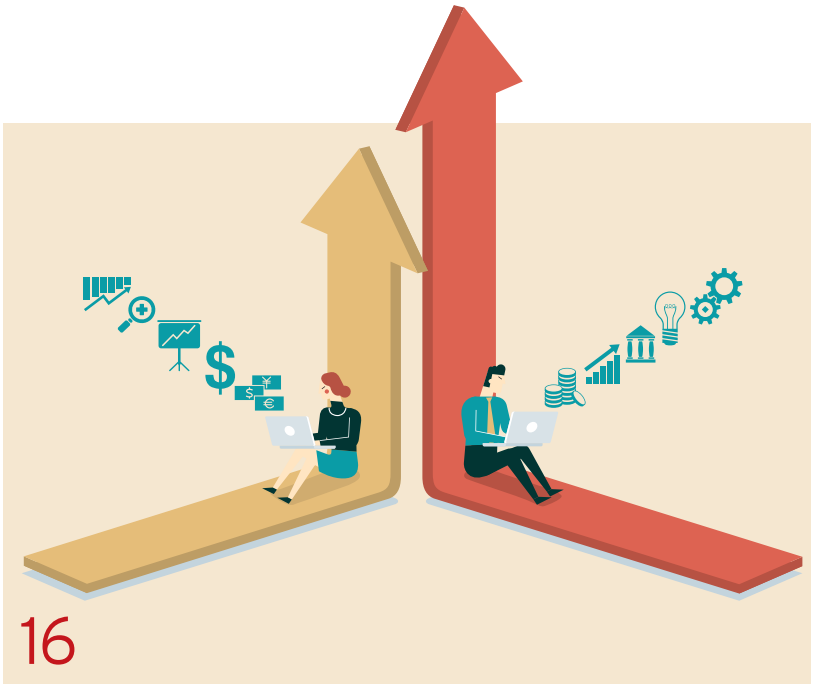

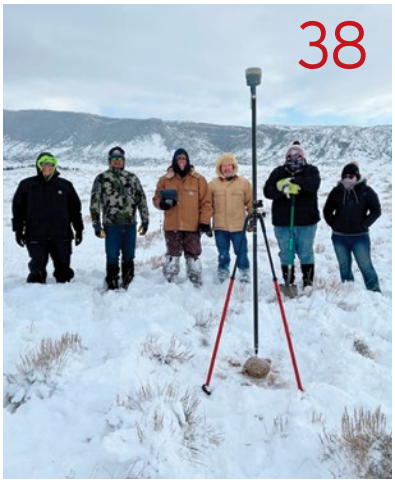

DEPARTMENTS

FEATURES

COVER: MARIAN/GETTY IMAGES

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ACEC's award-winning quarterly magazine *Engineering Inc.* provides expert analysis on all issues affecting the overall business of engineering. Other highlights include in-depth interviews with major policy makers whose decisions impact bottom lines; updates on critical advocacy issues and industry news, best practice management trends and marketplace projections, along with member firm innovations and announcements.

Greater Pittsburgh Closes a Chapter as ACEC Member Organization

After more than 60 years, as of December 16, 2022, ACEC/Greater Pittsburgh ceased being a Member Organization in the now 51-member ACEC nationwide federation. During their time as a Member Organization, ACEC/Greater Pittsburgh served as a legislative and business advocate for its Pittsburgh-area members.

ACEC/Greater Pittsburgh is considered one of the founding members of ACEC. The organization was a member of the Consulting Engineers Council (CEC), which in 1973 merged with the American Institute of Consulting Engineers (AICE). That collaboration subsequently became the American Consulting Engineers Council, and later the present ACEC. ACEC will continue to assist all former ACEC/Greater Pittsburgh member firms as much as possible to preserve their status and benefits as a member of the national federation.

The legacy of ACEC/Greater Pittsburgh also will be honored during the upcoming ACEC Board of Directors meeting and through ACEC media and its podcast *Engineering Influence*.

In other news, the collaboration between ACEC, the American Public Works Association (APWA) and the American Society of Civil Engineers (ASCE), completed its second stop on the Engineering & Public Works Roadshow in March, this time in Richmond, Virginia.

In celebration of resiliency and building community, the award-winning renovations to the Shed at Main Street Station were on display at the event, which featured Virginia Sen. Tim Kaine, ACEC Virginia Executive Director Nancy Israel, and several local government leaders.

This issue of *Engineering Inc.* offers an important cover feature on what the engineering industry needs to do to support the growing electric vehicle (EV) market, including the additional infrastructure development needed to match customer demand as the EV market continues to expand.

Also included is a unique engineering achievement in surveying by a coalition of Native American tribes in partnership with state and federal agencies that is now being adopted nationally as a model for rural surveys. And finally, we offer a report on how the industry's focus on increasing diversity is slowly beginning to show itself among current college engineering students and graduates.

W. Arthur Barrett
ACEC Chair

Linda Bauer Darr
ACEC President & CEO

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ACEC Pushes Back on Proposed Immigration Fee Increases

ACEC submitted comments on a proposal from U.S. Citizenship and Immigration Services (USCIS) to substantially increase the fees associated with employment-based visas.

USCIS processes the documents that engineering firms use to employ international talent when qualified citizens and U.S. residents are not available. This includes optional practical training (OPT) work permissions, H-1B visas, and employment-based green cards. About 90 percent of the USCIS budget comes from visa and other immigration-related fees. The agency generally proposes fee increases every four years, although the fees were last raised in 2016.

In addition to significant increases in a variety of fees connected to employment-based visas, USCIS proposed imposing a $600 asylum program fee on all employers sponsoring temporary workers or workers for permanent residence visas to cover the expanded costs of asylum claims. ACEC urged USCIS to revise the proposed fee schedule with more moderate increases that reflect the financial strain caused by inflation and to seek congressional appropriations to process asylum claims.

ACEC Raises Concerns and Submits Recommendation on Proposed Ban on Noncompete Agreements

The Federal Trade Commission (FTC) issued a proposed rule that would prohibit employers from imposing most noncompete agreements and rescind those currently in effect. The rule includes a limited exception for individuals who own at least 25 percent of a business that is being sold.

ACEC submitted comments on the proposed rule that raised three areas of concern. The Council argued that noncompete agreements should be allowed for any owners of a business because ownership is a transparent transaction. Moreover, the 25 percent threshold is unlikely to be met in most cases in the engineering industry.

The Council also requested greater clarity on when other restrictive covenants, including agreements on customer nonsolicitation, employee nonrecruit, and nondisclosure of intellectual property or other confidential information, are allowed and when the FTC considers them functionally to be noncompete agreements and therefore not allowed.

Finally, ACEC recommended that the ban on noncompete agreements should be prospective instead of retroactive. Many noncompete agreements are paired with some type of financial consideration and rescission of existing noncompetes would amount to a windfall for the employee.

The FTC is expected to publish a final rule by the end of 2023, but it will face legal challenges that will likely draw out the regulatory process.

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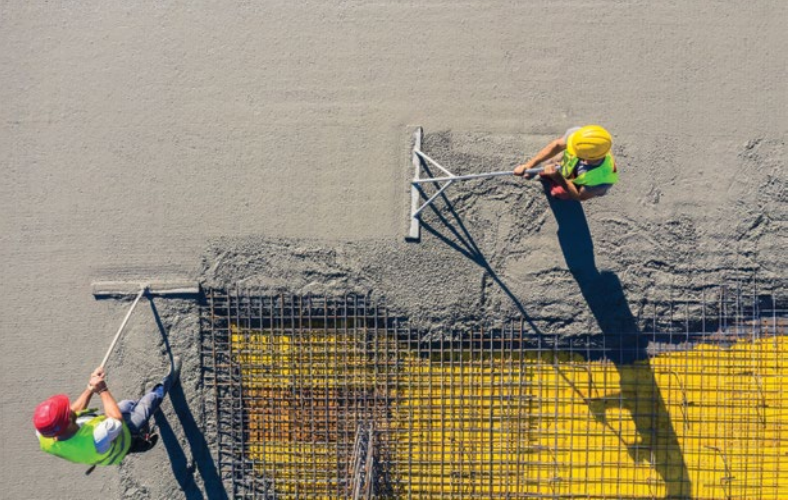

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Council Seeks More Efficient Process for Buy America Compliance

ACEC is encouraging the White House Office of Management and Budget (OMB) to facilitate better agency coordination and more collaboration between industry and government in implementing Build America, Buy America Act (BABAA) requirements contained in the Infrastructure Investment and Jobs Act.

In comments submitted in response to OMB guidance to agencies on federally financed projects, the Council reiterated its support for efforts to strengthen the U.S. manufacturing base through measures to leverage federal infrastructure investments with domestic sourcing preferences: "To achieve the shared goals for infrastructure systems that are safe, sustainable, and efficient, federal procurement policies must be flexible to accommodate situations where certain materials or technologies essential for infrastructure projects are not available in the U.S. and domestic sourcing requirements would impede cost-effective project delivery."

ACEC specifically referenced the need for improved coordination among federal agencies and the OMB in the use of market research on product-specific availability to efficiently manage the associated waivers and avoid duplication of efforts for all parties. The Council also highlighted challenges when assuring compliance and certifying project specifications to meet BABAA requirements that 55 percent of the cost of components of manufactured products are produced in the U.S. Many products used in the water sector, such as valves, pumps, and aerators, that are subject to this requirement contain thousands of parts with a range of costs. Additional guidance is needed for determining compliance with the 55 percent cost requirement.

Lastly, ACEC objected to efforts to undermine congressional intent to exclude aggregates, cement, cementitious materials, and related additives and binders from BABAA domestic sourcing requirements for construction materials. Any attempt to construe such materials as "manufactured products," as contemplated in the OMB guidance would be contrary to the explicit exclusion in the law. "The legal contortions contemplated in the proposed guidance are well outside the scope of OMB authority and inconsistent with legislative intent," ACEC wrote. "From a practical standpoint, subjecting these materials to BABAA requirements would impose significant cost and supply chain burdens on infrastructure projects across the country."

ISSUES ON THE MOVE	WHAT'S NEXT
Increase in fees for H-1B and other visa categories	Final regulatory decision possible by the end of the year
Proposed ban on noncompete agreements	Final FTC decision by early 2024
Build America, Buy America Act compliance	Further rules clarification this summer

ACEC Promotes Fair and Open Competition in Agency Comments

ACEC has submitted comments to the Office of Management and Budget (OMB) recommending changes to how agencies identify competitive advantages. Specifically, ACEC shared the Council's concerns over past interpretations of Code of Federal Regulations (CFR) 2, Section 200.319, which states, "In order to ensure objective contractor performance and eliminate unfair competitive advantage, contractors that develop or draft specifications, requirements, statements of work, or invitations for bids or requests for proposals must be excluded from competing for such procurements."

ACEC contends that forcing the most qualified engineering firms to forgo either assisting with project applications or pursuing projects after they are awarded funding is inefficient, unnecessary, and inconsistent with how other federal agencies have addressed the question of how local agencies should engage engineering services for various phases of projects.

Agencies vary in their interpretation of unfair competitive advantage; some have excluded firms that have assisted in the successful application of federal grants and loans. ACEC has challenged agency interpretations previously over their reading of CFR 2, Section 200.319. This has been proven to prevent agency clients from making procurement decisions for engineering services based on the needs of specific projects. Section 200.319 provides specific examples of situations considered to be restrictive to competition, all of which involve direct actions that favor the contractors involved.

As they continue their revisions of Title 2 of the CFR, ACEC recommends that the OMB clarify CFR 2, Section 200.319, by stating that services provided by an engineering firm as part of an application for federal funds do not create an unfair competitive advantage for that firm.

For More News

For legislative news, visit ACEC's *Last Word* blog online at www.acec.org.

Consumer Demand Gives Way to Manufacturing Boom

BY DIANA ALEXANDER

The industrial and distribution sector continues to lead the commercial real estate market for investment and development prospects, according to Urban Land Institute's *Emerging Trends in Real Estate 2023* survey. Investor preference for this market can be seen as far back as before the financial crisis of 2008-09 because this sector historically enjoys low vacancy rates, making for a worthwhile investment opportunity, especially during an economic downturn.

Design and construction spending for the commercial real estate market is expected to increase 9 percent year-over-year (YoY) in 2023 to an estimated $125 billion. Investments are forecasted to be predominantly driven by warehouse and distribution centers, which will account for more than 50 percent of annual spending within the market. Sector property types include R&D, manufacturing, warehouse, flex, and fulfillment centers.

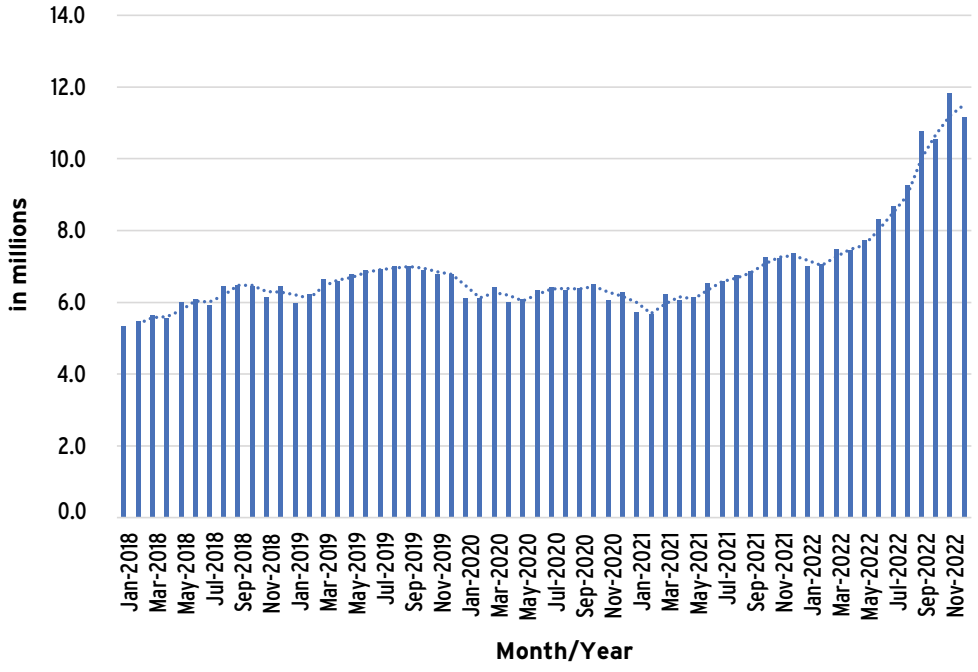
In February 2023, the U.S. Census Bureau released a new *Monthly Subnational Construction Spending* report for the private manufacturing market. At year-end 2018, private investment totaled approximately $72 million, and by 2022, investment totaled roughly $107 million, a 49 percent increase (see graph below for monthly data).

The manufacturing market, including public and private spending, is forecasted to experience growth until 2025. Investments are forecasted to grow 27 percent YoY in 2023, worth $138 billion, and up 9 percent in 2024, at $150 billion. Related market segments, including ports, rail, and transit, are also poised to experience increased investment due to the increase in manufacturing construction activity. Growth overlap worth $65 billion will also be felt in the communications market from the Infrastructure Investment and Jobs Act, which is slated to fund centers for data, manufacturing, logistics, and distribution.

The recently passed CHIPS and Science Act also intends to increase demand for domestically manufactured goods, which could lead to an improved U.S. supply chain. This new law intends to encourage local manufacturing activity, increase the number of jobs, lower the cost of goods, and ease supply chain pressures. The passage has led to the federal government investing $50 billion into American semiconductor manufacturing, with billions more expected from private sector semiconductor investments, according to the White House.

Forecasters at FMI believe that between 2025 and 2027, the manufacturing market could be negatively impacted by geopolitical tensions, trade disputes and the net zero transition and will not be able to sustain its current level of growth, according to *FMI's North American Engineering and Construction Outlook, Second Quarter Edition*. Demand for logistics facilities has recently slowed from record-breaking pandemic years, however, investments remain high.

TOTAL MANUFACTURING PRIVATE DESIGN & CONSTRUCTION SPENDING 2018-2022



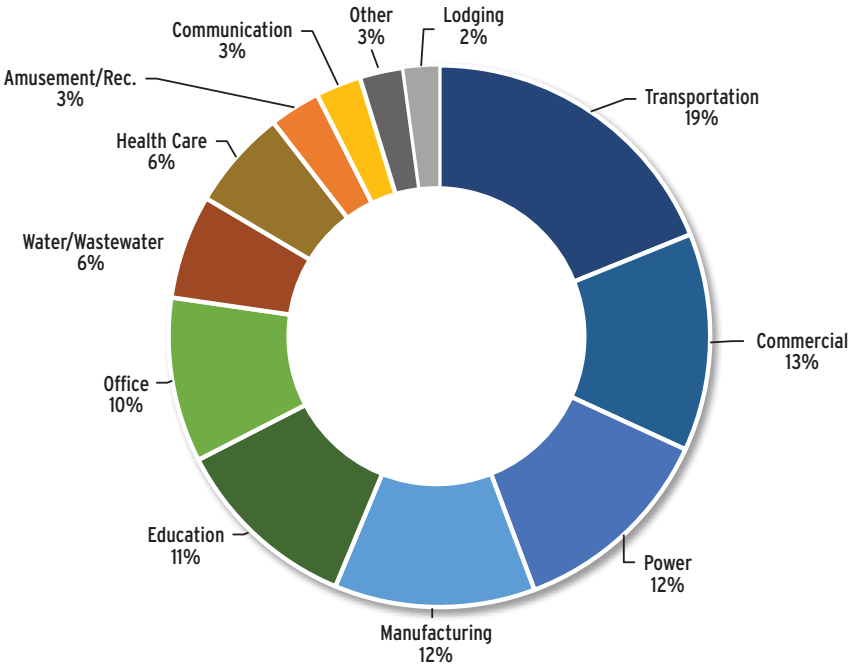
Source: U.S. Census Bureau, seasonally adjusted data

A/E/C Industry Reports Strong 2022 Despite Monetary Tightening

Total U.S. design and construction spending for 2022, including private and public markets, showed a 10 percent increase from $1.6 trillion in 2021 to $1.8 trillion, according to the U.S. Census Bureau's February 1, 2023, Construction Put-in-Place report. Private residential spending increased by 13 percent for the year, nonresidential increased 9 percent, and public spending increased by about 5 percent. Despite the Federal Reserve System increasing monetary tightness, rising interest rates, and a potential recession, the A/E/C industry remained strong through 2022.

