A New Era in Transportation Design & Construction

"Roadbotics" & Artificial Intelligence

NATIONAL CONVENTION
Sept. 22-25
Savannah, Ga.
GOMACO Corporation pioneered the development of the first cylinder finisher nearly 50 years ago when the company manufactured and introduced a bridge deck cylinder finisher to meet the growing needs for bridge markets. Today, GOMACO cylinder finishers are designed for versatility with the C-450 and C-750. The frame widths can range from 12 feet to 160 feet. They are easy to operate and save time and labor costs on all of your concrete finishing projects. Pin-connected sections provide fast setup time and the versatility to fit exact job requirements. GOMACO's patented three-point finishing system provides the smoothest deck possible with an auger to level the concrete, a cylinder consolidates and finishes the concrete, and a float pan seals and textures the surface. GOMACO finishers are available with several different options to customize them to your exact bridge deck specifications. Join the bridge builders choosing GOMACO for sales, service, and parts support.
“I am here to tell you that Congress’s chronic failure to fix the Highway Trust Fund program threatens all federal surface transportation programs.”

ARTBA Chairman Robert E. Alger, p. 6

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“Transportation Builder” (TB) is the official publication of the American Road & Transportation Builders Association (ARTBA), a federation whose primary goal is to aggressively grow and protect transportation infrastructure investment to meet the public and business demand for safe and efficient travel. In support of this mission, ARTBA also provides programs and services designed to give its members a global competitive edge. TB is the primary source of business, legislative, regulatory, safety and economic news that matters most to transportation development professionals.

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Visit us: transportationbuilder.org
Don't Miss This Convention

It's hard to miss all the news about artificial intelligence (AI), whether you read it in a print format such as Transportation Builder, or on digital platforms like your smartphone.

Check out these recent headlines:

Firms' Use of AI Is Expected to Surge: Consulting firm Deloitte predicts that within two years nearly three-quarters of businesses will have implemented or be planning to implement technology to gain insights in marketing, sales, pricing, logistics, compliance and fraud detection.

Microsoft Invests $1 Billion in OpenAI in Hopes of Rivaling the Human Brain: The software giant is pumping money into the Elon Musk start-up, called OpenAI, to eventually perform tasks ranging from filtering spam emails to predicting an earthquake.

AI in Road Maintenance to Be Deployed in UK: AI will be used to assess, collate, and analyze data on the condition of highways and road markings so local governments can better decide where to allocate investment.

ARTBA's 2019 National Convention, held Sept. 22-25 in Savannah, Ga., will focus on AI, robotics and other technologies, and their impacts on the transportation design and construction industry. It is also the focus of this issue. Inside, you'll find previews from all three of the convention's main speakers and several guest panelists.

ARTBA is hosting this convention for its members to gather real-world, value-added information from thought leaders and experts, and assess the impacts on future business operations.

Don't miss your chance to see what's coming ... ever more quickly ... before it passes by in a whoosh. Register today: artbanationalconvention.org.

Three distinct industries.
One integrated solution.

Mark Holan
Editorial Director
mholan@artba.org
Editor’s Note: ARTBA Chairman Bob Alger, chairman of the board of The Lane Construction Corporation, July 16 testified at the House Highways & Transit Subcommittee hearing on the Federal Transit Administration’s (FTA) Capital Investment Program (CIG). This is an edited version of his opening statement.

“There has been a lot of talk about a federal infrastructure initiative since the 2016 presidential campaign. If you take anything away from my remarks, it should be that it is time to start acting on our infrastructure needs and that process begins with fixing the Highway Trust Fund (HTF).

I am here to tell you that Congress’s chronic failure to fix the HTF program threatens all federal surface transportation programs, including transit projects.

The next trust fund crisis looms shortly after the FAST Act expires in less than 15 months. Rather than repeat the past dysfunctions that led to $140 billion in General Fund transfers and budget gimmicks, President Trump, congressional leaders and members of this subcommittee must seize the initiative and fix the trust fund revenue shortfall once and for all.

ARTBA urges you to consider several approaches to address the HTF shortfall:

• Raise the federal gasoline and diesel user fee rates;
• Apply a freight-based user fee to heavy trucks; and
• Institute a fee to ensure electric vehicle users also help pay for the system from which they benefit.

While ARTBA believes these options are the most viable in the short-term, we are open to any user-based, recurring revenue solutions that would support increased federal highway and public transportation investment.

Many of the same complications we face when delivering a highway project are also prevalent on public transportation projects as well. And these obstacles cost American taxpayers time and money.

Project delays can far exceed the 5 percent annual increase projection. My company recently completed work on a project that went from under three years projected completion to nearly four years. The increase in costs for that single year amounted to a nearly 20 percent cost increase.

I’d like to highlight a few other recommendations for meaningful improvements to the regulatory and project delivery process.

Public transportation projects have previously been allowed to use federal loan programs such as TIFIA and RIF as local match. Recent denial of such flexibility has delayed some critically important projects, which only increases their eventual cost and schedule. Since the loans are repaid with local dollars, they should be allowed to be counted as local match.

Another key factor in keeping transportation construction projects on schedule is the use of dispute resolution boards. These entities should include members recommended by the project owner, contractor or industry and should set up quick and efficient timelines so that members can carefully follow its progress.

Previous federal surface transportation laws included provisions to expedite the project approval process. Due to lack of application and awareness of these reforms by project sponsors, the permitting process time horizon has not substantially improved. It’s time to take the next step to ensure these tools are utilized to deliver the transportation benefits Americans need.

Thank you for the opportunity to testify. ARTBA and its members look forward to working with Congress.”

FROM THE CHAIRMAN
ROBERT E. ALGER | President & CEO, Lane Industries, Inc.

Fix the Highway Trust Fund, ARTBA Chairman Tells Congress
Preventing Falls in Roadway and Bridge Construction, Inspection and Repair

A comprehensive safety training program for the transportation construction industry, including:

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- Rescue Plans
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...and much more!