Recently, the housing market showed its first decline since 2009. The National Association for Business Economics reported that housing starts were down 12 percent in 2022 with a projected 18 percent decline for 2023. FMI's *2022 North American Engineering and Construction Outlook; Fourth Quarter Edition* projects rising interest rates through early 2023 and a 30-year fixed mortgage rate nearing 7 percent or higher. As of April 2023, the 30-year fixed mortgage rate in fact hit more than 7 percent. For the reporting year 2022, the largest nonresidential markets were transportation (19 percent); commercial (13 percent); power and manufacturing (tied at 12 percent); education (11 percent); and office (10 percent). Nonresidential segments, including the commercial real estate market, are projected to follow the residential market decline later in 2024-2025. Other markets, including transportation, will trend upward, given funding from the Infrastructure Investment and Jobs Act. Below are the market trends forecasted through 2026, per FMI:

2022 NON-RESIDENTIAL SPENDING



Source: U.S. Census Bureau, not seasonally adjusted data

- **Trending up:** transportation, communication, water/wastewater, and conservation and development.
- **Remains stable:** health care and education.
- **Fluctuations:** manufacturing, power, amusement and recreation, and other (public safety, religious).
- **Declines:** single-family residential, multifamily residential, home improvements, lodging, office, and commercial.

Commercial & Residential Real Estate

Health Care & Science+ Technology

Intermodal & Logistics

Economic Outlook

Energy & Utilities

Education

The Private Side column in *Engineering Inc.* focuses on the private-sector markets listed above, and information and insights on economic data relevant to the industry. For more on these topics, subscribe to ACEC's bimonthly *Private Industry Briefs*: **https://programs.acec.org/industrybrief**.

***Diana Alexander**, CPSM, is ACEC's director of private market resources. She can be reached at **dalexander@acec.org**.*

AS EVS GAIN MOMENTUM, ENGINEERS MUST ADDRESS THE CHALLENGES OF BUILDING A ROBUST NETWORK OF CHARGING STATIONS, BATTERY MANUFACTURING PLANTS, AND MORE

PIRANKA/GETTY IMAGES

Electric Vehicle Infrastructure Steers Forward

BY SAMUEL GREENGARD

The road to functional electric vehicles (EVs) has encountered many bumps and barriers. Yet over the last few years, both EV technology and adoption have shifted into high gear.

More than 807,000 electric vehicles were sold in the U.S. in 2022—nearly double the amount in 2021, according to research firm Motor Intelligence. About 6 percent of all new cars sold in the U.S. in 2022 fell into the EV category, representing a big jump from 3.2 percent in 2021, according to *The Wall Street Journal*. Furthermore, a May 2022 Pew Research Center survey found that 42 percent of Americans would be very or somewhat likely to seriously consider purchasing an EV.

More than 2 million EVs are now on the road in the U.S. What's more, almost every major automaker around the world sells EVs or plans to have one on the market soon. "EVs are finally moving into the mainstream," says Marc Geller, spokesperson for the Electric Vehicle Association. "Over the next few years, adoption will increase dramatically, and this will lead to fundamental changes."

Nowhere is this fact more apparent than in EV infrastructure, which incorporates everything from manufacturing plants that produce batteries and charging equipment to networks of charging stations along highways and byways. In the future, filling a tank at a gas station might be as quaint as a horse stable. "EVs introduce a very different societal model with entirely different requirements," Geller says.

Transitioning to EV infrastructure is an enormous societal undertaking. In addition to producing vehicles, batteries, and charging stations, there are some prickly technical and practical issues. These challenges include deciding where to locate charging stations, ensuring they're compatible with all cars, and managing maintenance and repairs of the stations—particularly in areas prone to vandalism. Further complicating matters, many consumers do not live in a single-family home with an outlet and a garage, which is the most common way to charge an electric vehicle.

42 percent
of Americans say they are very or somewhat likely to seriously consider purchasing an EV.

Source: Pew Research Center

"We see record-breaking EV sales numbers quarter after quarter," says Stacy Noblet, ICF Climate Center senior fellow and vice president of transportation electrification. "It's vital to work toward a high level of interoperability so that EV drivers can charge at any charging station they approach, regardless of the network or place."

ONURDONGEL/GETTY IMAGES

CHARGING AHEAD

Although electric vehicles have been around in one form or another since the 1800s, the technology has only begun to mature and move into the mainstream over the last few years. Of course, Tesla paved the way for the industry, but now EVs are about to hit the road in a big way. "It's critical for the infrastructure to keep up with the increased demand if we're going to transition to EVs and address climate objectives," says Rick Azer, associate vice president at Black & Veatch, which has worked in the EV infrastructure arena since 2013.

The 2022 Inflation Reduction Act, which provides a credit up to $7,500 for new EV purchases, is helping to supercharge the industry. Ford Motor Co. and South Korean battery maker SK Innovation have announced plans to invest a combined $11.4 billion for a new EV truck assembly plant and an EV battery plant in Tennessee and two EV battery plants in Kentucky to boost the automaker's electric vehicle production.

Meanwhile, Black & Veatch and energy services firm SAI Group have announced a joint partnership to build a coast-to-coast network of more than 2,000 fast-charging EV stations for Electrify America, a private company that already offers more than 3,479 chargers in the U.S., including 116 Level 2 chargers that can refuel at 12 to 80 miles of range per hour. (Level 2 is the most commonly used for public EV charging.) By 2027, the company plans to have invested $2 billion in zero-emission vehicle infrastructure and education programs, including $800 million in California.

Technical advances in charging have also changed the stakes. "The technology on vehicles and the charging infrastructure have evolved, enabling crucial applications like power control and managed charging," Azer explains.

Today, at a fast-charging Level 3 station, it takes 20 to 60 minutes to obtain a charge of about 80 percent, depending on the vehicle. Level 3 charging technology can fuel a vehicle at three to 20 miles per minute, but it comes at a higher cost than Level 1 and 2 chargers. While all of this is a good thing, it has also introduced a somewhat chaotic environment with different types of connectors and charging standards, with different voltage requirements.

The good news for the engineering industry is that there's enormous demand for expertise in a variety of technical areas. For perspective, U.S. electric vehicle sales jumped by about two-thirds in 2022 while the broader auto market shrunk. "This means engineering services are needed for electric vehicle charging, building energy consumption studies, boiler/chiller replacements, high efficiency system upgrades, and many other services," says John Burns, chair of the ACEC Coalition of American Mechanical and Electrical Engineers (CAMEE), and senior vice president of Burns Engineering.

An April 2022 McKinsey & Company article, *Building the Electric-Vehicle Charging Infrastructure America Needs*, notes that the Bipartisan Infrastructure Law, which provides $7.5 billion to develop the country's EV-charging infrastructure, won't solve the problem. "Even the addition of half a million public chargers could be far from enough," it points out. The writers estimate that the U.S. will require 1.2 million public EV chargers and 28 million private EV chargers by 2030. (*See chart on page 15.*) That's about 20 times the number of chargers that currently exists.

"It's critical for the infrastructure to keep up with the increased demand if we're going to transition to EVs and address climate objectives."

RICK AZER
ASSOCIATE VICE PRESIDENT
BLACK & VEATCH

"Engineering services are needed for electric vehicle charging, building energy consumption studies, boiler/chiller replacements, high efficiency system upgrades, and many other services."

JOHN BURNS
CHAIR
ACEC COALITION OF AMERICAN MECHANICAL AND ELECTRICAL ENGINEERS (CAMEE)
SENIOR VICE PRESIDENT
BURNS ENGINEERING

"Over the next few years, adoption will increase dramatically, and this will lead to fundamental changes."

MARC GELLER
SPOKESPERSON
ELECTRICAL VEHICLE ASSOCIATION

"We must focus on building out a robust charging network nationwide while making charging more accessible and affordable for both current and future EV drivers."

STACY NOBLET
SENIOR FELLOW AND VICE PRESIDENT OF TRANSPORTATION ELECTRIFICATION
ICF CLIMATE CENTER

RIDING THE CURRENTS

Plug-in vehicles will account for 23 percent of all new passenger car sales globally by 2025, according to BloombergNEF. But charging situations and stations vary considerably, a fact that's often overlooked. For instance, electricity purchased at a public charger can be more costly because most public charging takes place during the day, when the price per kilowatt-hour can be between five and ten times higher, according to McKinsey. Of course, pricing—and carbon footprint—are dependent on the energy source and where people charge their electric vehicles.

The latter is critically important. Newer EV models can top out at a range of over 300 miles, and approximately 80–90 percent of charges take place at home, Geller says. These Level 1 systems charge at 120 volts, which equates to a range of about three to five miles per hour. Yet, "If you live in a single-family home and have a garage, you already have your own charging station," Geller points out. "For the vast majority of situations—work, shopping, and local driving—this is sufficient. You charge at night when rates are low and when the vehicle isn't needed."

Things get more difficult with condos, apartments, and office buildings, all of which often lack sufficient charging stations or outlets. These structures may require retrofitting, including in underground garages or outside parking spaces. And things get even more complicated when private companies such as Electrify America must buy electricity from a regulated utility.

Although the price of EVs is dropping rapidly—and thanks to current incentives could match the sticker price for gasoline-powered vehicles within a year or two—for now the cost difference remains an important factor for new and used EV sales.

Of course, the need for home EV charging stations in no way diminishes the necessity for public infrastructure. "We must focus on building out a robust charging network nationwide while making charging more accessible and affordable for both current and future EV drivers," Noblet says. "This includes the full range of vehicle types—from personal vehicles to taxis to commercial delivery vans."

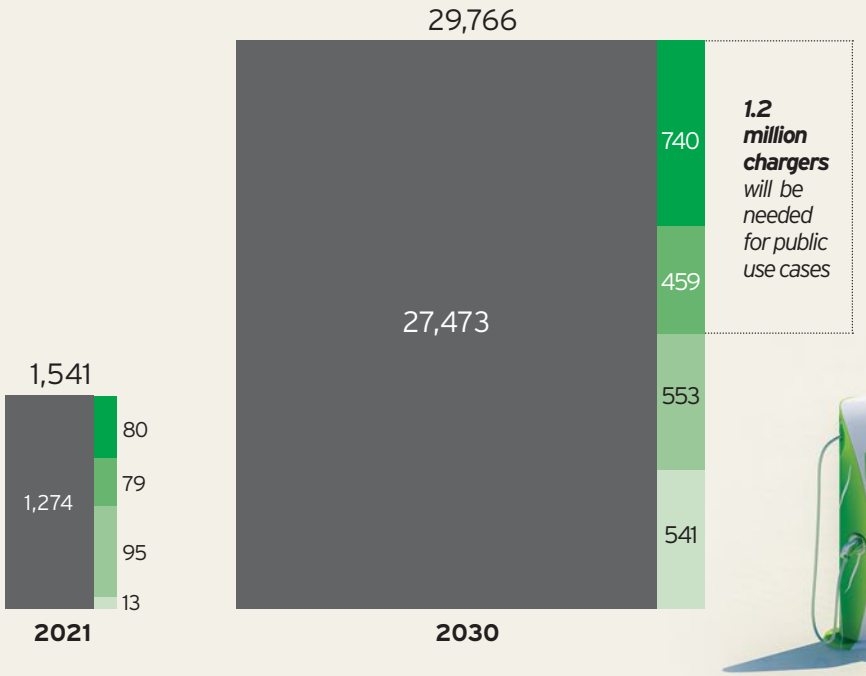
Fortunately, many metro areas already boast a large number of charging stations—located at workplaces, government buildings, retail locations, and other destinations. "Rural areas can be a lot more challenging," Noblet says.

If demand for chargers isn't particularly high in certain areas, there's often no incentive for private companies to build and maintain stations. This has led to some gaps in charging infrastructure, and it could put the brakes on future sales, Noblet adds.

WHAT'S NEXT FOR EVS?

There's no question that building out the infrastructure required for EVs will be costly. However, there's good reason to be optimistic. For one thing, federal funding is making its way to state agencies through the National Electric Vehicle Infrastructure program. It is designed to establish a national network of charging stations along highway corridors, enabling long-distance EV travel. Many cities, including Los Angeles, Atlanta, Boston, and Seattle, are also responding to the needs of EV owners through legislative actions such as passing new building

ELECTRIC VEHICLE CHARGER DEMAND: 2021 VERSUS 2030



Note: Figures may not sum because of rounding.
Cumulative charger demand is based on a scenario where zero-emissions vehicles (battery-electric vehicles, plug-in hybrid electric vehicles, fuel-cell electric vehicles) account for half the vehicles sold in the United States in 2030, in line with a federal target.
Source: McKinsey Center for Future Mobility

codes and zoning laws to allow for the installation of charging stations and speeding up the permitting process for charging station applicants.

There's also a growing focus on simplifying public EV infrastructure, including moving toward greater compatibility in charging systems—which can vary among automakers. In February 2023, the U.S. government indicated that Tesla wouldn't receive part of $7.5 billion in subsidies if it didn't open up its charging network. As the largest EV charger network in the country, Tesla's stations feature chargers that can only be connected to plugs used by Tesla cars. Likewise, many are pushing for standard and consistent ways to pay for a charge by card or an app, along with consistent signage and other tools to simplify finding available charging stations.

Engineers have a crucial role to play, which extends far beyond building out EV infrastructure, says Noblet. "It is important to design charging stations so that they meet the needs of EV drivers—whether they're at a fleet yard, in an employee parking lot, in a residential garage, or at curbside locations," she says.

There's also a need to factor the desire for bi-directional charging, which can use an EV's battery to supply power to a home or business during a power outage. Several EV manufacturers already offer vehicles capable of handling two-way charging. "The way a charging station site is designed is as important as the ability to serve a variety of vehicles, from compact sedans to tractor-trailers," Noblet adds.

Nevertheless, a more sustainable future appears to be in sight. As EV technology continues to mature and the infrastructure expands, more widespread adoption will almost certainly follow. Similar to any major transition, there will be bumps and detours along the way, but the common denominator is a need for engineering services to guide the industry.

"In order to meet ambitious net-zero greenhouse gas goals, we must move EVs further beyond early adopters and into the mainstream," Noblet says. "These users will demand accessible, reliable, and efficient charging infrastructure." ■

***Samuel Greengard** is a technology writer based in West Linn, Oregon.*

GREMLIN/GETTY IMAGES

ACEC RESEARCH INSTITUTE: GROWING IN STATURE AND IMPACT

THE GROUP PROVIDES VALUABLE DATA THAT IMMENSELY HELPS FIRMS, STATE LEGISLATURES, U.S. CONGRESS, AND THE WHITE HOUSE

BY BOB VIOLINO

When the ACEC Research Institute was launched in early 2020, the engineering profession was facing a multitude of national business challenges that continue today and into the foreseeable future: the COVID-19 pandemic, climate change, and workforce shortages, to name a few.

Engineers have always shouldered the responsibility of delivering critical design solutions for national dilemmas, no matter the nature of the difficulties. The ACEC Research Institute was created to help firms address those challenges. Since its launch, the Institute has advanced in fulfilling its mission of delivering knowledge and business strategies that guide and elevate the engineering industry.

"The Institute's success is rooted in the quality and consistency of the research," says Daphne Bryant, executive director. "With more than 650 engineering firm executives participating in the quarterly *Engineering Business Sentiment* survey, we can give a snapshot of the current business climate—data that business leaders across many different markets can use in their planning."

The ACEC Research Institute has added valuable context to the discussions happening in the halls of Congress and in state capitols throughout the country.

"Through our research, we determined that the Bipartisan Infrastructure Law (BIL) will require 82,000 new engineers to complete the work," Bryant says. "With an engineering shortage already, that concrete data can help ring the alarm on the need for immigration reform and expanded STEM education," she adds. "For the first time ever, our industry has data to quantify engineering's value-add to GDP, jobs, wages, taxes, and more at the state and federal levels through our annual *Economic Assessment of the Engineering and Design Services Industry* forecast."

As implementation of the BIL ramped up, one of the biggest wins to date for the Institute came during the Accelerating Infrastructure Summit at the White House last year, Bryant says. At that event, the Biden administration unveiled the Action Plan for Accelerating Infrastructure Projects, citing an ACEC Research Institute study that

recommended best practices in design-build project delivery.