For more information, contact Robinson Vasquez at rvasquez@artba.org, or 202.289.4434.
n 2010, Ohio Department of Transportation (ODOT) employee Shawn Blubaugh was performing routine maintenance on a local highway when a piece of heavy construction equipment backed over him. He was killed instantly. This devastating tragedy forever changed the lives of his wife and children.

Fast forward eight years. The ARTBA Foundation was ready with a program to help Shawn’s daughter, Mashawn. The Lanford Family Highway Worker Memorial Scholarship program was created to provide post-high school financial assistance to the children of highway workers killed or permanently disabled on the job. Mashawn, who is studying early childhood education at Kent State University, is a two-year scholarship recipient.

Here’s what she recently told the ARTBA Foundation trustees about what the program meant to her:

> After losing my father at the age of 10, I relied on my teachers and classmates to help get me through. I specifically remember how understanding and supportive my teachers were, and that is what has motivated me to become a teacher and help students going through any issues at home. Last year, I was a recipient of the Lanford Family Highway Worker Memorial scholarship, and my family and I could not have been more thankful. It helped me feel more comfortable financially. Finishing college and becoming a teacher like the ones who supported me has always been a goal of mine, and this scholarship is helping to make it possible.

Earlier this year, the trustees awarded a record $80,000 to 16 worthy students, including Mashawn, for the 2019-20 academic year. Since the program was launched in 1999, we have awarded more than 180 scholarships, providing $570,000 in financial aid.

I want to thank all the individuals, firms, associations and foundations that have contributed to the scholarship program this year. A list of them is in the nearby box. Our ability to continue providing financial assistance depends on the generosity of existing—and new—donors.

I’m asking readers of Transportation Builder to help us replenish the scholarship fund for the next academic year by making a tax-deductible donation soon. You can contact Director of Foundation Programs Eileen Houlihan at ehoulihan@artba.org and she will provide you with the best option for your gift.

Together, we can make a meaningful difference in the lives of our industry’s own. Thank you in advance for your consideration and generosity!

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2019 Lanford Family Highway Worker Memorial Scholarship Donors

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- The Berger Charitable Foundation, Inc.
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- Mississippi Road Builders’ Association, Inc.
- The Donald B. and Dorothy L. Stabler Foundation
- The Wagman Community Fund of York County Community Foundation
- Paul & Anita Yarossi

*from January 1-July 31, 2019
OUT WITH THE OLD...

....................IN WITH THE NEW...

...THE FUTURE OF BRIDGE OVERHANG CONSTRUCTION!

WWW.PRECASTEEL.COM
The message in this column as it relates to transportation investment and policy issues: Game On!

The month of July saw at least four notable happenings in the Nation’s Capital; including a key month-end Senate committee markup of the next multi-year highway reauthorization bill. But we will come back to that in a moment.

First, ARTBA Chairman Bob Alger used a July 16 House subcommittee hearing to highlight the association’s support for the transit capital investment grant program. He also took the opportunity to continue the push for a permanent Highway Trust Fund revenue solution. The subcommittee’s chair, Rep. Eleanor Holmes Norton (D-D.C.), told Alger: “I couldn’t agree more with the fact that you detoured from your testimony to discuss the Highway Trust Fund. I think it sends a message to this committee about how important it is to get something done in raising the gas tax.” Ranking member Rodney Davis (R-Ill.) recognized ARTBA’s leadership on the issue and expressed interest in a solution.

Second, on July 17, the ARTBA Transportation Investment Advocacy Center held its 6th Annual “National Workshop for State & Local Transportation Advocates.” More than 80 attendees from 26 states came to the Nation’s Capital to outline keys to successful funding campaigns, share best practices, and spotlight pending legislation and ballot initiatives. Two participants told us “it was the best workshop ARTBA has held so far.”

Third, over the two following days, we hosted our Annual Public-Private Partnerships (P3s) in Transportation Conference. For more than 30 years, this event has been the industry’s pre-eminent innovative financing forum. And this year didn’t disappoint. The “great debate” on the future of P3s and the “appetite for risk” session was engaging, spirited and full of challenging viewpoints. It was a solutions-focused discussion, the kind we seek to provoke. At the end of the event, it was hard to miss the outstanding leadership role being played by ARTBA’s P3 Division.

Finally, and most notably, the Senate Environment & Public Works (EPW) Committee led by Chairman John Barrasso (R-Wyo.) and Ranking Member Tom Carper (D-Del.), July 30 marked up a five-year highway bill. It represents the first program reauthorization bill in nearly 15 years that would significantly increase federal investment in highway safety and mobility improvements.

It was approved by a unanimous vote; proof positive that bipartisanship in Washington still lives, at least on transportation issues. Other Senate committees still have work to do in their respective areas of the bill, but the EPW committee’s action represents the beginning of a long legislative process. The nearby chart illustrates the potential for real market growth compared to previous surface transportation laws.

The Senate bill offers our industry a meaningful “rally point” to fight for the robust infrastructure initiative both parties have been trumpeting since the 2016 presidential election. As the industry’s grassroots activists, it’s now your time to suit up and engage your federal elected officials. The game is definitely on!
The Safety Certification for Transportation Project Professionals™ (SCTPP) program was developed and launched by top transportation design and construction industry’s executives from the public and private sectors. Their goal: significantly boost the hazard awareness and risk management skills of all transportation project professionals who are in positions of influence—from project inception through completion—to cause a decline in the 50,000 fatalities and injuries that occur in and around U.S. transportation infrastructure projects annually.

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SCTPP Developers
2019 National Convention

“Roadbotics” & Artificial Intelligence: A New Era in Transportation Design & Construction

Savannah, Ga.

Sept. 22-25
Savannah, Georgia, site of this year’s National Convention, is steeped in moss-draped history. But our annual gathering is laser-focused on today … and tomorrow.