"The Institute's research is shaping the discussion and helping to create efficiencies when bringing projects to fruition at the highest levels," Bryant says.

"The Institute's research is shaping the discussion and helping to create efficiencies when bringing projects to fruition at the highest levels."

DAPHNE BRYANT
EXECUTIVE DIRECTOR
ACEC RESEARCH INSTITUTE

THE POWER OF DATA

While the Institute is an independent, nonprofit research organization, ACEC member firms understood early on how valuable the group's data would be in quantifying the impact of the industry and informing business decisions.

"The success of the Institute has been funded at all levels by partners in the industry dedicated to engineering today for a better tomorrow," Bryant says. "We've seen commitments from individuals, firms, grant-making foundations, and industry suppliers continue to grow over the last three years, with more than 150 donors to date."

Firms and affiliate members should consider supporting the Institute financially, says Gregory Kelly, president and CEO of STV and fundraising committee chair for the Institute.

"The ACEC Research Institute delivers new research, resources, tools, and education to guide and elevate the engineering industry," Kelly says. "Its work provides engineering leaders with fact-based research in critical areas such as design-build and market sentiment that allow us to drive our businesses forward. Given the internal and external changes around our industry, it's more important than ever to support the Institute so we have access to the data that helps our businesses continue to thrive today and tomorrow."

Firms can participate in sentiment surveys, consider a financial pledge over one or multiple years, or support fundraising activities such as the annual golf outing or auctions at the ACEC Convention.

STV's support for the Institute is an opportunity for the firm to help both ACEC members and the industry "be more collaborative and resourceful in driving innovation and creative solutions that will support our clients and the communities we serve," Kelly says.

The ACEC Research Institute can also provide a resource that is undeniably valuable to firms today: data. "I believe that data-driven decision-making is the key to the success of any business or trade association," says Jonathan Curry, executive director of ACEC/MN, the first ACEC state Member Organization to donate to the Institute.

Collecting data and issuing reports is an expensive process. Investing in the ACEC Research Institute gave ACEC/MN the opportunity to contribute a small percentage of its annual revenues and simultaneously deliver a new member benefit to firms across Minnesota, Curry says.

"The ACEC federation is stronger when we all work together to share resources and support common causes, which is why every Member Organization should consider supporting the ACEC Research Institute," Curry says.

LEADING SOURCE OF KNOWLEDGE

The vision of the ACEC Research Institute "is to be the leading source of knowledge and thought leadership for creating a more sustainable, safe, secure, and technically advanced built environment," says John Carrato, chairman of the board of Benesch and inaugural chair of the ACEC Research Institute.

"We want to be part of discussions that impact the future of our industry, the country, and the world when the built environment is being considered," Carrato says.

ACEC's strategic plan focuses on raising the value of the profession through greater influence and involvement, being more inclusive, and building a stronger knowledge base, Carrato says. "The strategic plan led to the reconstitution of the ACEC Foundation into the ACEC Research Institute to help pursue these goals," he says.

"By better understanding what society will require, we can explore what we will be challenged to deliver in order to succeed and be viable, thriving firms in a thriving industry."

MIKE CARRAGHER
CHAIR, ACEC RESEARCH INSTITUTE
CHAIRMAN OF THE BOARD, CEO, AND PRESIDENT, VHB

"I believe that data-driven decision-making is the key to the success of any business or trade association."

JONATHAN CURRY
EXECUTIVE DIRECTOR, ACEC/MN

The Institute has developed a research and stakeholder engagement framework that incorporates a range of research materials, webinars, and roundtable discussions on various initiatives.

"We have worked with experts, leaders, and academics inside and outside the industry to identify several current subjects that our clients and companies are considering in the short, medium, and long term," says Kate Harris, Institute board member and president and CEO at Stanley Consultants. "Today, those initiatives include business-critical issues such as the talent revolution, the ethical and appropriate use of technologies, artificial intelligence and generative design, and the development of sustainable, resilient infrastructure practices."

Even though the Institute was created during the COVID-19 crisis, "we are very happy with what we have produced and accomplished over the last three years," Carrato says. Highlights include the landmark Engineering Industry Impact Series, the *Engineering Business Sentiment* survey, *An Analysis of QBS in the Procurement of Engineering Services* report, the *Design-Build State of Practice* report, and the Future of Engineering Roundtable Series.

"We recently committed to a three-horizon approach to research and thought leadership for the Institute moving forward," Carrato says. "Horizon One will be efforts that have a quick turnaround and provide current business insights for ACEC member firms. Horizon Two is focused on midterm projects that are driving business outcomes and require a bit more time to complete. And Horizon Three will be long-term and forward-looking thought leadership initiatives that will drive our industry into the future."

"The Institute's focus on Horizon Three, and an exploration of the *Firm of the Future* (2035), is an area I'm particularly passionate about," says Mike Carragher, chair of the ACEC Research Institute and VHB chairman of the board, CEO, and president. "Key areas for exploration have been developed from contemplating what society will need with regards to the built environment. By better understanding what society will require, we can explore what we will be challenged to deliver in order to succeed and be viable, thriving firms in a thriving industry. This future-focused thinking empowers us to view the complexity of the challenges we face as tremendous opportunities that we, as an industry, have a responsibility to address—opportunities that will significantly benefit our communities and planet."

Industry experts are taking notice of the Research Institute's remarkable efforts. "The Institute has quickly emerged as the thought leader tackling some of the most complex issues around infrastructure and a resilient built environment," says Steven Lefton, vice chair of the ACEC Research Institute and Kimley-Horn president and CEO. "The groundbreaking research the Institute is undertaking is critical for the engineering and broader design community to drive business outcomes and ensure a sustainable future for generations to come." ■

***Bob Violino** is a business and technology writer based in Massapequa Park, New York.*

"Given the internal and external changes around our industry, it's more important than ever to support the Institute so we have access to the data that helps our businesses continue to thrive today and tomorrow."

GREGORY KELLY
FUNDRAISING COMMITTEE CHAIR, ACEC RESEARCH INSTITUTE
PRESIDENT AND CEO, STV

"We want to be part of discussions that impact the future of our industry, the country, and the world when the built environment is being considered."

JOHN CARRATO
INAUGURAL CHAIR, ACEC RESEARCH INSTITUTE
CHAIRMAN OF THE BOARD, BENESCH

"The Institute has quickly emerged as the thought leader tackling some of the most complex issues around infrastructure and a resilient built environment."

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PRESIDENT AND CEO, KIMLEY-HORN

"We have worked with experts, leaders, and academics inside and outside the industry to identify several current subjects that our clients and companies are considering in the short, medium, and long term."

KATE HARRIS
BOARD MEMBER, ACEC RESEARCH INSTITUTE
PRESIDENT AND CEO, STANLEY CONSULTANTS

ACEC RESEARCH INSTITUTE'S CHAIR CARRATO COMPLETES TERM

After taking the lead of ACEC's new Research Institute during the heart of the COVID-19 pandemic, Chair John Carrato has completed his term. Being the first-ever Institute chair, he leaves it as one of the most impactful services for members offered by ACEC.

The Institute's mission has been to provide expanded thought leadership capabilities in relation to industry trends and analysis. Significant progress has been made, and the Institute will continue to produce essential programming and resources to support member firms and our industry.

"I was a member of ExCom during the development of the strategic plan," says Carrato, a former president and CEO of Benesch. "This is when discussion about creating a research arm to help position ACEC and the engineering industry as thought leaders was occurring.

"I was intrigued by the mission of the Institute and decided I would like to get involved in any way that I could. When they asked me to serve as the inaugural chair, I was absolutely thrilled."

Carrato was confident he could help support the Council's innovative endeavor. "I was a founding director for the American Society of Civil Engineers' Structural Engineering Institute Futures Fund," he notes. "While not the scale of the ACEC Research Institute, it is also a 501(c)(3) organization that funds research. I was hopeful that my experience with that effort could be helpful."

He pointed to several reasons for the Institute's success. "We have an incredible Board of Directors, including our new Chair Mike Carragher. They refined our vision and mission statements and have developed a solid framework for approaching our pursuit of research that will not only position our industry as thought leaders but provide useful information and tools to help our member firms excel.

"Our staff is absolutely incredible, starting with our Executive Director Daphne Bryant, whose passion and drive to make the Institute successful is amazing. Kerry Gaylor, Joe Bates, and Kevin McMahon have also been instrumental in our success. Of course, we would not be where we are today without the financial support of our member firms, state Member Organizations, ACEC, and the Design Professionals Coalition."

Going forward, Carrato sees continued expanded growth and industry prominence of the Institute, while he plans to relish more relaxing aspects of life.

"I have enjoyed my time as chair these past three years immensely," he says. "Fortunately, I will be able to serve on the board for two more years as past chair. I will be retiring as a full-time employee of Benesch on November 3 and will stay on as an on-call employee until I complete my term on the Institute board.

"With my newfound spare time, I intend to spend as much time with my family as they can tolerate, learn how to fly-fish, and see how much golf I can play without getting tired of it."

THE ENGINEERING PIPELINE:

Striving for Inclusivity

Like other companies in the science, technology, engineering, and math (STEM) fields, engineering firms have been increasingly focused on improving diversity within their organizations in recent years—but progress remains remarkably slow.

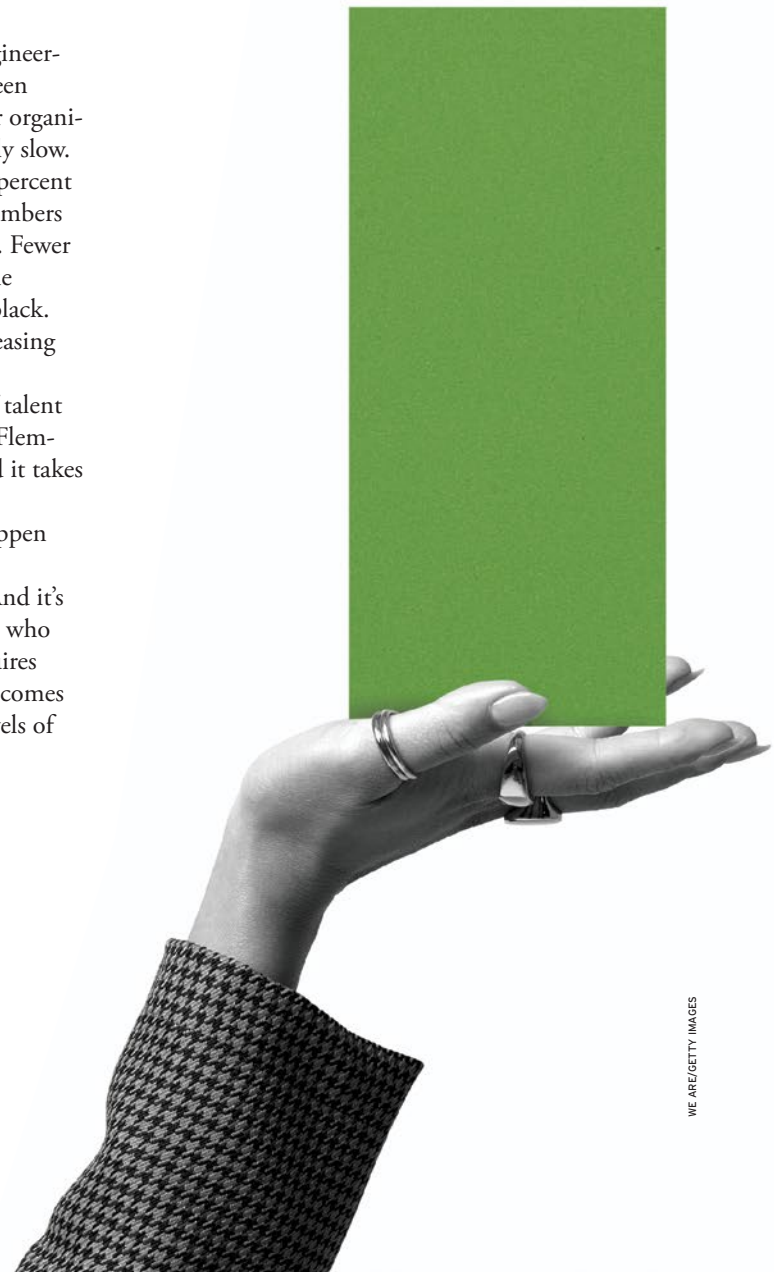
The share of women in engineering jobs stood at 15 percent in 2019, according to the Pew Research Center. The numbers are similarly low among other underrepresented groups. Fewer than 10 percent of engineers are Latinx, according to the employment research firm Zippia, and only 3.3 percent identify as black.

For those in the field, there's a recognition that meaningfully increasing diversity at engineering firms will be a long-term project.

"It's not a sprint; it's a marathon," says Masai Lawson, manager of talent acquisition and Diversity & Inclusion Committee chair at Gannett Fleming. "Change is not going to happen overnight. It takes courage, and it takes some wherewithal to be able to push and drive for change."

It's also becoming essential for companies to make that change happen from a business perspective.

"The demographics of the country are changing," Lawson says. "And it's important that we can make that connection and engage individuals who are coming from underrepresented groups in our industry. This requires that we are intentional about our outreach and engagement when it comes to identifying women and people of color for opportunities at all levels of the organization."



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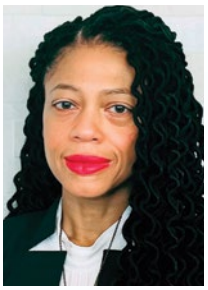


"It's not a sprint; it's a marathon. Change is not going to happen overnight. It takes courage, and it takes some wherewithal to be able to push and drive for change."

MASAI LAWSON
MANAGER OF TALENT ACQUISITION
GANNETT FLEMING

FIRMS, UNIVERSITIES, AND ORGANIZATIONS ARE TAKING STEPS TO ATTRACT MORE DIVERSE CANDIDATES TO THE FIELD

BY BETH BRAVERMAN

A FOCUS ON REQUESTS FOR PROPOSAL AND RETENTION

Lawson says that Gannett Fleming is increasingly seeing requests for proposal from prospective clients asking about the firm's diversity recruiting and retention-related metrics, as well as how many people from diverse backgrounds hold leadership roles. To help improve such figures, Gannett Fleming has been focused on creating an internal culture of inclusion so that employees feel a sense of belonging at work.

"That's critical to retaining talent," Lawson says. "And it allows you to hold on to that intellectual capital and elevate the people that you've invested in into more senior roles at the company."

There's a similar focus at Parkhill, says Dawn Moore, principal and senior vice president of people and culture at the firm.

"We think inclusion plays a large role in engagement and retention of our people," she says. "We work hard to find outstanding people. Once we find them, we want to keep them."

At both Parkhill and Gannett Fleming, there's a focus on minimizing bias in the workplace and during the hiring process itself.

"Our hiring managers do not have access to candidates' identifying information," Moore says. "We emphasize the importance of diversity on a regular basis with all leadership to ensure it is front of mind."

The firm also invests in career development opportunities that allow staff members of all backgrounds the opportunity for advancement.

"We value deepening credibility," Moore says. "All Parkhillers are expected to keep learning and developing our competencies. We also believe pay equity is important in retaining a diverse workforce."

REVERSING LONGTIME TRENDS

Gannett Fleming and Parkhill have both invested in employee resource groups to give diverse employees an opportunity to connect with allies and others with a similar background. Such resources are seen as steps in the right direction, necessary to level the playing field in the industry.

"We think inclusion plays a large role in engagement and retention of our people. We work hard to find outstanding people. Once we find them, we want to keep them."

DAWN MOORE
PRINCIPAL AND SENIOR VICE PRESIDENT OF PEOPLE & CULTURE
PARKHILL

"The profession has generally suffered from implicit bias that women or people of color didn't have the right skill set or ability to thrive in the profession."

ANDREA GOLDSMITH
DEAN OF ENGINEERING AND APPLIED SCIENCE
PRINCETON UNIVERSITY

"The profession has generally suffered from implicit bias that women or people of color didn't have the right skill set or ability to thrive in the profession," says Andrea Goldsmith, dean of engineering and applied science at Princeton University. "This bias is historical, and now we are dealing with the impact of that bias in terms of recruiting and retaining diverse people in the profession."

At Princeton, for example, 41 percent of undergraduate students in engineering are women, 6 percent are black, and 8 percent are Hispanic. Those figures track closely with national data that show that in 2018, women earned about half of all science and engineering bachelor's degrees, 44.7 percent of master's degrees, and 41.2 percent of doctoral degrees, according to the National Science Foundation.

Such figures reflect a long-term, systemic problem within the industry as a whole.

KLAUS VEDFELT/GETTY IMAGES

"Due to a number of factors, including bias, diverse people who could have thrived in the profession, going back to its origins, were unable to enter the profession, let alone thrive in it," Goldsmith explains. "Therefore, we don't have many diverse senior people in the field to serve as role models. When there are no senior people of color or women in the field, it perpetuates the stereotypes about them."

Another case in point: About 1 in 5 undergraduate engineering students at Virginia Tech are women, and about 5 percent are black and 9 percent are Latinx. Those numbers are an improvement over the past, says Bevlee Watford, associate dean of equity and engagement at the university's College of Engineering and the executive director of the Center for the Enhancement of Engineering Diversity at Virginia Tech.