Business and thought leaders will offer their expert insights about how artificial intelligence (AI), mobile supercomputing, intelligent robots, and automation will shape the design, construction, and safety of transportation projects; impact development of the industry’s workforce; and transform business operations.

Our key speakers will offer an introduction to AI and other disruptive technologies and their impacts on your investment strategies and bottom line. These presentations will be fascinating to hear and challenge you to think about the future.

On the following pages you’ll find stories and interviews with three main convention speakers and key industry panelists.

There’s also a handy schedule at a glance, including the spouse program. See the latest details and register for the convention at [artbanationalconvention.org](http://artbanationalconvention.org).

Of course, no ARTBA convention is complete without briefings from senior staff about current efforts to fix the Highway Trust Fund, updates on the surface transportation reauthorization and federal regulatory issues, and a preview of the 2020 transportation construction market forecast. We also will discuss why the Foundation’s Safety Certification for Transportation Project Professionals™ program is so important to our industry.

Finally, we’ll close out the program with a dinner to honor new ARTBA Chairman Steve McGough and his leadership team.

Special thanks to our sponsors for helping make this program a reality.

Chairman’s Message

Bob Alger
The Lane Construction Corporation
**SCHEDULE AT A GLANCE**

**SUNDAY, SEPTEMBER 22**

1:30 – 5 p.m.
Contractor Safety Awards Judging

4:30 – 5:30 p.m.
- Past Chairmen
- Bridge Policy & Promotion Council
- Council of State Executives

5:30 – 7 p.m.
Opening Reception*
*Hosted by the Materials & Services Division

**MONDAY, SEPTEMBER 23**

8:30 – 9:30 a.m.
Breakfast

General Session: Panel Discussion with “Glass Hammer” Winners from ARTBA’s Women Leader Awards Program (1 PDH)

Moderator: Lisa Robert, executive vice president, RS&H, ARTBA

Women Leaders Council chair

Speakers:
- Jihane Fazio, associate vice president, AECOM
- Agnieszka Lapinski, department manager, Gannett Fleming
- Melissa Tooley, director of external initiatives, Texas Transportation Institute
- Melinda Peters, partner, RK&K
- Susan Martinovich, national highway market director, Jacobs

9:30 – 11 a.m.
Executive Committee (for committee members only)

10 – 11 a.m.
ARTBA 101 Overview (for new directors, new members, and first-time attendees)

A PwC report estimates that AI will contribute $15.7 trillion to the global economy by 2030. By making products and services better, it will boost annual GDP by double digits.

11 a.m. – 12:15 p.m.
Opening General Session: How Artificial Intelligence Can Help Your Business & Drive Results (1.25 PDH)

Speaker: Amber MacArthur, president, Ambermac Media and host of the award-winning “The AI Effect” Podcast

12:30 – 2 p.m.
ARTBA Foundation Awards Lunch

2:15 – 3:15 p.m.
General Session: Federal Legislative & Regulatory Update and Transportation Construction Market Conditions Report (1 PDH)

Speakers:
- Dean Franks, senior vice president, congressional relations, ARTBA
- Dr. Alison Premo Black, senior vice president and chief economist, ARTBA
- Nick Goldstein, vice president, regulatory & legal issues, ARTBA

3:15 – 4 p.m.
General Session: Putting Safety First: Subject Matter Experts Explain Why Transportation Project Safety Certification Matters

Moderator: Brad Sant, senior vice president, safety and education, ARTBA

3:15 – 4 p.m.
General Session from the Industry Leader Development Council (1 PDH)

Speaker: Tina Millán, senior vice president and U.S. national market leader—aviation, WSP USA

4 – 5 p.m.
Public Private Partnerships Division

4 – 5:30 p.m.
TSID and Safety Committee

6 – 7:30 p.m.
Political Action Team Reception

Chairman’s Banquet

Entertainer: Comedian Dan Naturman

NBC’s “America’s Got Talent” semi-finalist

**TUESDAY, SEPTEMBER 24**

7 – 9 a.m.
Buffet Breakfast

7:30 – 9:30 a.m.
- Contractors Division
- Planning & Design Division
- Transportation Officials Division

**ARTBANATIONALCONVENTION.ORG**
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<td>10:15 – 11:50 a.m.</td>
<td>Vintage Tea Ceremony at the Roots Up Art Gallery</td>
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<td>12 – 1:10 p.m.</td>
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**Spouse Program**

**Sunday, September 22**

- 9:45 – 10:45 a.m. How Automation Will Lead to “Superjobs” of the Future (1 PDH)

**Monday, September 23**

- 10:45 – 11:45 a.m. General Session: Robots & Artificial Intelligence: How Transportation Design & Construction Firms Are Preparing for a New Era (1 PDH)
  - Moderator: Tom Webb, vice president of strategic initiatives and customer relations, HCSS
  - Speakers:
    - Carson T. Carney, vice president of sales & technology integration, TyBot, LLC
    - Andy E. Kaiyala, vice president of engineering, The Lane Construction Corp.
    - Jim Peterson, design build director & senior vice president, HNTB Corporation
    - Mitch Tobias, market manager, Caterpillar Inc.

**Tuesday, September 24**

- 9 – 11 a.m. Board of Directors

**Wednesday, September 25**

- 8 – 9 a.m. Breakfast
  - Speaker: Russell McMurry, commissioner, Georgia Department of Transportation
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ARTBA Convention Panel to Explore Robots & Artificial Intelligence in Transportation Design & Construction

By Mark Holan
mholan@artba.org

Artificial intelligence (AI) and other advanced technologies are not far-in-the-future aids to transportation design and construction. It’s already on the job.

On the Koppel Bridge decking project near Pittsburgh, an autonomous rebar-tying robot sped the operation and reduced labor needs. Instead of splitting crews between placing, framing, and bulk tying the deck’s reinforcing steel, the contractor adjusted the work plan by focusing their preparation of larger areas as the automated robot worked uninterrupted over 125,250 horizontal rebar intersections.