BROADENING THE DEFINITION OF DIVERSITY

In addition to making progress on representation of women and people of color, institutions of higher learning and engineering firms need to broaden the way they think about diversity, says Watford.

"We are looking at the nontraditional paths and people and trying to increase access for all of them."

BEVLEE WATFORD
ASSOCIATE DEAN
OF EQUITY AND ENGAGEMENT
VIRGINIA TECH

Fewer than 10 percent of engineers are Latinx, and 3.3 percent identify as black.

Source: Zippia

"There are other populations that we are also targeting to increase and broaden participation rates in engineering in particular and STEM fields in general," she adds. "That includes first-generation students, Pell Grant-eligible students, or students who come from the lower end of the income spectrum."

In October, Virginia Tech announced the creation of a task force on access and affordability, which is aimed at getting more students interested in engineering at a young age. The university is also working to make more opportunities available to veterans and to students transferring from two-year schools.

"We are looking at the nontraditional paths and people and trying to increase access for all of them," Watford says.

The National Science Foundation (NSF) initiative Engineering for Us All is directed at a slightly younger demographic. It provides an engineering curriculum to dozens of high schools across the country, mostly in urban settings, with the goal of getting diverse students interested in the profession at an earlier age. Susan Margulies, assistant director of the NSF's Directorate for Engineering, notes that she chose engineering in college because she liked math and science, but she didn't know or understand what engineers really did.

"We are being creative about how to raise awareness about what it means to be an engineer and the multiple pathways you might take to get there," Margulies says. "You might start with two-year technician training. You might have an undergraduate degree. Or, increasingly, campuses are realizing they need to create post-baccalaureate training for those who didn't select an engineering major as undergrads but entered the engineering workforce via an engineering graduate degree."

The push to increase diversity in the engineering pipeline has gained momentum in recent years, but the journey to achieving real progress is far from over. With continued commitment and investment, the engineering industry can create a more equitable and inclusive future for all. ■

Beth Braverman *is a business writer based in New York.*

"We are being creative about how to raise awareness about what it means to be an engineer and the multiple pathways you might take to get there."

SUSAN MARGULIES
ASSISTANT DIRECTOR OF THE
DIRECTORATE FOR ENGINEERING
NATIONAL SCIENCE FOUNDATION

Member Organizations, Firms CARRY INDUSTRY TORCH During Engineers Week

State organizations and member firms throughout the ACEC federation recognized the important history and future significance of engineers during this year's National Engineers Week in February.

During the week, **ACEC/Missouri** coordinated its first ever "Engineering Day at the Missouri Capitol," where more than 65 engineering professionals attended. Other highlights included **ACEC Indiana** conducting its annual National Engineers Week outreach featuring presentations to 100 classrooms throughout the state, and Houston-based **Walter P Moore** commemorating Engineers Week with a series of new videos relating to the 2023 National Engineers Week theme, "Creating the Future."

GETTY IMAGES/CSA IMAGES

Other National Engineers Week highlights included:

REDESIGNED MESSAGE TO ATTRACT STUDENTS NEEDED, SURVEY SHOWS

DiscoverE and the Global Strategy Group released results from a year-long research project in 2022 to determine exactly how today's teens and their parents perceive engineering.

Titled *Messages Matter: Effective Messages for Reaching Tomorrow's Innovators,* the research was designed to gauge the level of understanding and interest in engineering among students and parents, to assess general career choice motivators, and to evaluate current engineering promotion messages. More than 4,000 high school students and 1,000 parents were surveyed.

Key findings include:

- Half (50 percent) of the total high school students surveyed are either very interested (18 percent) or somewhat interested (32 percent) in engineering as a career, compared to 30 percent who are not interested at all.
- Specific categories include male students (24 percent very interested; 38 percent somewhat interested; 19 percent not at all interested); female students (19 percent very; 26 percent somewhat; 41 percent not at all); Black students (17 percent very; 32 percent somewhat; 34 percent not at all); and Hispanic students (16 percent very; 35 percent somewhat; 25 percent not at all).

When students were asked to name the top three people in their lives whom they had spoken to about a future career, the responses were: mother/female parent or guardian (55 percent had spoken a lot and 30 percent had spoken a little); father/male parent or guardian (42 percent had spoken a lot and 33 percent had spoken a little); and close friends (41 percent had spoken a lot and 39 percent had spoken a little). And when asked to choose from a long list of factors regarding what's important when considering a future career choice, financial security was the top choice for both parents (61 percent) and students (55 percent).

The report references two projects conducted in the early 2000s, calling that an "aha moment" when it became clear how engineering industry messaging that emphasized how engineers solve problems using math and science neglected to mention the critical work being done by engineers and also failed to align with many students' career or personal aspirations. The study report continues to say that as a result of this realization, the engineering industry has since changed how it presents itself, and so part of the purpose of this latest survey was to discover how today's students have received the new messaging. Read the full DiscoverE *Messages Matter* report at discovere.org/messages-matter.

During National Engineers Week, 6th grade science students at an Evansville, Indiana, school were challenged to construct a marble run.

ACEC INDIANA ENGINEERS WEEK ACTIVITIES REACH 1,000-PLUS STUDENTS

Every year, ACEC Indiana coordinates a National Engineers Week student outreach effort during the month of February. Their engineer volunteers make presentations at elementary, middle, and high schools, encouraging students to consider a job in engineering or related fields.

As a collaborative effort to develop the talent pipeline for future engineers, ACEC Indiana members partnered with several public agencies including Citizens Energy Group, the Indiana Department of Transportation, the Indianapolis Department of Public Works, and city and county engineers to conduct these presentations.

As result, ACEC Indiana was able to reach more than 1,000 students in 100 classrooms throughout the state of Indiana during the 2023 National Engineers Week.

The 2023 Toledo Engineers Week Banquet, co-hosted with the ACEC Ohio Northwest Ohio Chapter, named Khalid Al-Olimat the 2023 Engineer of the Year and Ariya Fathi the 2023 Young Engineer of the Year.

ACEC OHIO CELEBRATES NATIONAL ENGINEERS WEEK

The ACEC Ohio Central Ohio Chapter hosted the 2023 Central Ohio Engineers Week Luncheon with over 350 attendees who heard from Kevin Hoggatt, Intel's director of state government affairs for Ohio; Dr. Allison MacKay, professor and chair of civil, environmental, and geodetic engineering at The Ohio State University; and Jack Marchbanks, director of the Ohio Department of Transportation.

Also during the week, ACEC Ohio Northwest Ohio Chapter co-hosted its annual Toledo Engineers Week Luncheon *(pictured),* presented in conjunction with the Ohio Society of Professional Engineers Toledo Chapter and the University of Toledo College of Engineering.

ACEC Colorado leaders enjoy the annual Engineers Week legislative reception. From left to right: State Rep. Anthony Hartsook; Dave DiFulvio, PLS (Farnsworth Group); State Rep. Lisa Frizell; and Zachery Stone (CP&Y, an STV Company).

ACEC COLORADO DELIVERS MULTIFACETED 2023 ENGINEERS WEEK CELEBRATION

ACEC Colorado kicked off National Engineers Week with a Tuesday legislative reception near the state capitol. More than 20 state member firm employees joined with ACEC Colorado staff and its lobbying team to discuss key issues with 14 state senators and representatives, as well as several aides.

The state organization also hosted a volunteer orientation for member firm employees interested in becoming tutors in conjunction with the Colorado Association of Black Professional Engineers and Scientists. ACEC Colorado also received a proclamation from Gov. Jared Polis.

GETTY IMAGES/CSA IMAGES

WALTER P MOORE STAFF VIDEO SERIES UNDERSCORES NATIONAL ENGINEERS WEEK THEME

Walter P Moore produced a series of videos featuring its staff from throughout the nation emphasizing the significance of the 2023 National Engineers Week theme "Creating the Future."

"Our goal was twofold," says Kirsten Cornell, the firm's senior communications specialist and a senior associate. "We first wanted to align ourselves with the 2023 National Engineers Week theme, and then use our employees' diverse areas of sector expertise to highlight the abundant ways engineering enhances everyday life."

View Walter P Moore's 2023 National Engineers Week videos at:

Connect with Experts | **David Ford**: https://bit.ly/40XnMiu
Connect with Experts | **Armen Megerdoomian**: https://bit.ly/429FwIy
Connect with Experts | **Bart Miller:** https://bit.ly/3oUfYkl
Connect with Experts | **Kelly Dillard**: https://bit.ly/3ANwxRP
Connect with Experts | **Ray Drexler**: https://bit.ly/44naSgX

Colleagues from Smith Seckman Reid's (SSR) Sarasota office enjoy a lively lunch at Longhorn Steakhouse to celebrate Eweek.

SMITH SECKMAN REID FOCUSES ON TEAMBUILDING

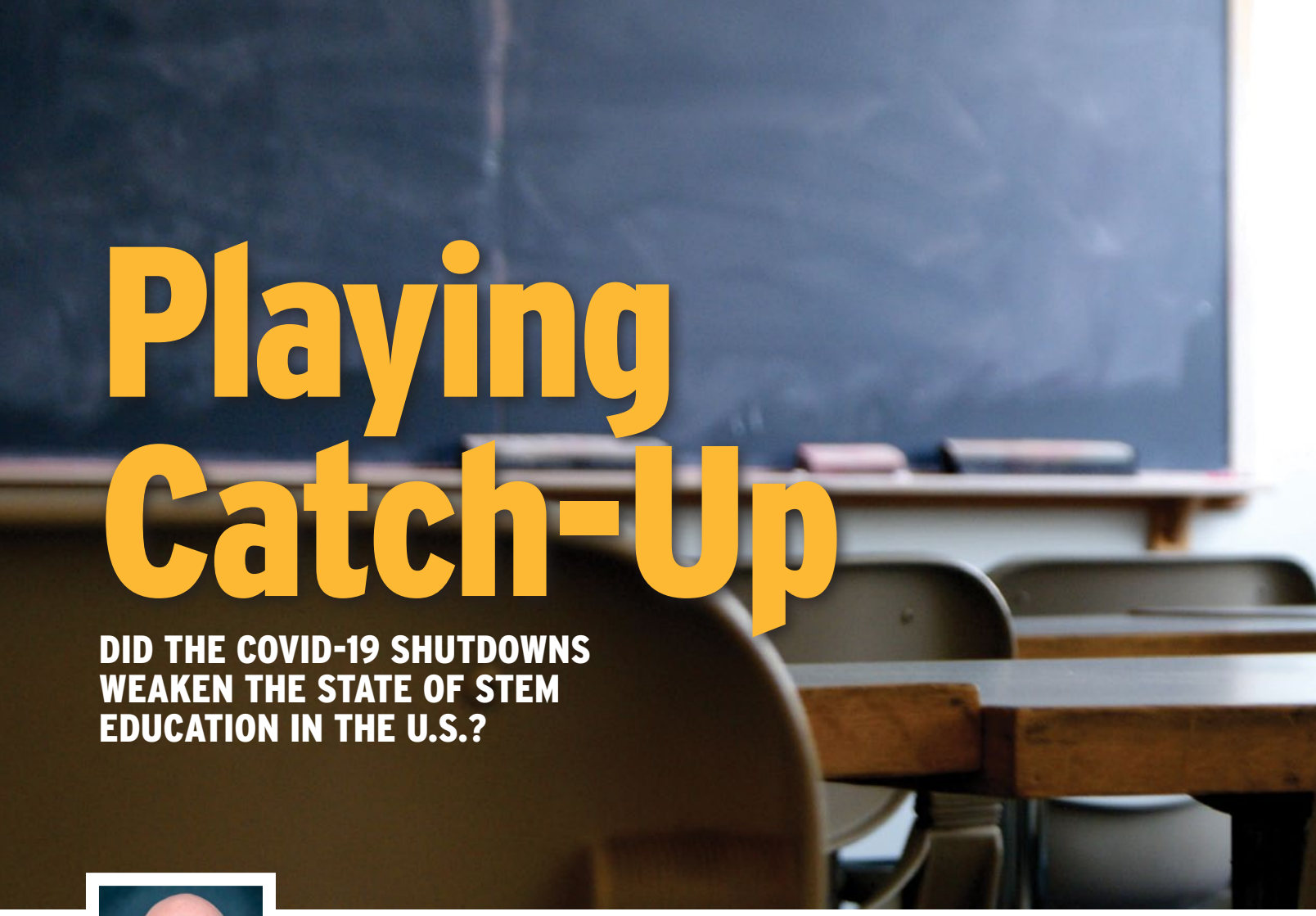
Every year, Smith Seckman Reid (SSR) pauses to celebrate its engineers during Eweek. With colleagues located in offices across the country, the firm encourages activities that allow for teambuilding and camaraderie. This year, colleagues took time to enjoy team breakfasts, lunches, and happy hours. SSR also brought in fun games to encourage friendly competition. ■

AVCON INTRODUCES GIRL DAY DURING NATIONAL ENGINEERS WEEK

Following the theme of how engineers make a difference in our world and help create the future for the next generation, AVCON produced a series of video interviews with several of the firm's engineers reflecting on what engineering means to them and how they can foster innovation and excellence in the next generation of students and engineers, and offering some personal insights on their journey in the field.

As part of Girl Day, the firm invites women in engineering to inspire young girls to do anything they put their minds to, especially when it comes to engineering. To highlight the importance of Girl Day this year, AVCON interviewed Tonia Nation to discuss her introduction to engineering, mentorship, and advice for girls and young women interested in becoming engineers. Currently a senior site development manager in Niceville, Florida, Nation has been with AVCON for 21 years.

AVCON Professional Engineer Tonia Nation discussed her engineering career and advice for young women interested in the industry.



Playing Catch-Up

DID THE COVID-19 SHUTDOWNS WEAKEN THE STATE OF STEM EDUCATION IN THE U.S.?

"This is going to be something that we'll have to watch as more research comes out. But it might be something that we'll have to deal with on a more national or even international scale."

JOE BATES
SENIOR RESEARCH CONSULTANT
ACEC RESEARCH INSTITUTE

BY SUSAN FIREY

On March 25, 2020, Idaho—the last holdout among states that had shutdowns—announced the closure of its public schools due to the COVID-19 pandemic. At that point, more than 50 million American students had been taken out of the classroom, launching the beginning of an unplanned (and completely unprepared-for) experiment in remote learning on a mass scale.

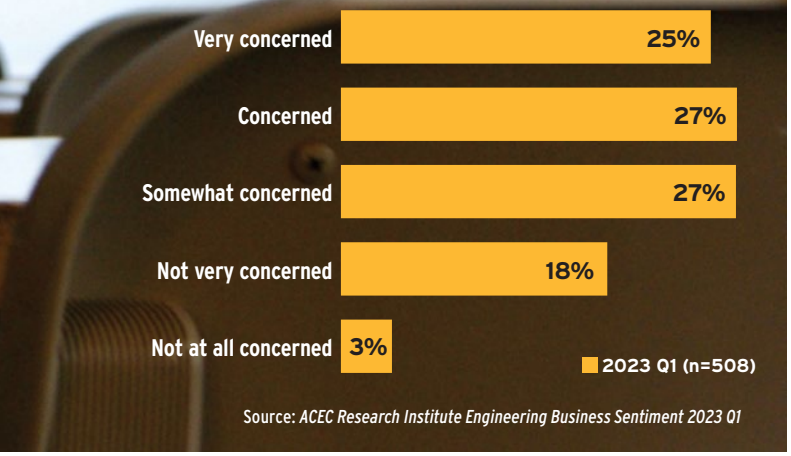
As much of the nation went into full lockdown and classrooms gave way to Zoom, both academic standards and student engagement fell precipitously. Some students adjusted quickly to this seismic shift in reality. For other students, however, the transition was far more difficult, and brought with it complications—and consequences—that are still being felt.

Brian T. is one of those students. He was in fifth grade when the COVID shutdowns began, and his mother says that the once-aspiring architect's math education suffered tremendously during remote learning. "Kids can't learn math remotely," she says. "It was the self-study that made it so hard—compounded heavily by some teachers not knowing how to use tech like Zoom." Even now, two years after the shutdowns, her now-middle schooler son is struggling to catch up in his math classes.

That sentiment was echoed by Matthew G.'s father. Matthew, who is described as a preternaturally bright kid, is now plagued by a slight hitch in his confidence that didn't exist before COVID caused a shutdown at his school, shifting his scholastic frame of

CONCERN ABOUT COVID'S IMPACT ON STUDENTS CHOOSING STEM MAJORS IN COLLEGE

Seventy-nine percent of firm executives are at least somewhat concerned that fewer students will choose STEM majors in college due to the long-term impact of COVID on their education.



Source: *ACEC Research Institute Engineering Business Sentiment 2023 Q1*

reference from his well-appointed school lab to his bedroom. An aspiring doctor since first grade, those ambitions have since been derailed—or at the very least hindered—by that lack of confidence.

"You can't speak about the damage, the real damage, that has been done to a lot of kids without it snowballing into a political issue over the COVID response as a whole," says Matthew's father, himself a physician. "There are kids who absolutely thrived at home. But how do you teach advanced chem online? I sat in on several lessons and was buffaloed by how inadequate they were. That's not an indictment of the teachers or even of the decision to shut down. It just is what it is."

HOW WILL THIS AFFECT THE ENGINEERING INDUSTRY?