“Currently, AI is trying to work its way into the existing work crews, equipment, and planning,” says Carson T. Carney, vice president of sales & technology integration at TyBot, LLC, and a convention panelist. “Eventually this will flip, and the industry will adapt the crews, equipment, and planning to maximize the benefits of AI.”

Potentially, infrastructure designs will be adapted to accommodate AI and other technology, and largely for the same reason the construction industry has made earlier changes: economics.

At ARTBA’s 2019 National Convention, business and other thought leaders and industry experts will discuss how AI, robotics, and automation are impacting the services offered by transportation design and construction firms; the workforce they recruit and develop, and how they interact with customers. This article previews the discussion to come.

Amber MacArthur, president of digital media company AmberMac Media, Inc. and the convention’s keynote speaker, says there are dozens of ways AI will impact the construction industry, including better systems to keep large projects on budget; as well as logistics, customer-relations, management support, workflow automation, human resources, and finance.

“The best opportunity for construction businesses to leverage AI in the near future is to integrate new tools and technologies that allow for work to be done smarter, faster, and more data-driven,” MacArthur says.

Tom Webb, vice president of strategic initiatives and customer relations at HCSS, will moderate a key panel of industry experts.

“We will look at comparable industries and see the impact already realized in those industries, discover where investment is happening in our industry today, and discuss where we expect this to be going in the short, mid, and long-term,” he says.

Webb asks attendees to prepare for the session—and really the whole convention—by asking themselves these questions:

· What could robotics be used for within our company?
· Where do I see artificial intelligence used today?
· What do I know about Blockchain?
· How can we use devices from the Internet of Things?
· How tech-ready are our newer employees compared to our traditional employees?
· What do our customers expect from us with technology?

Workforce Impact

Convention speaker Ross Smith, director of Skype for Good at Microsoft and one of the nation’s top innovation thought leaders, notes the number of workers displaced by technology is growing across industries, including transportation construction.

“Over the last few decades, design and build processes have leveraged technologies such as CAD/CAM,” he says. “Looking ahead, 3D modeling, 3D printed structures, autonomous construction vehicles, radio-frequency identification (RFID), and sensors all have the potential to
And processes impact the workforce. The construction industry is currently coping with a significant gap between workforce availability and demand.

“There is no expectation that this disparity will be resolved through increased availability, so we must resolve the situation by making the workforce more productive,” Carney says. “Automation allows the existing workers to be more productive.”

It also will keep them safer.

“Robots perform the same work while removing the workers from exposure to high risk activities,” says TyBot’s Carney. “The less manhours that are expended to perform high risk activities, the better safety performance contractors will achieve.”

Smith and MacArthur, who each work outside the construction industry, also emphasize technology’s role in safety for workers and the public that use the transportation systems they build.

Gradual Change

Panelist Jim Peterson, design build director & senior vice president, HNTB Corporation, warns that these changes won’t happen overnight.

“We have skilled operators throughout the industry,” he says. “Any change to a machine doing it without a person in the cab, or a machine back in the office controlling the equipment in the field, will take time.”

Peterson also says human project managers will continue to play a vital role, deploying AI and other technology as tools, as they continue to “run the projects and not let the projects run them.”

Still, he acknowledges that workforce will be impacted as some tasks shift to automated processes.

Lane Construction Corp. Vice President Engineering Andy Kaiyala agrees. “New personnel with new technical training will be required, and leadership that can embrace the elimination of paper documents as the contract deliverable and move toward a model-centric contract will also be required. There will be an expansion of the hiring pool into additional technical areas,” Kaiyala said.

Peterson and Kaiyala see the benefits of autonomous vehicles and other technology on the nation’s (and world’s) transportation infrastructure system. Vehicles will travel “faster and closer to one another, moving more goods and people through any corridor,” Peterson said. Commerce will be scheduled to move off peak through dense metro areas, or routed around commuter congestion.

The ability to “virtually” construct projects using 3D, 4D and 5D data will radically alter construction planning, said Kaiyala. “This alteration comes with an upfront cost of planning, and delayed ‘bucket in the ground’ execution, but at the same time yields more specific information on which to base the real-world planning and execution of complex tasks.”

“Some of these are incremental changes, some may move rapidly,” Peterson added.

Convention speaker Russell McMurry, commissioner of the Georgia Department of Transportation, isn’t waiting. His agency is busy deploying 1,700 traffic signals that will communicate with autonomous vehicles about changing signals, adjusting speed, and alerting pedestrians.

“The opportunities in front of us to improve safety by embracing technology are huge,” McMurry says. “The use of AI will greatly enhance construction where our workforce doesn’t currently exist.”

Mark Holan is ARTBA’s editorial director.

Tech firms invested $8.5 billion in AI in 2015. Some estimates expect that number to reach $47 billion by 2020.
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[Website and Contact Information]

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1.888.323.6374
Amber MacArthur is president of the digital media company AmberMac Media, Inc. (ambermac.com) and co-host of “The AI Effect” podcast. She is a tech-focused entrepreneur, bestselling author, blogger, keynote speaker, and TV/radio host. MacArthur is scheduled to address the ARTBA National Convention at 11 a.m., Monday, Sept. 23. Transportation Builder caught up with her for a Q&A.


MacArthur: Broadly speaking, artificial intelligence is the ability for a computer system or machine to learn and (eventually) think. Within the AI umbrella term, there is weak AI and strong AI.

A chatbot is an example of weak AI because it is simply simulating human behavior (a Facebook Messenger chatbot is programmed to interpret text and respond with simple answers). Strong AI would, when fully realized, act intelligently. In other words, in the future, it could include robots that are able to match or exceed human intelligence.

ARTBA: Which U.S. companies are leading the way in their use of artificial intelligence?

MacArthur: When it comes to leading the way in AI, a few U.S. companies forging forward include Amazon, Google, and Microsoft. Using Microsoft, as one example, the software giant bought five AI start-ups in 2018. From chatbots to digital assistants, Microsoft offers AI services for consumers and businesses. They are also very active in the construction industry.