If fewer students pursue STEM areas of study, this will result in a smaller future applicant pool. For firms already experiencing workforce shortages, that's a sobering thought. According to the ACEC Research Institute's *Engineering Business Sentiment 2023 Q1* report, nearly half of all firms reported turning down work because of workforce shortages.

One recruiter for a major manufacturing firm says that her organization has not experienced any significant hiring shortages. She pointed to her firm's robust college internship program as one of the main drivers behind the quantity—and quality—of its applicant pool.

"Our internship program is very comprehensive," she says. "By establishing those relationships early, we can make an impression on a future prospective full-time applicant before they've even graduated."

She says it's critical that firms build deep connections with college and university career centers. "That's Recruitment 101, but you'd be surprised by how many organizations just don't do it. We also recruit heavily at HBCUs (historically black colleges and universities), which is important for our diversity, equity, and inclusion (DEI) goals."

Those DEI goals may be more difficult to meet in the coming years, as students from historically underserved areas were placed at an even greater disadvantage because of the shutdowns. Nearly every student in the U.S., regardless of their racial or economic background, from kindergarteners to high school seniors, had their education disrupted by the COVID shutdowns. The extent of that disruption—and the toll it has taken (and will take)—on college preparedness for STEM majors remains an unresolved question.

That's unsettling, at least for industry executives. As part of the *Engineering Business Sentiment 2023 Q1* report, firm executives were asked to weigh their concern that fewer students will choose STEM majors in college due to the long-term impact of COVID on their education. More than three-quarters of respondents indicated they were at least somewhat concerned, with one-quarter indicating they were "very concerned."

ACEC Institute Senior Research Consultant Joe Bates, who oversaw and conducted the study, notes that statistics show that the education of younger children was more impacted by COVID and that they continue to be more affected by it. He also says the COVID shutdowns and remote learning were more difficult for students who were transitioning to a higher level of education at that time, such as those making the shift from prekindergarten to kindergarten, elementary to middle school, middle school to high school, or high school to college.

"How does this translate into our world?" Bates asked during a March webinar in which the study results were unveiled. "Is there going to be an impact on STEM majors? Are there going to be fewer people who are interested in STEM majors in college because of the impact of COVID?"

Bates notes the concern of industry executives for the state of STEM education and shared an anecdote from his personal life. "My own son had to take an extra year to get his footing back," Bates says. "He was one of those who was transitioning from high school to college, and in fact he is now an aeronautics engineering major." But, he continues, "It took him an extra year to get there."

"This is going to be something that we'll have to watch as more research comes out," Bates concludes. "But it might be something that we'll have to deal with on a more national or even international scale." ■

Susan Firey *is ACEC's senior communications writer. She can be reached at sfirey@acec.org.*

ACEC KANSAS

THE MEMBER ORGANIZATION'S FOCUS ON LEADERSHIP DEVELOPMENT AND ADVOCACY BENEFITS MEMBER FIRMS

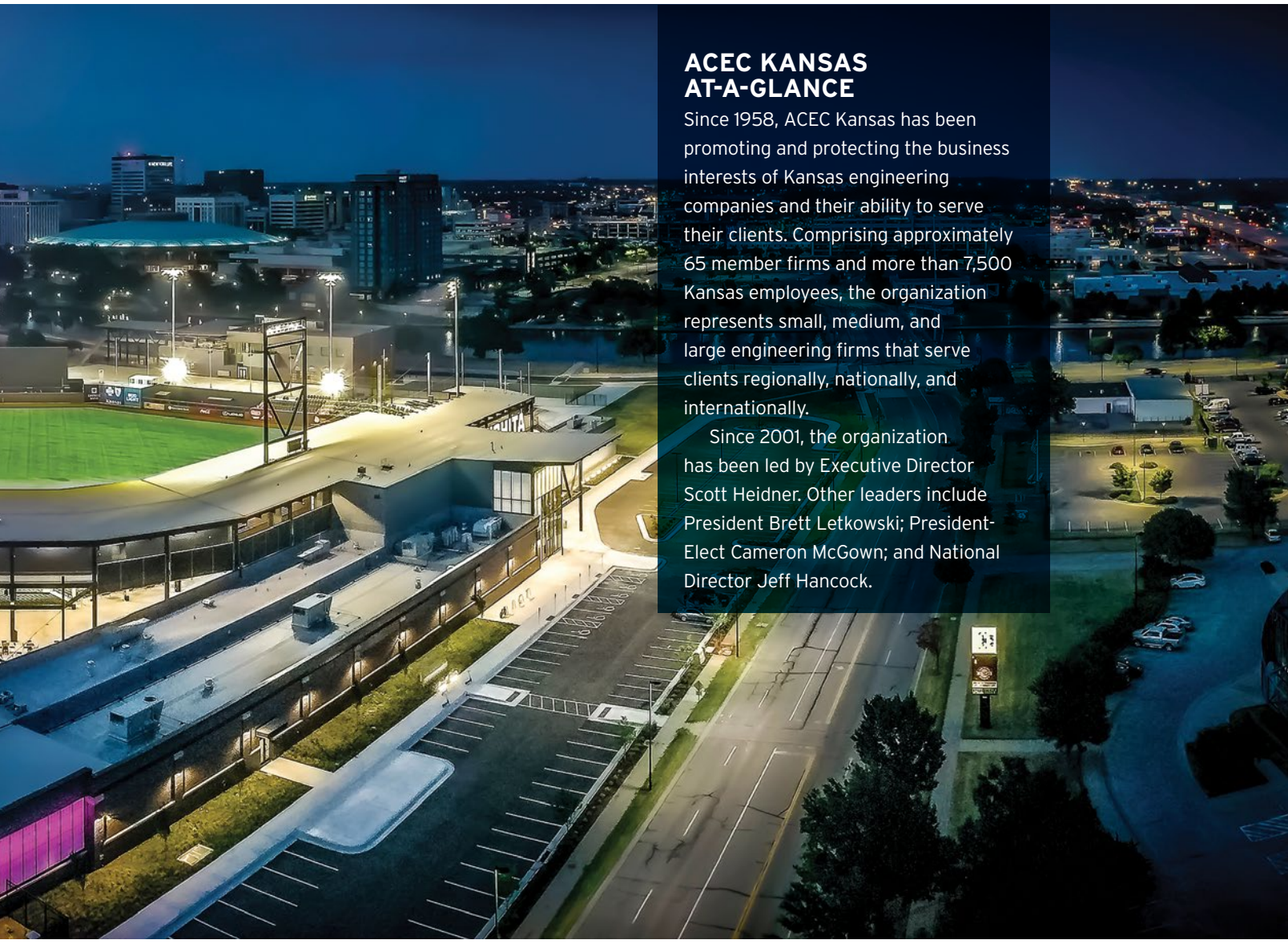
BY STACEY FREED

Scott Heidner, ACEC Kansas executive director and podcast host, aims to build connections with his program guests and direct their attention—and support—to some of the most critical issues facing the engineering industry. As one example, Heidner remembers the show he did with then-Kansas State Representative and Speaker of the House Ron Ryckman.

"We spoke about everything from his job as speaker to country music to sports to Qualifications-Based Selection (QBS)," says Heidner. "Three months after the podcast, he sent me a text message with a meme of a train traveling over a river on a collapsing wooden bridge. The text read, 'This is why I support QBS.'" Heidner maintains that the podcast helped Ryckman become more invested in the importance of QBS.

Over the past three years, Heidner has interviewed nearly two dozen people representing state agencies, as well as legislative, committee, local, and municipal leaders for ACEC Kansas' podcast, *The QBS Express.*

"The value of the podcast is in getting these folks to come and sit at an ACEC Kansas event and spend an hour or two with me and other organization leaders," Heidner says. "The guests feel appreciated, and the exposure and the relationships we create make an impact."



ACEC KANSAS AT-A-GLANCE

Since 1958, ACEC Kansas has been promoting and protecting the business interests of Kansas engineering companies and their ability to serve their clients. Comprising approximately 65 member firms and more than 7,500 Kansas employees, the organization represents small, medium, and large engineering firms that serve clients regionally, nationally, and internationally.

Since 2001, the organization has been led by Executive Director Scott Heidner. Other leaders include President Brett Letkowski; President-Elect Cameron McGown; and National Director Jeff Hancock.

SUPPORTING LEADERS AMONG US

The successful connections made by Heidner on the podcast underscore the power of partnership in relation to leadership. In 2006, Heidner participated in Leadership Kansas, an affiliate of the Kansas Chamber. Each year, Leadership Kansas selects 40 individuals to participate in its leadership skills program, which consists of training sessions in six communities in the state. During those sessions, participants meet with experts from a variety of fields to discuss topics such as business, education, agriculture, public policy, societal health and development, economics, and government. "My experience was extraordinary and impactful, and I saw an opportunity to build something similar for ACEC Kansas," Heidner says.

In 2007, he and the ACEC Kansas leadership team developed the organization's Emerging Leaders Program (ELP) for outstanding individuals in the A/E/C industry. The program runs from August through October each year, meeting for two days each month. Only 20 individuals are accepted into the program annually. They meet in person in various locations around the state. "Throughout the day, we have speakers who talk about topics such as leadership, business development, government affairs, risk management, human resources, and finance. And there are fun events at night," says 2015 ELP graduate Joe Surmeier, president and CEO of Professional Engineering Consultants (PEC) in Wichita.

Surmeier, who was PEC's division manager of municipal transportation and was mid-career when he went through ELP, says the experience was incredible and the networking was invaluable. "In the ELP program, you get to meet with people from other companies," Surmeier says. "Even though many are competitors, you come together and see each other as partners."

Surmeier says he still meets with five other participants every other month to talk about their companies.

Kansas House Minority Leader Vic Miller joins the ACEC Kansas podcast.

"Having the opportunity to partner with young leaders both in Kansas and other states has been the most fulfilling part of my ACEC Kansas career."

SCOTT HEIDNER
EXECUTIVE DIRECTOR
ACEC KANSAS

Four years after going through the ELP program, Surmeier became president of his company. He credits ELP with giving him the confidence and knowledge to take the leadership path. Now, as president, he continues the tradition by sending employees to the training. "I have a waiting list of those wanting to go," he says.

Surmeier chooses candidates based on "their position, experience, and who might benefit the most from the program," adding that he has noticed that ELP attendees gain experience and appreciate the value of networking. "They also speak up at meetings and are not afraid to disclose their ideas," he says. "They seem more confident."

Heidner says other Member Organizations have asked ACEC Kansas about opportunities to partner on developing leadership programs built on a similar set of values and objectives. "Having the opportunity to partner with young leaders both in Kansas and other states has been the most fulfilling part of my ACEC Kansas career," he says.

STAYING ON TOP OF LEGISLATION

The leadership program supports the Member Organization's legislative initiatives by encouraging ELP participants to meet with state representatives and senators to make their concerns and priorities known.

Heidner reiterates the importance of relationship building. "In the ELP, we teach participants that when meeting with legislators, they should invest in relationships first before asking them to look at something on our behalf," he says. "We encourage them to humanize their projects, show legislators the good that engineers do in the community, and find ways to be helpful. That allows them to become trusted experts for local and state officials."

Heidner works closely with Brett Letkowski, ACEC Kansas chapter president and senior vice president of TranSystems in Wichita, on legislative issues. The pair monitors issues and determines the best way to address legislators to influence positive outcomes for the Member Organization. This can mean testifying in person, or sometimes it means writing to legislators or contacting them by phone. Letkowski says that any member of the organization can testify.

ACEC Kansas closely tracks and lobbies dozens of bills and testifies on many of them. For illustration, ACEC Kansas is closely following three bills at the state level in early 2023: a bill meant to promote entrepreneurship, a bill regarding a vehicle registration fee that impacts transportation funding, and a bill that increases the on-call threshold for vertical work.

"Once we started asking questions, the state legislator embraced those suggestions and began working with us on improved language."

BRETT LETKOWSKI
CHAPTER PRESIDENT
ACEC KANSAS

2022 Emerging Leaders Program.

Kansas House Majority Leader Chris Croft talks to Executive Director Scott Heidner on the ACEC Kansas podcast.

"In the ELP program, you get to meet with people from other companies. Even though many are competitors, you come together and see each other as partners."

JOE SURMEIER
PRESIDENT AND CEO
PROFESSIONAL ENGINEERING CONSULTANTS

In the entrepreneurship bill, H.B. 2123, ACEC Kansas took issue with confusing language. The bill suggested that 5 percent of state work be awarded as a target to companies that have been in business less than five years and whose principal place of business is in the state of Kansas.

Letkowski and Heidner got in touch with the writer of the bill. "Did they mean 5 percent of every department? Did a subcontractor count? Was it for every state department or just specific ones? How would the Kansas Department of Transportation (KDOT) track it and award it?" Letkowski says. "There was no clarity in the language. We got them to see that they would be taking opportunities away from long-established firms, and that's not what they were intending to do. Once we started asking questions, the state legislator embraced those suggestions and began working with us on improved language."

ACEC Kansas also is testifying in person and in writing against the identical vehicle registration bills, S.B. 90 and H.B. 2148. These bills called for removal of a $4 fee that originally went toward DMV modernization. The fee was later repurposed as a funding source for state transportation infrastructure, raising $12 million to $13 million a year for transportation. "We don't want them to pull funds from our state infrastructure money," Letkowski says.

ACEC Kansas also testified in support of H.B. 2234, a bill that would increase the on-call threshold for vertical work for each individual company involved in a project. The on-call amount is $1 million per project, and the bill would raise it to $1.5 million per project. "With the costs of construction now, it's appropriate to raise that on-call," Letkowski says.

Aside from working with the legislature, ACEC Kansas has partnering committees with KDOT, the Corps of Engineers, and state agencies in vertical infrastructure, water, and many other areas. ACEC Kansas also works closely with the Kansas Society of Professional Engineers. "We team together a lot on legislation we want to chase," Letkowski says. "And we have a meeting as part of their annual meeting each year. Doing that is fairly unique to ACEC Kansas."

Overall, Heidner says the organization puts a lot of effort into being ahead of issues rather than reacting to them. His vision for the future? "I want to see our emerging leader graduates grow into the backbone and strength of grassroots lobbying efforts," he says. "In a perfect world, I'd like to see them run for office. We don't have one licensed engineer, surveyor, or architect in a legislative office. It's a void; our voice needs to be much more present." ■

Stacey Freed *is a writer based in Pittsford, New York, who has contributed* to This Old House, Professional Builder, *and* USA Today.

EMPLOYEE-LED BENEVOLENCE MAKES A HUGE

The building crew for Habitat for Humanity during an AAAE conference.

Staff participate in a Sleep in Heavenly Peace bed build at a C&S facility.

The C&S Foundation donates to Meals on Wheels in recognition of the firm's volunteer efforts.

IMPACT

C&S Companies shows its compassion through wide-ranging community assistance programs

BY MICHELE MEYER

There's a secret to inspiring employee engagement in a corporate social responsibility (CSR) program, according to C&S Companies: Take a personalized approach to giving by supporting the causes that mean the most to your staff.

"You should never underestimate someone's passion," says Terry Hopkins, administrative principal at C&S. "When they pursue personal passions, nothing will stop them."

Philanthropy has been central to C&S since the company was founded 55 years ago, and the A/E/C firm launched its Community Service Team (CST) in 2002 to formalize those efforts. Then in 2019, the C&S Foundation was formed to direct some of the company's profits toward charitable causes.

"Having a foundation opens up the number of nonprofits receiving grants," says Hopkins, explaining that funds can benefit 501(c)(3) tax-exempt nonprofits.

As foundation board members, Hopkins and 16 others in the firm's 20 offices encourage local largesse.

TEAM SPIRIT

Since 2003, C&S volunteers have contributed a total of more than 150,000 community service hours.

The Link, the firm's intranet, devotes a page to charity to inspire workers about ways to help and to commend those who do. Once a teammate logs 40 hours of service in a year on The Link, C&S donates $500 to the charity of the employee's choice. The company has donated $10,000 toward such causes since 2019.

Employees take the lead on CSR projects. "We trust our teammates to invest their time well, balancing work and community efforts," says CEO Michael Hotaling.

Hotaling isn't on the board of the foundation or the CST. That's by his and the committee's choice. "We feel those closest to communities should decide where dollars are invested," he says.

But leadership gets involved in other meaningful ways. Hotaling and other executives helped pack boxes for those in need when C&S's aviation team met recently in Portland, Oregon. "When we volunteer alongside teammates, it sends a strong message that we support their efforts to engage in their communities," Hotaling says.

Hotaling believes the culture at C&S is what makes it special. "We're a low-ego, noncorporate type of organization focused on core values of integrity, authenticity, and team spirit," he says. "I may be CEO, but we're all teammates."

C&S COMPANIES GIVES BACK

150,000+ community service hours logged in the past 20 years

1,500 hours served by 325 volunteers in 2022

$450,000 in C&S Foundation grants to 200 groups

$30,000 in matching gifts

$10,000 in donations to honor employees who volunteer 40+ hours in a year ($500 donated to each worker's organization of choice)

"You should never underestimate someone's passion. When they pursue personal passions, nothing will stop them."

TERRY HOPKINS
ADMINISTRATIVE PRINCIPAL
C&S COMPANIES

Employees build and sand a bed for Sleep in Heavenly Peace to support children in need.