ARTBA: What are some of the ethical issues about using artificial intelligence?

MacArthur: There are several ethical issues in terms of the future of AI. The World Economic Forum outlines nine specific issues. To simplify their list, consider these three dilemmas: unemployment (automation will affect the future of work); inequality (hourly work will cease to be the standard); and security (AI warfare will include autonomous weapons).

ARTBA: Speaking specifically to the construction industry, how might artificial intelligence change the way transportation improvement projects are designed and built?

MacArthur: There are dozens of ways that AI will impact the construction industry. A few key areas include better systems for budgeting to keep large projects on track, including software to predict cost overruns, and improve productivity. In 2017, McKinsey found that construction companies will be able to boost productivity by as much as 50 percent thanks to the ability to do real-time analysis on job sites, and monitor workers and machines.

ARTBA: How might artificial intelligence affect the transportation construction workforce?

MacArthur: There is much evidence today that shows robots and machines will be part of the future transportation construction workforce, including logistics, customer-relationships, management support, workflow automation, human resources and finance. Some jobs will be significantly affected, such as operating engineers, with elements of this work likely to be automated. But humans will continue to perform physical labor for the near future. In many cases, AI and other technology has the potential to make this work safer.

ARTBA: Conceptually speaking, how could artificial intelligence help improve safety on roads, bridges or transit systems?

MacArthur: Artificial intelligence technology promises to provide more data for cities and countries to better manage infrastructure such as bridges and roads. For example, more sensors monitoring these transportation systems can ensure that potential safety issues are detected and fixed without delay.

The most innovative AI technologies improving roads and bridges exist today in European countries. As one example, Microsoft built AI-powered drones to better monitor the Great Belt Bridge, a suspension bridge in Denmark. According to Microsoft, “the drones are used to fly around the bridge and capture thousands of pictures of the
Amber MacArthur
AmberMac Media, Inc.

concrete structure - a method that's far safer and faster than tasking a worker to dangle 200 meters above the surface to take pictures manually."

**ARTBA:** When considering artificial intelligence, what issues do companies have to consider from a security perspective?

**MacArthur:** Security will continue to be a growing concern for construction businesses of all sizes. When companies start to rely on more data, there is always the risk of a data breach. This means that all businesses must ensure that privacy and security is a priority while optimizing new technologies such as artificial intelligence.

**ARTBA:** How can opportunities relating to artificial intelligence be monetized?

**MacArthur:** When you increase productivity, there are always opportunities to be more profitable. In other words, the best opportunity for construction businesses to leverage AI in the near future is to integrate new tools and technologies that allow for work to be done in a smarter, faster, and more data-driven manner.

Some predictions say that AI will replace 16 percent of the workforce over the next decade, including up to 85 percent of telephone customer service jobs.

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Automation, Artificial Intelligence & Displaced Workers in the New Machine Age

Advances in Artificial Intelligence (AI) are changing every aspect of our lives. How do we learn from the past lessons of industrialization to prepare for the current and future technological revolutions? A look at how the nature of work evolves.

By Ross Smith, FRSA

Merriam-Webster defines “automation” as the “automatically controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human labor.”

When we hear this word today, we tend to think about assembly lines or robots, but the idea of mechanical devices replacing humans dates back several millennia. In 3500 BC the Minoans, on the island of Crete, invented what later became known (and improved) in Roman times, as aqueducts. These structures were used to transport water over great distances, eliminating the need for humans to carry it by hand.

Other examples of the automation of human tasks include the water wheel, windmill, printing press, and steam engine. There is a long history, especially pronounced during the industrial revolution, of the changing nature of work, whether through the application of steam power to manufacturing, or the assembly line to mass production.

What is also changing is the economics of the paid worker. Henry Ford was known for paying almost double the going rate of $2.25 a day to reduce the costs associated with turnover and training on his new assembly lines. Just as the spinning loom had done a century earlier, production increased, prices dropped, and demand soared – allowing workers to grow along with the industry.

Today, Artificial intelligence (AI) is again changing the workforce and market landscapes. Ride service apps are reducing the demand for full-time taxi drivers and reducing wages. Algorithms are replacing insurance actuaries, not growing the industry. Online web services are selling directly to customers. (When was the last time you used a travel agent or a bank teller?) The number of workers displaced by technology is growing.

Technology is also influencing transportation construction. Over the last few decades, design and build processes have leveraged technologies such as CAD/CAM. Looking ahead, 3D modeling, 3D printed structures, autonomous construction vehicles, radio-frequency identification (RFID), and sensors all have the potential to disrupt traditional processes.

This will certainly change the nature of work, but there is also reason for optimism. Robots and automation can replace humans at dangerous jobs. They can handle repetitive and redundant tasks without getting injured or bored, leaving the more creative and skilled jobs for humans.

Nobody knows what the future will look like, only that it will look different than today. We can be certain that technology will provide relief to the workforce, such as the aqueducts that saved people from having to haul water in the ancient world. At the same time, technology is creating new challenges to reskill and retrain those workers whose jobs are being replaced, whether the travel agent, bank teller or construction industry employee.

Ross Smith, Fellow of the Royal Society of Arts, is director of Skype for Good at Microsoft and one of the nation’s top innovation thought leaders.
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Russell McMurry began working at the Georgia Department of Transportation (GDOT) in 1990 as an engineering trainee. In January 2015, he was appointed commissioner and now leads the agency of nearly 4,000 employees with an operating budget of over $3.5 billion. At the ARTBA National Convention, he is the featured speaker at the 8 a.m. Sept. 25 breakfast.

ARTBA: You are approaching 30 years at GDOT. What are some of the most significant changes you’ve witnessed regarding the building of transportation infrastructure, and what do you expect to change over the next 10 years?

McMURRY: We’ve seen a tremendous evolution of the department itself. A strategic downsizing of our workforce over time (from more than 10,000 employees when I joined vs. under 4,000 now) and the development of a network of consultant resources has improved our ability to efficiently deliver a larger program to serve a much larger population. Today, we focus on continuing to develop a more highly motivated, skilled, and educated workforce than ever. In the future, GDOT will leverage that human talent and continue to harness technology, new materials, and innovative approaches to get the job done.

ARTBA: Our 2019 National Convention will focus on Artificial Intelligence, robots and automation. How does GDOT see these technologies impacting safety, project delivery, or other areas of potential benefit in the future?

McMURRY: Technology enhances everything we do. The opportunities in front of us to improve safety by embracing technology are huge. We’re working hard to ready ourselves for a world of connected autonomous vehicles. We are currently engaged in a project to deploy some 1,700 traffic signals utilizing dedicated shortwave radio communication that will talk directly with vehicles to advise of signal changes, to adjust vehicle speed, and to alert the vehicle of a pedestrian in the crosswalk. The use of AI will greatly enhance construction and can fill the gaps where our workforce doesn’t currently exist.

ARTBA: Tell us about some of GDOT’s workforce recruitment and retention strategies.

McMURRY: Our vision is to recruit the most talented people and provide a breadth of knowledge and experience in transportation that will help them lead the department forward. We deploy specialized recruiters on college campuses, and also target potential employees with certain professional backgrounds. Our training programs for college graduates apply to civil engineers, construction and project management, and increasingly we consider other degree types such as computer science. We compete with the private sector by building a culture of collaboration and innovation, which challenges employees to think, make decisions, and innovate in ways they can’t in other professional settings.

GDOT encourages team members to share and implement ideas about how to “make it better,” which gives the employee the satisfaction of tangible contributions and improves the efficiency of the Department.

ARTBA: What is currently the largest or most innovative transportation infrastructure project in Georgia?

McMURRY: GDOT is engaged in building a comprehensive system of tolled, managed express lanes designed to function as part of a hub-and-spoke system, four of which are designated as part of our $11 billion Major Mobility Investment Program (MMIP). The MMIP consists of 11 initial projects, which together will greatly improve mobility of people and freight statewide. Express lanes provide enhanced mobility like no other solution can.

Last September, we opened our third Georgia Express Lanes project, the 30-mile Northwest Corridor (NWC) along I-75 and I-575 in northwest metro Atlanta. More than 5 million motorists since opening have slashed their previous travel times by utilizing the lanes; even motorists in the general-purpose lanes have seen their average speeds double during rush hour. Rush hour in both the morning and evening in the corridor have been cut by up to an hour.

In addition to more reliable trip times, the lanes provide new express lanes transit opportunities that didn’t previously exist. As we open new express lanes projects over the next decade or so, these benefits will spread across a wider region and will improve quality of life for millions.

ARTBA: What are your thoughts about balancing the
transportation construction needs of Georgia’s urban residents and those in rural communities?

McMURRY: With 6 million residents, Atlanta is one of the country’s largest cities. Even though reducing congestion across the region remains an ongoing focus, we never forget that agriculture is still Georgia’s number one business. Ensuring mobility in rural Georgia includes not only building and maintaining roads that serve those communities, but also replacing bridges that help ensure farmers can move their crops to market efficiently. It also means ensuring good freight mobility, always with an eye toward safety. We work closely with communities and MPOs to strike that correct balance and make the right investments in both places.

ARTBA Southern Leadership Team Upcoming Events

- Sept. 10: conference call
- Oct. 28-29: Southern Regional meeting featuring the Dr. J. Don Brock TransOvation™ Workshop, Miami, Fla.
- Dec. 3: conference call

Contact ARTBA’s Allison Klein at aklein@artba.org for details.
‘Go-To’ State & Local Transportation Investment Resource Turns Five

By Carolyn Kramer & Eileen Houlihan

In March 2014, ARTBA launched an innovative, first-of-its-kind program to provide resources on transportation investment to advocates seeking to move the needle in their states, cities and municipalities. Since then, the Transportation Investment Advocacy Center™ (TIAC) has grown into the “go-to” resource for state and local transportation advocates, with original research, valuable events, and a network of experts to provide support for new and existing campaigns aimed at building highway, bridge, and transit funding through the legislative and ballot process. It’s anchored by the comprehensive website, transportationinvestment.org.

The idea, then ARTBA Chairman Doug Black said, was “to put in one place—and promote the sharing of—current strategies, sample political and communications tools, legislative and ballot language, and information on where to obtain professional campaign advice, research and help.” Mission accomplished.

The Center has also established “best practice” strategies used by advocates for successful campaigns across the country. Emily Cohen, executive vice president of government relations, public policy and political advocacy at United Contractors, worked closely with other advocates in California to pass transportation funding legislation in 2017 and against a repeal attempt in 2018. ARTBA economic reports, based on cutting-edge research, demonstrated the localized benefits of the added investment and helped advocates prevail over the noise of social media and negative advertisements deployed by opponents.

California’s Senate Bill 1 and Proposition 6, its attempted repeal, are among the largest referendums tracked by the Center in terms of investment level and population.

With the Center’s core belief that “data doesn’t lie, facts are key,” TIAC has developed and analyzed a collection of over 1,700 ballot measures, 800 legislative measures, and election statistics of 2,800 state lawmakers who voted on a gas tax increase. The Center staff has published 120 analyses and reports with valuable insights on transportation funding methods and campaign strategies.

Ahead of the Center’s launch, nine states were considering less than 20 funding measures by mid-year 2013. In the first half of 2019, over 300 measures have been introduced in 46 states. The New York Times cited the Center’s data in a 2017 op-ed, noting the 21 states “tired of waiting for Washington” that had raised fuel taxes since 2013. That number has since grown to 31 states.