COMMUNITY CAUSES

Emma Phillips, project planner at C&S, joined the firm in part because of its focus on impacting local communities. "As a planner, that's all you think about," she says.

Her goal is to volunteer one hour per week, though she's on track to surpass that in 2023. She even double-books herself: Recently, she planned a spin class fundraiser for Parkinson's disease and a 5K walk to raise funds for the homeless—on the same Saturday. That day of exercise raised $2,500.

Last May, after 10 people lost their lives in the Tops supermarket shooting in Buffalo, New York, Phillips knew she had to step up. She asked C&S, which has an office only two miles away from the store, for aid. The firm promptly agreed to match all employee contributions. With direct donations, Phillips bought food, diapers, and formula for families on the East Side of the city. "I'd deliver the groceries to the East Side, and in five minutes they were gone," she says. "People would grab bags out of my trunk."

Donations from staffers nationwide helped Phillips and her teammates provide groceries for weeks. "I learned that when C&S employees see a community in need, they jump to help," she says.

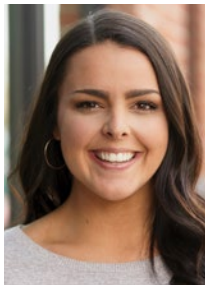
Another case in point: When a Syracuse, New York, staffer introduced the office to Sleep in Heavenly Peace, which builds beds for children in need, 40 employees joined a C&S bedding drive. They provided each child with pillows, a comforter, and a set of sheets and also raised $18,500 for the charity.

"Kids were sleeping on the floor, couches, and piles of clothes," says Hopkins, vice president of the C&S Foundation and a CST member. "Now those children have small spaces of their own—and their smiles were awesome."

When Hopkins was diagnosed with breast cancer in 2004, many in the Syracuse office united to support the Susan G. Komen Race for the Cure. "It was so heartwarming and empowering," she says.

The cause closest to home for Hotaling is Huntington's disease, which has affected members of his family. "I was blessed to be spared, but it's important to me to raise money for the Huntington's Disease Society of America," he says.

And the Cleveland C&S office has participated in the Leukemia & Lymphoma Society Light the Night event since a staffer's mother died of leukemia.



"I learned that when C&S employees see a community in need, they jump to help."

EMMA PHILLIPS
PROJECT PLANNER
C&S COMPANIES

C&S also supports the American Heart Association, local food pantries, The Salvation Army, and The Rescue Mission, a nonprofit for the homeless.

"When you find something that pulls at your heart, ask to do more," says Nick McLaughlin, an aviation service group manager and CST member. "I've never heard a community organizer say no to that."

WINNING WAYS

In 2007, the Mac, an annual award, was created to honor an employee who goes to great lengths to help others. The prize is named after former ACEC Chairman Orrin "Mac" MacMurray, a former C&S president and CEO.

"He was deeply engaged in helping the community—and still is," Hotaling says. "He helped us understand the importance of giving back."

The winner of the Mac award gets a plaque and $2,000 for the charity of their choice. Phillips won in 2022, McLaughlin in 2016, and Hopkins in 2011.

All were surprised that they won.

"When you do things for your community, you don't do it for recognition," Phillips says. "You do it because it's the right thing to do." ■

Michele Meyer *is a management and marketing writer based in Houston. She has written for* Forbes, Entrepreneur, *and the International Association of Business Communicators.*

C&S mentors support students throughout the summer.

Employees volunteer at the Oregon Food Bank in Portland.

Staff supports HomeAid San Diego on an awareness and fundraising walk.

Teammates have fun with 'canstruction' in Phoenix to support a local food bank.

"We feel those closest to communities should decide where dollars are invested."

MICHAEL HOTALING
CEO
C&S COMPANIES

"When you find something that pulls at your heart, ask to do more. I've never heard a community organizer say no to that."

NICK MCLAUGHLIN
AVIATION SERVICE GROUP MANAGER
C&S COMPANIES

3 WAYS TO INSPIRE GIVING

Galvanize charity work at your firm with these strategies from C&S Companies:

1. THINK BIG—BUT START SMALL.

You can't solve the world's hunger crisis, but you can donate to food banks in your office's community. And you can show support by matching workers' donations. "If you can't match $500, match a smaller amount," says C&S Administrative Principal Terry Hopkins.

2. EMPOWER EMPLOYEES.

Employee-led giving has more impact. Allow staff to select charities they care about and participate in fundraising or volunteer events. "We put people before profit at C&S," says Aviation Service Group Manager Nick McLaughlin. "That may be new for some companies, but it has always been true at C&S in the years I've worked here."

3. ADD A DAY FOR GIVING WHEN TRAVELING FOR BUSINESS.

On work trips, encourage employees to volunteer for a charity that matches the passions they pursue at home, says CEO Michael Hotaling. "It's our responsibility to help people who aren't as fortunate have better lives," he says.

MODEL TRIBAL SURVEYING SYSTEM CHARTS NEW PATHS

THE DECADE-LONG PROJECT WAS THE RESULT OF COLLABORATION BETWEEN NATIVE AMERICAN TRIBES, STATES, AND FEDERAL AGENCIES TO IMPROVE LAND MAPPING CAPABILITIES.

BY JASON BURKE

"This wind is playing havoc with my base antenna."

It was -20°F without the wind chill, and the frigid gale whipping across the prairie was not only blasting cold through the surveyor's overalls but also threatening to shut down the whole job. It was just another winter survey in Montana, when construction halts and it's time to catch up on field work—in this case supporting an award-winning decade-long project to enable state and tribal land mapping.

Since 2010, a coalition of Native American tribes along with state and federal agencies have been assembling Low Distortion Projections (LDPs), cross-origin resource sharing (CORS) base stations, and real-time survey-grade networks across Montana and Wyoming to improve cadastral and Geographic Information System (GIS) mapping capabilities in traditionally underserved regions.

In partnership with the Montana office of Northern Engineering & Consulting Inc. (NECI), the result has been more than anyone involved in the project envisioned when it began. A string of awards over the past 10 years speaks to its significance, the efforts put into it, and the impact the project has on tribal communities today and in the future.

Those associated with what became known as the Tribal Mapping Project point to the late "Big John" Smith as inspiration behind it. Until his death in 2016, Big John's role as the Eastern Shoshone/Northern Arapaho Transportation Director revealed a lack of tribal members in the construction and surveying crews.

Smith asked his team, "Where are our surveyors? Why are we sending this work off the reservation?" At the same time, as illustrated by Michael Dennis, geodesist for the National Geodetic Survey, there were several shortcomings with traditional coordinate systems which particularly affected tribal lands due to their remoteness and location in large states such as Montana and Wyoming. "State Plane Coordinate Systems were developed to simplify surveying, which they do," Dennis notes, but mountainous topography "creates a compromise between simpler coordinate systems and the number of those systems in use in a particular state."

Howard Brown, Big John's successor at the Wind River Inter-Tribal Council, transportation director for the Eastern Shoshone and Northern Arapaho tribes, and a member of the national Tribal Transportation Program Coordinating Committee, notes that the Tribal Mapping Project wasn't just about construction or public land maps. He says the cooperation required to build it has led to "one of the best relationships between tribes and states in the country."

Brown emphasizes that without consensus, compromise, and trust between the groups, projects such as this would simply not be possible. Dennis agrees. "There is always resistance to new technologies and systems," he says, noting that there are also opportunities to share resources and knowledge.

THE PROJECTION PROJECT

The impetus for local projections has been known for as long as mapping has existed—how to accurately depict a two-dimensional network against the ellipsoid shape of Earth. Historically, surveying measurements were performed directly on the ground, with steel chains eventually giving way to radio and laser. But the measurements merely improved in precision, not in fundamental approach—surveyors still moved from one point to another, sequentially traversing and turning angles.

GPS has since provided vastly greater capability, but it has introduced new sources of error. Now, locations are measured indirectly by a receiver and the orbiting satellite network. From radio signals and a thousand calculations, a receiver reports location in latitude and longitude or other units depending on the chosen coordinate system—but how accurate are these values?

"The people network is as important as the survey network, if not more."

HOWARD BROWN
TRANSPORTATION DIRECTOR
EASTERN SHOSHONE AND NORTHERN ARAPAHO TRIBES

In practice, the surveyor requires a network of known points against which to compare new measurements, but unfortunately, in remote or mountainous areas, such known points have been few and far between. Also, distortion between the traditional State Plane Coordinate System and Earth's elliptical shape causes undesirable errors and additional work to resolve. The expectations of modern cadastral records, construction tolerances, and large projects required additional calculations to perform even the simplest surveys on remote lands.

With limited staff and few resources available who understood traditional surveying, a new system was desperately needed for tribal lands.

BLAZING A TRAIL TO A DECADE OF AWARDS

Paul Azure, a veteran of the Bureau of Indian Affairs and now a supervising engineering tech for the Fort Peck Reservation, has been involved with transportation projects since 1992 and was instrumental in the Tribal Mapping Project. Portrayed in our opening paragraph, he has been on the front lines of design and construction in challenging environments. "GIS is everywhere now—from city utilities to self-driving cars," Azure says. "We want all tribal groups and departments to benefit [from accurate mapping]."

Further, he sees modern technology as key to the younger generation. "There aren't many surveyors out here in tribal communities," Azure says. "We need to hold on to those interested in GIS and GPS technology. These new

EKOLARA/GETTY IMAGES

systems are user-friendly and take advantage of the younger generation's comfort with computer technology."

The project began in 2012 with development and implementation of LDPs across four reservations, winning an ACEC Engineering Excellence Award in 2013. Montana's Fort Peck, Fort Belknap, and Blackfeet tribes, along with the Wind River tribe in Wyoming, worked with Dennis and NECI to produce LDPs suitable to accommodate land far from each state's central meridian (*see figure 1 below*). With LDPs available for each reservation, tribal surveys improved the accuracy of their measurements to match the precision available from modern equipment (*see figure 2 below*). Dennis notes this wasn't particularly complicated but required the "acceptance of multiple projections where there used to be just one."

Another award followed in 2015 when the team expanded to include Montana's Crow tribe and develop a handbook to educate new surveyors and other users of the network. The handbook provides guidance to surveyors and engineers to follow in the tribes' footsteps, using LDPs on future projects and training the next generation. The effort also fostered engagement with additional agencies, including the department of transportation and Marion County surveyors from the state of Oregon, who had prior experience with smaller local projections.

More recognition came in 2018 and 2020 with the incorporation of CORS stations and a Real-Time Network (RTN) (*see figures 3a and 3b on page 41*). The project took on a life of its own as more state agencies became involved—Montana Department of Transportation (MDT), the State Library GIS Department, Montana Association of Registered Land Surveyors, State of Washington GIS and RTN managers, and even private agricultural ventures who would make use of the finished product.

Several public agencies have since recognized the value of the tribes' work and have collaborated to further improve accuracy and usability for the public. To build an accurate GIS base, tribal nations, the states of Montana and Wyoming, the United States Geological Survey, the Natural Resources Conservation Service, the Federal Emergency Management Agency, the U.S. Fish and Wildlife Service, and the National Park Service partnered to conduct aerial lidar surveys over more than 10,000 square miles of tribal lands, providing detailed, easily accessible data to support development and resource conservation projects (*see figure 4 on page 41*). With this foundation, anyone surveying, designing, or mapping GIS data can coordinate and associate many projects onto one base and access it from anywhere in the world.

Robert Holliday, GIS analyst with the Montana State Library, notes that data becomes more valuable every year. "It's streamlined the grant process for projects requiring mapping," Holliday says. And "much larger projects—spanning whole counties or reservations" can be mapped with greater accuracy.

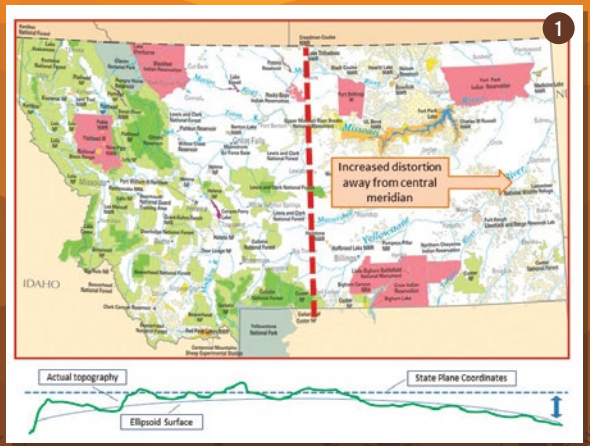
Holliday recognizes the value of the relationships built and reinforced as the project evolved. "Surveying is built on trust," he says. There is much greater trust and collaboration between the indigenous tribes and state agencies, such as the library which hosts the public GIS data, and MDT, which is more open to sharing data and assistance.

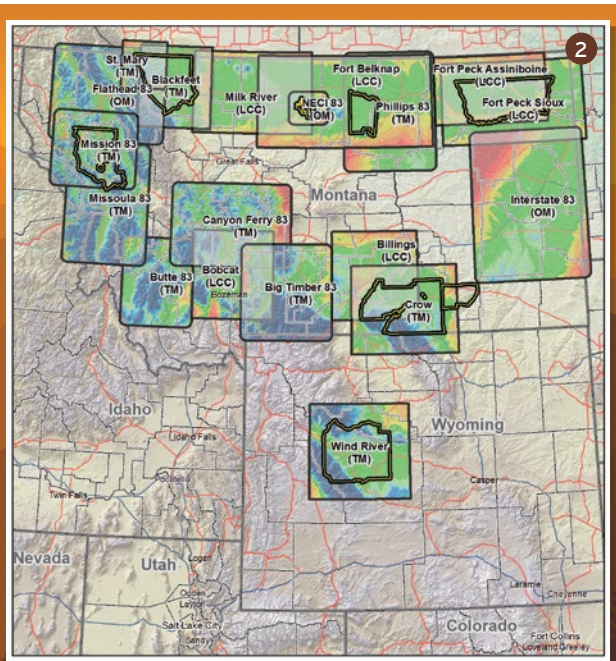
Involved in the project from 2016 to 2020, Harry Barnes, former Blackfeet Tribal Council Chairman, praised the project's value to the tribe and infrastructure improvements. The work clarified land boundaries, Barnes says, which few people paid attention to in the past. "Leadership requires accurate data, which the mapping project provided," he says. But ultimately, it's "all about relationships."

"Surveying is built on trust."

ROBERT HOLLIDAY
GIS ANALYST
MONTANA STATE LIBRARY

Figure 1: A map of the linear distortion due to Earth's curvature and ground height above the ellipsoid. Figure 2: Low Distortion Projections in Montana and Wyoming improved Geographic Information System mapping capabilities in underserved regions.





EKOLARA/GETTY IMAGES

His colleague, Blackfeet Transportation Director Donny White, also sees value in addition to the basic survey network. "We can employ and train interns from the tribes to help rebuild lost maps," White says, adding that the project "raises our capability to take on any project."

Several state and federal projects benefited from the connections and trust built between tribes and other government agencies. Barnes highlighted state and federal work, Highway 89 to the Canadian border, Glacier National Park, and other inter-jurisdictional road projects that have benefited from the alliances formed along with the survey network.

NOT WITHOUT RESISTANCE

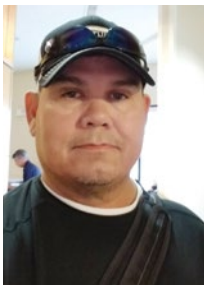
With each passing year, the project increases its usability and applicability, which stands in stark contrast to the initial resistance and even disbelief that such a system was even possible as recently as 10 years ago.

As straightforward as the techniques and technology have been, coordinating tribal councils, state land managers, federal agencies, and even international mapping bodies proved a greater challenge. Agreement and partnership did not come easily, as firms limited distribution of mapping products to the minimum required by regulation or project clients. And with some work on the system being somewhat experimental, it was difficult to fold into paying projects.

Achieving progress on the RTN, even with prior successes on the LDP and the handbook, required trust and willingness to share uncompensated work—to a degree considered unusual and even unprecedented between many of the groups involved. Perseverance on the part of the key players led to realization of the project and solidified bonds for the future.

NEW RELATIONSHIPS FOR A NEW GENERATION

Surveying as a profession has always been critical to land development, but it took more visionary stakeholders to see it as more than just a routine step in the process. In assembling groups to execute this project, it was difficult for the champions to convince others that this was more than just a "nice-to-have" for another road project. Brown of the Wind River tribe puts it this way: "The people network is as important as the survey network, if not more."



"There aren't many surveyors out here in tribal communities. We need to hold on to those interested in GIS and GPS technology."

PAUL AZURE
SUPERVISING ENGINEERING TECH
FORT PECK RESERVATION

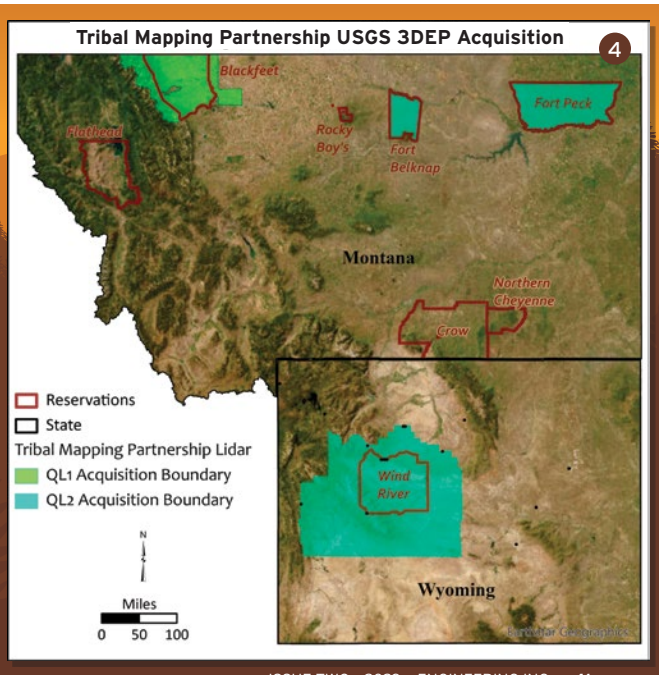
Brown adds that the tribes have historically been years behind in technology and capability. This project builds not only credibility but also trust in the tribes' commitment to progress. "This is just the beginning, even though it has taken four or five years of relationship-building," he says.

Of course, it saves money on many projects, but the real value is in the mutual reliance that the states and tribes have formed with each other.

As a new generation of surveyors and engineers enters their professions, they have the benefit of the foresight of their elders brought into reality through the Tribal Mapping Project and a foundation for conservation as well as construction through GIS systems dependent on it. ■

Jason Burke *is an engineering consultant for Kalium Resources in Billings, Montana, providing professional, technical, and management consulting services to global mining and industrial clients. Burke also is a veteran civil engineering industry writer.*

Figure 3a: Tribal surveyors search for PLSS corners with the Bureau of Indian Affairs land surveyor using the Real-Time Network in the Crow Coordinate System. Figure 3b: Rick Ollinger, a Blackfeet surveyor, searches for PLSS corners using the Blackfeet Coordinate System. Figure 4: The collaboration between tribal nations, the states of Montana and Wyoming, and several U.S. federal agencies, made it possible for anyone surveying, designing, or mapping GIS data to coordinate data into one base and access it anywhere.



THE FLOW OF INNOVATION

MEMBER FIRMS' WATER TREATMENT PROJECTS BOOST CAPACITY WHILE DELIVERING ENVIRONMENTAL GAINS

BY STEVE HENDERSHOT

THE WOOTEN COMPANY
THOMAS & HUTTON
WADE TRIM

PHILIP THURSTON/GETTY IMAGES

Two one-million gallon tanks store reserve finished water onsite.

In the finishing stages, calcite contact beds introduce minerals to the water.

These reverse osmosis trains treat brackish water withdrawn from aquifers.

A UTILITY DISTRICT DODGES PFAS BY DIGGING DEEP

Charlie Davis
Director of Marketing and Business Development
The Wooten Company

Bob Walker
Executive Director
H2GO

PROJECT: TAPPING AQUIFERS TO DELIVER CLEAN DRINKING WATER, BRUNSWICK COUNTY, NORTH CAROLINA

FIRM: THE WOOTEN COMPANY RALEIGH, NORTH CAROLINA

The threat to public health posed by per- and polyfluoroalkyl substances (PFAS), a set of compounds known as "forever chemicals," is affecting communities nationwide. But in Northeast Brunswick County, North Carolina, there's a particular urgency because up-stream introduction of PFAS subsequently contaminated the neighboring Cape Fear River.

When the news broke in 2017, it had the makings of a public health crisis—except that local officials were already at work on a project to provide a new source of clean drinking water separate from the river.

Brunswick Regional Water and Sewer H2GO, a self-governing public utility, was working with The Wooten Company on a high-pressure reverse-osmosis system that could extract brackish groundwater from aquifers up to 550 feet below ground. The project was originally conceived with long-term cost savings in mind, but H2GO's leaders also appreciated that the water in the aquifers had been there for hundreds of years and was untainted by contaminants.

"I'd like to say that we were ahead of the curve and saw PFAS coming," says Bob Walker, H2GO's executive director. "But we did know that there were vulnerabilities with the river and that with this approach, we would be protected. So when PFAS came out and everybody started scrambling, we were just kind of sitting back thinking, 'We're good.'"

The Wooten team devised a system capable of providing 6 million gallons of clean drinking water per day, with capacity for future expansion to 8 million gallons per day. It draws water from five sites, each consisting of two nested wells.

At its peak, the system boost-pressurizes the water at 380 pounds per square inch before passing the water through membranes that separate out the brackish salt content. The residual material is also free of contaminants and can be safely discharged into the river.

The system not only benefits the communities H2GO serves but also provides a blueprint for other coastal areas that could use high-pressure reverse osmosis to tap aquifers as a drinking water source. H2GO's system is set to go online in summer 2023.

"It shows that if you can do a project like this successfully, it can support sustainable growth and protect the environment," says Charlie Davis, director of marketing and business development at Wooten. "If treating groundwater can effectively reduce reliance on contaminated surface water, it might open up options for other areas, too."

A SHUTTERED TREATMENT SITE GETS A SECOND CHANCE

Chris Stovall
Environmental Group Leader
Thomas & Hutton

Trent Thompson
Principal and Vice President of Infrastructure
Thomas & Hutton

PROJECT: TRAVIS FIELD WATER RECLAMATION FACILITY
SAVANNAH, GEORGIA

FIRM: THOMAS & HUTTON
SAVANNAH, GEORGIA

In 2011, the city of Savannah moved on from its small Travis Field Water Reclamation Facility in favor of a new, modern, and expandable facility located on a spacious 12-acre plot. Travis Field was mothballed, its flow transferred to the new facility.

But Savannah's population has grown substantially over the last decade, taxing the region's infrastructure—while state and federal environmental regulators have placed limits on the amount of treated wastewater that each facility can release into the Savannah River.

Local leaders proposed the idea of revisiting the Travis Field site, which retained an active National Pollutant Discharge Elimination System permit. Savannah needed to add a lot of capacity, though, and the Travis Field site occupied just three acres.

So Thomas & Hutton devised a solution that used membrane bioreactor (MBR) technology to give the Travis Field facility a second life. The treatment process includes moving effluent through anoxic, aeration, and digestion processes before ultimately filtering it through membrane bioreactors.

The project began with the removal of existing equipment and materials, followed by the construction of the new facility, including the conversion of an existing on-site lift station into the new facility's influent pump station.

MBR technology is effective but expensive. But thanks to project efficiencies and careful selection of an MBR vendor, Kubota, the project ultimately cost about the same as it would have to expand the 12-acre site that had replaced Travis Field.

"It ended up being kind of a slam dunk to be able to do it this way," says Chris Stovall, environmental group leader at Thomas & Hutton.

Still, building the new facility wasn't the project's only challenge. The team also needed to run a new effluent line to the Savannah River, which meant navigating land controlled by the Georgia Air National Guard, multiple freight carriers at the Georgia Ports Authority, and a Chatham County canal, as well as working around several major roads in an area with heavy truck and container traffic.

"There are always little fun things you get to deal with on every project," says Trent Thompson, principal and vice president of infrastructure at Thomas & Hutton. "This one had many of those."

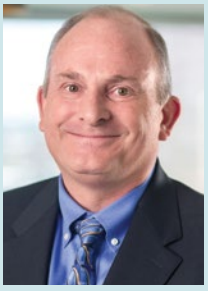
The new Travis Field facility began operations in late 2022.

The revived Travis Field facility uses membrane bioreactor technology to treat wastewater to reclaimed standards.

The VPSA Facility and the city of Miami in the background.

VPSA blowers, silencers, and switching equipment.

VPSA adsorbers, low pressure vessels, and valve skid.



Jeff Lowe
Vice President and Principal Engineer
Wade Trim

PROJECT: ENHANCED OXYGEN CAPACITY, CENTRAL DISTRICT WASTEWATER TREATMENT PLANT VIRGINIA KEY, FLORIDA

FIRM: WADE TRIM CORAL GABLES, FLORIDA

A NOISY UPGRADE GETS THE SILENT TREATMENT

When Florida's Miami-Dade County Water and Sewer Department set out to upgrade the oxygen capacity of its Central District Wastewater Treatment Plant, the department's leaders settled on vacuum pressure swing adsorption (VPSA) as the technology they wanted to deploy.

VPSA works by adsorbing nitrogen, water, and carbon dioxide from the air, then filtering the remaining air molecules to produce richer oxygen. It's an energy-efficient way to accomplish what the department wanted: sustainable capacity to support its high-purity oxygen advanced wastewater treatment process.

The challenge for Wade Trim was integrating the VPSA to work with the county's existing wastewater treatment plant cryogenic system, which is located on Virginia Key, a small island a couple of miles from downtown Miami and nestled between two of the region's toniest residential areas, Key Biscayne and Fisher Island. And quiet operation is seldom listed among the virtues of VPSA.

"It's as loud as a dragster taking off down the drag strip," explains Jeff Lowe, vice president and principal engineer at Wade Trim.

Lowe's team had to reduce the volume level from about 115 decibels down to 85 within 3 feet of the facility's exterior and 58 decibels at 500 feet from the building. They worked with a sound engineer to devise a plan that included adding thick concrete walls, sound absorption material on the intake and exhaust louvers, vibration isolation and sound-attenuating doors and windows, as well as isolating the floor from the rest of the building.

"Sound became a large part of this project to a degree that we hadn't anticipated," Lowe says. "Slowly but surely, we became experts on the topic."

Another engineering victory: Wade Trim worked with the VPSA manufacturer, Caire Inc.'s AirSep division, to modify its product by including a side discharge rather than a top discharge. That change enabled Wade Trim to reduce the height of the building by approximately 10 feet, saving money for the county.

Once the project was completed early last year, Miami-Dade's treatment plant benefited not only from lower operating costs and more dependable oxygen capacity but also from added resiliency. That's because both VPSA units were shielded from sea-level rise and severe weather-related threats and incorporated into the plant's enhanced standby power supply plans.

Hugh K. Leatherman Terminal Phase 1 Site Development

North Charleston, South Carolina

The $1 billion, 135-acre Hugh K. Leatherman Terminal Phase 1 is the nation's first completed greenfield container terminal in the last decade. The flagship facility of South Carolina Ports Authority (SC Ports), it features a 1,400-foot berth, a 47-acre container yard that accommodates 700,000 twenty-foot equivalent (TEU) containers, some of the tallest cranes on the East Coast, 25 hybrid gantry cranes, a refrigerated container yard, new operating systems, and enhanced technologies. It's also designed for expansion. At full build-out, the development will double the port's capacity with a 286-acre, 3-berth, 2.4 million TEU terminal.

Opened at a time when the world became concerned with supply chains, the new terminal provided SC Ports capacity to prevent backlogs. It is a critical hub for the South Carolina Port Authority, which contributes more than 225,000 jobs and $63 billion in annual economic impact.

The project team broke the mega project into five discipline-based contracts: wharf, site work, two bridge contracts, and buildings and canopies. Combined with value engineering, these efforts saved $39 million and provided opportunities for South Carolina-based firms to complete the work.

The effort also reduced impacts on the environment. SC Ports restored Drum Island into a natural oasis with more than 100,000 native plants. At the Terminal, five electric ship-to-shore cranes and 25 hybrid rubber-tired gantry cranes reduce emissions while efficiently moving cargo.

Twenty years in the making, the project overcame significant challenges, including 70 feet of unsuitable mud, an unimaginable quantity of materials, seismicity and high wind speeds, and potentially exposure to World War 2-era bombs on the former Navy base. It enhances SC Ports' ability to handle growing cargo volumes and the largest vessels calling the East Coast, keeping South Carolina globally competitive for decades to come.

2023 ACEC Engineering Excellence Grand Award Winner

After Record-Setting 2022, M&A Market Still Favors Sellers

BY NICK BELITZ

Booming backlogs, soaring valuations, a generational retirement wave, and fierce demand for talent fueled a record-breaking year for A/E industry deal-making in 2022. Robust demand for deals among buyers and sellers of all shapes and sizes propelled mergers and acquisitions to an all-time high of 466 U.S. transactions last calendar year, a 7 percent increase over 2021's then-record volume. More than 100 deals were announced in every quarter of 2022.

A degree of economic uncertainty caused by emerging geopolitical concerns, supply chain instability, persistent inflation, and rising interest rates delivered a slight cool-off in overall A/E industry mergers and acquisitions (M&A) activity in the closing months of 2022, but it's important to note that it's a *relative* slowdown in deal-making. The pace of transactions in the latter months of 2022 still eclipsed the tallies during the same time period just a few years ago.

The market for engineering firms continues to favor sellers, although buyers are becoming more cautious in pursuing companies located in cooling geographic regions that derive a large portion of their revenue from markets, such as land development, that are heavily reliant on private funding and lower interest rates.

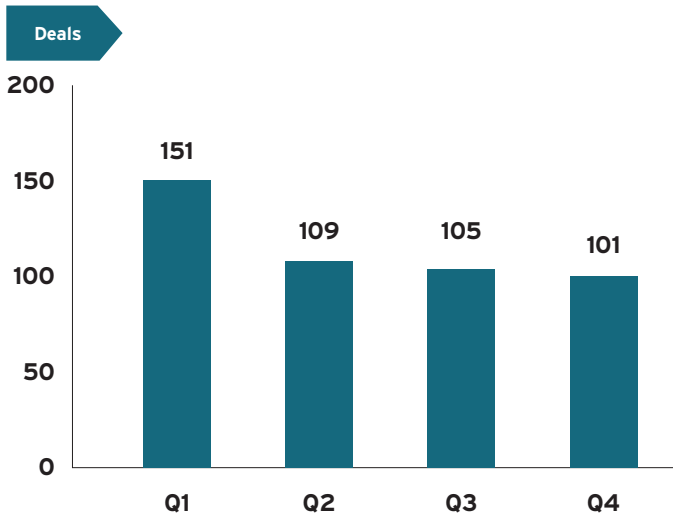
As recent transactions involving ACEC members can attest, however, there continues to be intense competition among well-positioned buyers for engineering firms serving infrastructure markets such as transportation, water/wastewater, environmental, and broadband power. A succession of acquisitions of infrastructure engineering firms kept the pace of announced deals involving ACEC members humming as the calendar turned to 2023.

Member firms ranked on the *Engineering News-Record (ENR)* 500 have been particularly busy. A record 45.6 percent of industry transactions involved *ENR* 500-ranked companies in 2022. In late 2022 and early 2023, **Pennoni** (Philadelphia), **IMEG** (Rock Island, Ill.), **Bowman Consulting Group** (Reston, Va.), **NV5** (Hollywood, Fla.), **Salas O'Brien** (Santa Ana, Calif.), and **Atwell** (Southfield, Mich.) were the most active ACEC member deal-makers.

The industry's biggest firms, though, weren't solely sellers. Twenty-one organizations on the *ENR* 500 were acquired in 2022, including the December purchase of **Greeley and Hansen** (Chicago) by **TYLin** (San Francisco) (*ENR* #31). In addition, **Verdantas** (Dublin, Ohio) announced its acquisition of **Borton-Lawson** (Wilkes-Barre, Pa.) (*ENR* #466) and its subsidiary, Precise Visual Technologies, just after the new year.

Buyers continue to be drawn to the Sun Belt by the growing populations and infrastructure budgets. The Southeast alone accounted for 27 percent of all domestic transactions in 2022. The market in Florida was particularly hot, with 10 deals in the Sunshine State that involved ACEC members announced in the last several months, followed by nine in California and six in Texas.

2022 U.S. DEAL ACTIVITY BY QUARTER



Private equity-backed companies accounted for one-third of all industry deals in 2022, and they continued to be active players in the marketplace for ACEC firms as the calendar turned to 2023. In January, private equity firm OceanSound Partners made a strategic investment in **Gannett Fleming** (Camp Hill, Pa.). Weeks later, one of the most prolific buyers in the A/E/C industry was itself acquired when private investment firm Littlejohn & Co. partnered with the management and employees of **Ardurra Group** (Tampa, Fla.) to purchase the firm.

A repeat of the unprecedented M&A activity seen in 2022 seems unlikely, as the current macroeconomic and financing environments continue to create uncertainty and constraint for deal-makers. Still, with the need to expand and improve U.S. infrastructure only projected to grow and industry backlog levels standing at unprecedented levels, expect deal volumes to remain well above pre-pandemic levels for the foreseeable future.

Deal-making in 2023 is on track to match the historically elevated volume of 2021, which was the second-best year on record and a step-function higher than the years preceding it. The record-setting M&A activity of the last two years has created scarcity and super-heated competition for the sellers that

remain. And once money from the Infrastructure Investment and Jobs Act finally arrives in earnest, demand for engineering firms working in infrastructure markets will only escalate.

Following is a list of recent transactions, with ACEC members highlighted in **bold**.

FEBRUARY 2023

Engineering, planning, and construction firm **KCI** (Sparks, Md.) (*ENR* #48) acquired National Telecom Design (Fredericksburg, Va.), a firm focused on the telecom industry with experience in the design and installation of aerial and underground fiber.

Architecture, engineering, environmental, and planning firm **ISG** (Mankato, Minn.) (*ENR* #250) acquired architecture and interior design firm ETHOS Design Group (Ankeny, Iowa).

Geotechnical, environmental, ecological, water, and CM services firm **GZA GeoEnvironmental** (Norwood, Mass.) (*ENR* #130) acquired Equity Environmental Engineering (Mount Olive, N.J.), a planning and environmental consulting firm.