“I’ve been working with the Georgia Transportation Alliance since 2013. In that time, the TIAC team has been an invaluable partner in our efforts to educate legislators, pass funding legislation, and conduct the follow-up activities necessary for a successful political environment,” said Advocates Council Co-chair and Georgia Transportation Alliance Executive Director Seth Millican. “Our relationship with TIAC is truly one of the most valuable partnerships we have.”

The data the Center provides also serves as major support for ARTBA’s main mission, to aggressively grow and protect transportation infrastructure investment at the federal level. Federal funding provides, on average, over half of all annual state department of transportation capital outlays for highway and bridge projects.

“There is a lot of good work being done at the state level, but that doesn’t undermine the importance of the federal role,” said ARTBA Executive Vice President Jason Ferrante. "The TIAC team allows our Advocates Council members to adapt their work strategies to fit within the unique needs of their states, while also providing critical resources and support they need to be successful.”
of the federal piece. It’s a partnership. It’s not either or,” said ARTBA Chief Economist Dr. Alison Premo Black.

The Center’s work includes analysis of the impact a state gas tax increase has on the price of gasoline at the pump, and addressing the false notion that supporting a gas tax increase will cost legislators their jobs.

“We’ve built something that has had a meaningful impact. We are routinely using this information to debunk all the myths surrounding raising the gas tax and what that means for consumers and legislators,” ARTBA CEO Dave Bauer said July 17 at the 6th Annual National Workshop for State & Local Transportation Advocates.

“The data shows that those legislators who voted for a gas tax increase get elected at higher rates than those who voted against it,” added U.S. Chamber of Commerce Vice President of Transportation Infrastructure Ed Mortimer at the July event.

The annual workshop has hosted nearly 600 industry professionals and state legislators from 36 states.

A popular topic at the workshop and in TIAC research is the examination of alternative funding mechanisms in place of, or in combination with, the gas tax. As the Center began examining different trends in transportation investment, electric vehicle fees stood out as a topic of interest among advocates and lawmakers.

In 2016, TIAC began a deep-dive into the topic, producing detailed analysis of existing state legislation and creating model legislative language for other states to implement this fee. Since publication of those reports, 17 states have created their own electric vehicle fees.

The Center is in the process of revamping its website and expects to launch a refurbished site in August. Updated reports and more webinars are also on the horizon, and the Center will continue to track the over 300 transportation funding measures introduced this year. Stay up to date at transportationinvestment.org.

Carolyn Kramer is ARTBA Transportation Investment Advocacy Center director: ckramer@artba.org

Eileen Houlihan is ARTBA senior writer/editor and director of Foundation programs: ehoulihan@artba.org


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The Transportation Investment Advocates Council™ is a national network of more than 90 business professionals and public officials who share a common interest in building support for transportation infrastructure investments in their state or local community — roads, bridges, public transit, pedestrian walkways and cycling paths, airports, waterways, ports and rail facilities. The group helps guide the Center’s operations and program of work.

Some of the benefits of the free membership include:

• Access to the Center’s email listserv to connect with other advocates;
• Participation in regional conference calls and webinars;
• Subscription to the weekly TranspoAdvocates News (transportationinvestment.org) blog;
• Subscription to the monthly “State Transportation Funding Initiatives Reports™; and
• Opportunity to attend the Center’s annual “National Workshop for State and Local Transportation Advocates.”

The Council Co-chairs are Maria Fuentes, executive director of the Maine Better Transportation Association; and Seth Millican, director of the Georgia Transportation Alliance.

Connect with TIAC

Visit: transportationinvestment.org

Contact: ARTBA Transportation Investment Advocacy Center Director Carolyn Kramer: ckramer@artba.org
Maryland’s Purple Line Light Rail Project Stays on Track

By Eileen Houlihan

The 16.2-mile Purple Line light rail line under construction in the Maryland suburbs north of Washington, D.C., is expected to remove nearly 20,000 cars a day from the region’s congested roads. It will extend from Bethesda in Montgomery County, to New Carrollton in Prince George’s County, including five stations serving the University of Maryland. The $6 billion project is one of the nation’s largest transit public-private partnerships (P3).

The Maryland Department of Transportation’s Maryland Transit Administration (MDOT MTA) selected a P3 to design, build, finance, operate and maintain the system in 2013. Purple Line Transit Partners (PLTP), which includes ARTBA member firms Fluor Enterprises Inc. and Star America, along with Meridiam Infrastructure, will design, build, operate, and maintain the system for 35 years.

“The Purple Line will connect the Washington, D.C. area like nothing else and our team is proud to be building such an important project,” said Christophe Petit, president and managing partner of Star America. “We’re making steady progress every day and indeed accelerating our pace.”

As recently as March, anti-growth activists tried to revive their three-year legal effort to derail the project. A federal district judge ruled “unfortunately for plaintiffs, this second attempt to stop the Purple Line fares no better than their first.”

The design-build team Purple Line Transit Constructors consists of two more ARTBA members, The Lane Construction Corporation and Atkins, as well as Traylor Bros., Inc. Service is expected to begin in 2022.

Unlike traditional “heavy rail” systems that use a third rail to operate and must be in an exclusive right-of-way that is grade separated from cars and pedestrians, light rail is powered by overhead wires known as a catenary system. The Purple Line will operate mainly in dedicated or exclusive lanes, primarily at ground level, in both mixed traffic and in separate right-of-way lanes.

The light rail vehicles are modern streetcars, with low floors that allow passengers to board without climbing steps and in
compliance with the Americans with Disabilities Act (ADA). The stations are convenient for pedestrians and bicyclists – who can use on-board storage. The Purple Line will connect with the Maryland Area Regional Commuter (MARC) train, Amtrak, and local bus services.

ARTBA toured the project in May. Most of the work was related to both overhead and underground utility relocation to make way for the light rail line. Additional work included excavation and building retaining walls, several tunnel and bridge projects, and building the operation and maintenance facilities.

Eileen Houlihan is senior writer/editor at ARTBA. Photos by Luiza Carson.