Multidisciplinary consulting firm **Pennoni** (Philadelphia) (*ENR* #95) acquired certain assets of Andersen Engineering Associates (Sellersville, Pa.), a firm that provides engineering and surveying services to municipal, institutional, commercial, and private sector clients.

Merrick & Company (Greenwood Village, Colo.) (*ENR* #113), a leading employee-owned engineering, architecture, surveying, and geospatial solutions firm, acquired Mountain Waterworks (Boise, Idaho), a firm that specializes in water/wastewater engineering.

Bennett Surveying (Chouteau, Okla.) joined civil engineering, structural engineering, and landscape architecture firm **Wallace Design Collective** (Tulsa, Okla.) (*ENR* #393).

Private investment firm Littlejohn & Co. (Greenwich, Conn.) partnered with management and the firm's employees to acquire one of the most prolific acquirers in the A/E industry, **Ardurra Group** (Tampa, Fla.) (*ENR* #114).

JANUARY 2023

Atlas Technical Consultants (Austin, Texas), entered into a definitive agreement to be acquired by private investment firm GI Partners (San Francisco).

NV5 (Hollywood, Fla.) (*ENR* #24) acquired Bromley Cook Engineering (Fort Lauderdale, Fla.), a firm that provides forensics, specialty structural engineering, and waterproofing services to support facilities and infrastructure projects.

HUNT Engineers, Architects, Land Surveyors & Landscape Architect, DPC (Horseheads, N.Y.) acquired **Shumaker Consulting Engineering and Land Surveying** (Binghamton, N.Y.), a civil and environmental engineering and geomatics firm.

Rossi Transportation Group (Hunt Valley, Md.), a consulting firm providing civil and transportation engineering and planning services, acquired Rybinski Engineering (Kennett Square, Pa.), a firm specializing in traffic engineering services for U.S. DOT-funded projects in the mid-Atlantic.

Multidisciplined professional consulting and design firm **H2M architects + engineers** (Melville, N.Y.) (*ENR* #209) acquired water, wastewater, environmental, and civil engineering firm Crew Engineers (Butler, N.J.).

SWCA Environmental Consultants (Phoenix) (*ENR* #126) acquired Terra Verde Environmental Consulting (San Luis Obispo, Calif.), an environmental consulting firm that serves the energy, utility, and government sectors.

HMB Professional Engineers (Frankfort, Ky.), a civil engineering and environmental planning firm, acquired Municipal Engineering Company (Frankfort, Ky.), a civil engineering firm.

Trilon Group (Denver), a family of infrastructure consulting businesses, announced a strategic partnership with **Wilson Engineers** (Tempe, Ariz.), an engineering firm focused on water, municipal, and disaster recovery services.

RINA (Genoa, Italy), an inspection, certification, and engineering consulting firm, entered the U.S. infrastructure market with the acquisition of **Patrick Engineering** (Lisle, Ill.) (*ENR* #214), an engineering firm focused on infrastructure, transport, and renewable energy sectors.

Engineering and design firm **Olsson** (Lincoln, Neb.) (*ENR* #74) acquired Nielsen-Baumert Engineering (Omaha, Neb.), a firm that specializes in structural engineering analysis and design of commercial, educational, institutional, and industrial facilities, in addition to civil and restoration projects.

Legence (San Jose, Calif.), a firm that provides advisory and implementation services, acquired three firms in the Western United States: MEP engineering firm Shadpour Consulting Engineers (San Diego), design-build mechanical contracting firm Trinity Process Solutions (Anaheim, Calif.), and MEP engineering firm **KLOK Group** (Golden, Colo.).

Urban planning, design, and architecture firm Waggonner & Ball (New Orleans, La.) joined infrastructure advisory firm **Moffatt & Nichol** (Long Beach, Calif.) (*ENR* #82). The combination advances Moffatt & Nichol's capability to offer integrated resilience solutions.

Multidisciplinary consulting firm **Pennoni** (Philadelphia) (*ENR* #95) announced the purchase of assets of Van Note-Harvey Associates (Princeton, N.J.), an engineering, environmental, planning, and land surveying firm.

Dufoe Consulting Engineers (San Diego), a mechanical engineering firm that offers HVAC, control systems, plumbing, and fire protection services, joined fast-growing facilities planning and design firm **Salas O'Brien** (Santa Ana, Calif.) (*ENR* #78).

Provider of technology-enabled laboratory testing, inspection, and quality management services **RMA Group** (Rancho Cucamonga, Calif.) (*ENR* #182) acquired C Below (Chino, Calif.), a firm focused on technology-enabled underground utility locating services. ■

To view the most up-to-date and "live" versions of the M&A heat maps, and to see who are the buyers and sellers in each state, go to www.morrisseygoodale.com.

Nick Belitz is a principal with Morrissey Goodale, LLC, a management consulting firm that specializes in the A/E industry and provides strategic business planning, merger and acquisition, valuation, executive coaching, leadership development, and executive search services. He can be reached at nbelitz@morrisseygoodale.com.

On the Move

Chicago-based **Clark Dietz** announced the following leadership appointments: **Wes Christmas** was named president and chief executive officer, succeeding retiring chief executive **Chip Craddock**. **Jerry Payonk** was named chairman of the board; **Sean Widener** was named senior vice president and Illinois regional director; **Kevin Hetrick** was named senior vice president and Indiana regional director; and **Mustafa Emir** was appointed executive vice president, Wisconsin regional director, and director of business development.

Darren K. Riegler has been appointed president and chief executive officer of Santa Barbara, California-based **MNS.** Prior to joining MNS, Riegler served as a senior vice president at Michael Baker International and was responsible for the management and growth of various geographies including Southern California, Arizona, and New Jersey.

Eric Michel has been named chief executive officer of **KLJ Engineering LLC (KLJ),** succeeding previous CEO Barry Schuchard, who passed away in March 2021. Michel brings decades of construction, engineering, and leadership experience to the role. Michel returns to KLJ, having previously served as the company's vice president of energy and natural resources. He is past president of ACEC North Dakota and a current member of ACEC/MN. Michel is based out of the firm's Saint Paul, Minnesota, office.

Chad Heimbigner was named chief operating officer at Spokane, Washington-based **Coffman Engineers, Inc.** Heimbigner joined the firm in 2009, and currently provides principal leadership for the Spokane office and civil engineering group and the Northwest Region marketing team.

Christopher E. Brazell was promoted to chief operations officer of Savannah, Georgia-based **EMC Engineering Services, Inc.** Brazell has been with EMC for 21 years and is a licensed professional engineer in 33 states, as well as a professional land surveyor in Georgia.

Stephanie Price has been named chief people officer at Olathe, Kansas-based **Terracon**. Price now serves as head of Terracon's human resources team, as well as a member of Terracon's executive leadership team. She succeeds John Prutsman, who is now an executive coach with the firm.

Ryan Belyea has been named chief digital officer at Reston, Virginia-based **Bowman Consulting Group Ltd**. Belyea most recently served as vice president and director for digital at AECOM in the U.S. and Latin America. Belyea will partner with Bowman's senior executive team to establish and embed digital service offerings into existing and new business lines and ensure alignment of digital strategies with acquisition initiatives and technology systems development.

Bryan Jones has been named president of **HNTB Corporation's** Mid-Atlantic Division, where he will oversee complex infrastructure programs, business operations, and lead more than 580 multidisciplinary HNTB professionals. Jones most recently


Wes Christmas


Jerry Payonk


Sean Widener


Kevin Hetric


Mustafa Emir


Darren K. Riegler


Eric Michel


Chad Heimbigner


Christopher E. Brazell


Stephanie Price


Ryan Belyea


Bryan Jones

served as office leader for HNTB's Gulf Coast office covering Louisiana and Mississippi. He chairs the legislative committee for ACEC of Louisiana.

New York-based **WSP USA** announced the following appointments: **Joseph Black** has joined the company's national Transit and Rail business as senior vice president and lead for the rail operations and service planning team. Black, who most recently served as senior program manager, rail operations and integration, at Jacobs, is based in the firm's Austin, Texas, office. **Nate Bryer** and **Craig Baxter** have joined the company to direct the firm's new road usage charging (RUC) operations business, expanding on WSP's RUC strategic consulting portfolio. Bryer serves as vice president, senior director of RUC development, and Baxter is assistant vice president, director of RUC operations. Baxter and Bryer are based in Colorado Springs.

Lori Labrum joins Kansas City, Missouri-based **TranSystems** as a senior vice president and west transit market and national bus-rapid transit (BRT) leader. Labrum, who brings more than 30 years of engineering and planning experience for transit agencies across the U.S., has planned and designed more than 200 miles of BRT systems.

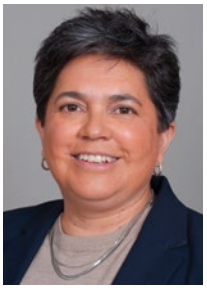
New York-based **Thornton Tomasetti** announced the following appointments: **Timothy D. Lynch** has joined the firm as a senior vice president in the firm's forensics practice. Formerly he served as chief enforcement engineer for the New York City Department of Buildings' Investigative and Forensic Engineering Units. He is based in the firm's New York office. **Brad Pridham,** a specialist in acoustic, noise, and vibration control strategies, has joined the company as a vice president. During his nearly 20-year career, Pridham has worked on various architectural, mechanical, and construction vibration projects in North America and across the globe, including controlling vibrations in long-span highway and pedestrian bridges and industrial machine installations and solving wind-induced noise problems associated with architectural façade elements. Pridham is based in the company's Mississauga, Canada, office. **John Fatseas** has joined the company as vice president of the firm's façade access team, working on the development of façade access and maintenance strategies for new and existing buildings as well as safety best practices. Fatseas previously served as the façade access national practice leader at Lerch Bates Inc. and is based in the Denver office. **Tyler Ranf** has joined the company as a vice president and aviation sector leader for the West region in the firm's structural engineering practice. Ranf has more than 15 years of structural engineering experience, including the design of terminals, hangars, and support facilities across the U.S. Ranf, who most recently served as a structural engineer with KPFF Consulting Engineers, is based in the San Francisco office.

Linnea Brudenell has joined Jacksonville, Florida-based **RS&H** as vice president, national sustainability and resilience director. Brudenell comes to RS&H after serving as a director of sustainability in the private sector since 2015.


Joseph Black


Nate Bryer


Craig Baxter


Lori Labrum


Timothy D. Lynch


Brad Pridham


John Fatseas


Tyler Ranf


Linnea Brudenell

Welcome New Member Firms

ACEC Alabama
Axis Engineering Group, LLC
Foley

ACEC Arizona
RS&H
Phoenix

ACEC California
Argento Graham Consultants LLC
Los Angeles

ACEC Colorado
Belfay Engineering P.C.
Denver
GeoMet Engineering
Boulder
HCL Engineering & Surveying
Centennial
SET Engineering, LLC
Durango
SGM
Glenwood Springs
Slopeside Engineers
Glenwood Springs

ACEC-CT
Barton & Loguidice, LLC
Glastonbury
BSC Group, Inc.
Glastonbury
LiRo
New York, N.Y.

ACEC/Delaware
Sanborn, Head & Associates, Inc.
Newark

ACEC-FL
Expedition Consulting Engineers, LLC
Orlando
JBPro
Gainesville
MiGre Engineers, LLC
Longwood
OCI Associates, Inc.
Maitland

ACEC Georgia
Templeton & Associates
Suwanee
The Southeast Civil Group LLC
Douglasville
Travis Pruitt & Associates, Inc.
Norcross

ACECHawaii
QRSE, LLC
Honolulu

ACEC of Idaho
AHJ Engineers, P.C.
Garden City
Schnabel Engineering, Inc.
Boise

ACEC Illinois
APEX Consulting Engineers, LLC
Chicago
PDF Engineering
Glenview
QRSE, LLC
Park Ridge

ACEC Indiana
Fleis & VandenBrink
Indianapolis
Three i Design
Evansville

ACEC/Iowa
Prairie Engineers, P.C.
Keokuk

ACEC Kansas
Hoss & Brown Engineers, Inc.
Shawnee

ACEC-KY
Black & Veatch
Louisville

ACEC of Louisiana
GHD
Baton Rouge
Girau & Associates, LLC
Metairie
NTB Associates, Inc.
Shreveport

ACEC/MA
BALA Consulting Engineers
Boston
Bloom Companies, LLC
Boston
CHESS Engineering LLC
Lowell
Fraser Polyengineering Services P.C.
Boston
Pristine Engineers, Inc.
Raynham
The Dennis Engineering Group, LLC
Springfield

ACEC/MD
Anchor QEA, LLC
Baltimore

ACEC/Michigan
Burns & McDonnell
Detroit
Jones & Henry Engineers, Ltd.
Kalamazoo
Matrix Consulting Engineers, Inc.
Lansing
Surveying And Mapping, LLC (SAM)
Novi

ACEC-Montana
Waatti Engineering
Kalispell

ACEC/NC
DWM Engineering, PLLC
Raleigh
Myriad Engineering
Chapel Hill
VIAS Infrastructure PLLC
Wake Forest

ACECNJ
Area Engineering, Inc.
North Brunswick
Structures & Foundations PC
Ridgefield

ACEC Nevada
Ardurra
Las Vegas
HPA Consulting Engineers
Las Vegas
Moffatt & Nichol
Carson City

ACEC New York
Gedeon Engineering, PC d/b/a Gedeon GRC Consulting
Syosset
ZOFS Engineering, P.C.
Valley Stream

ACEC Ohio
3D Engineering Solutions
Cincinnati
E. P. Ferris & Associates
Columbus
Mainthia Technologies, Inc.
Cleveland
Palmer Associates Inc.
Toledo
Watcon Consulting Engineers, LLC
Gahanna

ACEC Oregon
Kimley-Horn and Associates, Inc.
Portland
Stantec
Portland

ACEC/PA
Apogee Engineering
Harrison City
Blake Consulting Services, LLC
Furlong
Caplan Engineering Company
Pittsburgh
Sanborn, Head & Associates, Inc.
Horsham
Stahl Sheaffer Engineering
State College

ACEC-SC
Freese and Nichols, Inc.
Charlotte, N.C.
Volkert, Inc.
Columbia

ACEC of South Dakota
Schemmer
Sioux Falls

ACEC Tennessee
Bacon Farmer Workman Engineering & Testing
Brentwood
Civil & Environmental Consultants, Inc.
Franklin
James C. Hailey & Company
Brentwood
Merrick & Company
Chattanooga
MBI Companies Inc.
Knoxville
Wilson & Associates, PC
Franklin

ACEC Texas
Au+Engineering
Frisco
Fehr & Peers
Dallas
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For further information on national affiliate members, go to: http://bit.do/ACEC-natl-affiliate-memb or contact Erin Wander at 440-281-0464 or ewander@acec.org.

Leadership Advancement Opportunities

Registration is open for Class 7 of Pathways to Executive Leadership, ACEC's midcareer leadership development program, beginning October 14-16, 2023, in Austin, Texas. Sessions prepare participants for new leadership roles by teaching them how to explore personal mastery, recognize industry trends, and build long-term client relationships. In addition to coursework, participants have the opportunity to connect with a trusted national network of colleagues to learn best practices and exchange knowledge. The hybrid program consists of two in-person seminars and three virtual learning sessions tailored to those transitioning to managing teams and other managers. For more information, visit program.acec.org/pathways-to-executive-leadership or contact Katie Goodman, director of leadership programs, at 202-682-4332 or email kgoodman@acec.org. Registration is limited.

EJCDC® CONSTRUCTION MANAGER AT RISK (CMAR SERIES) DOCUMENTS

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This comprehensive new series consists of 27 documents, including contracts, bonds, contractor-procurement documents, and administrative forms, intended for use on projects in which the owner retains a construction manager at risk (CMAR) to provide preconstruction services and then construct the project.

The Construction Manager at Risk method of delivering projects evolved from traditional design-bid-build by involving the construction contractor early in the project. The CMAR delivery process adds value by (1) having the contractor involved in the design phase of the project by performing services such as constructability reviews, providing advice on material availability and selection, estimating and scheduling, assessment of risk factors and mitigating strategies, development of procurement strategies, and organization of the work into efficient work packages; (2) taking advantage of opportunities for early procurement of materials and equipment, especially in volatile markets; and (3) starting construction before the design of the entire project is complete (fast tracking).

Review the entire EJCDC CMAR Series at https://bit.ly/EJCDC-CMAR.

ACEC COALITIONS

WHAT'S NEW WITH ACEC COALITIONS

ACEC's coalitions have been hard at work for the past few months developing new content for education, publications, and roundtables. Each coalition has designed a robust platform for its members to network, share best practices, and collaborate on current initiatives. With the launch of ACEC's updated website, our members can easily find all of these activities, resources, and more through the ACEC Coalitions page.

Whether your practice focuses on structural, MEP, geotechnical, surveying and mapping, or land development, or if you are a small firm, the ACEC coalitions provide a platform for members to take a deeper dive into the business practice needs of their discipline or firm size. Joining a coalition is easy and it's firm-based, so all members of your firm are eligible to use the membership benefits. And, if your firm is currently participating in ACEC's Business Insurance Trust, the trustees will pay the first $250 towards a coalition membership.

Take advantage of one of ACEC's best kept secrets. Visit https://www.acec.org/coalitions for more information or to join. ■

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