The team from Purple Line Constructors includes Fluor Enterprises Inc., The Lane Construction Corporation and Traylor Bros. Inc. employees.
Hill & Smith Inc. is an industry leading manufacturer of a wide range of transportation safety products. Through the manufacturing of our premier MASH-compliant impact attenuator, the Smart Cushion®, our extensively tested & MASH-compliant portable steel barrier, Zoneguard®, and our Work Area Protection product lines of Smart Work Zone Systems, message and arrow boards and traffic control products, Hill & Smith Inc. is dedicated to advancing Work Zone Safety, ITS, & Roadside Safety nationwide.
Workforce development and retention are important for any business, but in construction—an industry where four workers leave for each one hired—it is vital to maintain production.

What can help? Beyond competitive benefits, this includes commitment to a safe workplace, opportunities for training and advancement, and improving employee engagement.

RJ Morris, director of talent acquisition and management for McCarthy Building Companies, relays five retention strategies to consider.

**Know Your Metrics**

Research shows that it’s not just salary that matters to employees. Metrics such as employee engagement, attrition rate, retention rate, participation in benefits, complaints, productivity and employee referrals are measured and monitored by McCarthy’s human resources team.

When warning signs indicate a problem, the company’s human resources team gets involved to guide managers and provide additional training.

**Focus on the Employer-Manager Connection**

The employee-manager connection is vital, based on the idea that day-to-day interactions are most important to retention. At McCarthy, first-time managers are well prepared when they step into their new role and they reinforce those skills over time with managerial seminars.

“We could have the best programs in the world, but if the field management doesn’t effectively support these through their actions, the programs don’t matter,” says Morris.

“The best way for our company to be successful is to have engaged employees. If people are unhappy working too many hours, missing important things with their family, they won’t be successful at work.”

**Remove Language Barriers**

Like many U.S. construction firms, a significant percentage of McCarthy’s workforce is Spanish-speaking. Three years ago, the company made a commitment to improving communication with these craft professionals.

Now, all their training personnel are bilingual. Open enrollment seminars are conducted in both Spanish and English and take place at the local level. The company also offers multiple bilingual advisors to help employees access the right health care providers for their family.

**Invest in Training**

When a company pays for training, employees recognize that the company is committed to making them successful. It also shows commitment to a safe workplace.

McCarthy employs full-time trainers, who travel to jobsites with a fully equipped training trailer for on-site training for craft workers. The company also offers tuition reimbursement.

“We help our craft professionals display good problem-solving and flexibility,” says Morris. “With those key skills, we can cross train and deploy our craft partners across multiple project types, which gives us, and them, the flexibility to succeed in any environment.”

**Value Everyone**

McCarthy tries to promote from within whenever possible, Morris says: “Managers who start at lower levels are fantastic leaders. They understand the work. They understand what it takes to be successful in the field and at a management level.”

Making Data-Driven Investment Decisions a Reality

By Donna Huey
donna.huey@atkinsglobal.com

In striving to operate efficiently, improve decision-making, and ensure good stewardship of public funds, state transportation departments (DOTs) rely on vast amounts of data to make investment decisions, provide accurate, timely information to internal and external customers, and meet state and federal mandates.

How DOTs manage such assets to achieve their business goals and comply with relevant legislation and regulation is known as data governance. To help define data management needs, the American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Planning has adopted a set of core principles for transportation data. These principles explain the benefits of accurate, accessible, secure data and how the information supports the decision-making process.

The Ohio Department of Transportation (ODOT) recognized that its data is a high-value strategic asset. Spurred by growing data requirements for smart city efforts such as the Ohio Smart Mobility Initiative and Smart Columbus, the agency realized its legacy data management practices no longer met demands. In January, ODOT hired Data Transfer Solutions, Inc. (DTS), an Atkins subsidiary, on a data governance contract to manage current and future investments in Ohio’s transportation system while maintaining citizen safety. DTS completed a six-month data governance “pilot” study in 2017, which included a maturity assessment, benefit analysis, and program plan that set the stage for this new program.

Data Analysis Tool

DTS developed a data analysis tool to facilitate asset lifecycle decision-making for pavement, bridges, and culverts. It helps ODOT administrators analyze data and resolve data discrepancies aggregated from as many as eight business systems. The tool also gives them the ability to simultaneously examine maintenance activities, asset conditions, and financial outlays to plan and scope cross-asset projects (e.g., bridge/culverts/pavements) more efficiently. Using the tool as a quality control mechanism, discrepancies in source data are identified, providing additional benefits to the data governance program.

For agencies such as ODOT, data governance implementation across the enterprise can create an environment that enables standardization, coordination, and integration of existing and future applications, data sources and reporting. Accessibility to the right data where and when it’s needed is critical to ongoing initiatives such as asset management, data around autonomous and connected vehicles, transportation systems management and operations, and project planning.

ODOT is in the process of conducting the data governance study and establishing a data governance framework by fall of this year, enabling the agency to make better decisions, reduce costs and increase effectiveness through coordinated efforts. ODOT estimates these efforts could yield as much as $375 million in savings within five years of implementation—enough money to reinvest in significant infrastructure improvements throughout Ohio.

Donna Huey is a senior vice president and client technology director in North America for ARTBA member firm Atkins, an engineering, design, and project management consultancy.
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ARTBA Announces 2019 Public-Private Partnership (P3) Award Winners

By Eileen Houlihan

ARTBA recognized two individuals and two transportation projects with awards during the 31st Annual Public Private Partnerships (P3s) in Transportation Conference held July 17-19 in the Nation's Capital.

Trailblazer of the Year: Dr. Morteza Farajian

This award is given to an individual who has made outstanding contributions to, and advocacy for, the forward progress of P3s in the U.S. transportation industry. Before becoming executive director of the U.S. DOT's Build America Bureau in 2019, Farajian helped procure and deliver some of the highest profile and most beneficial P3 projects in the country for the Virginia Department of Transportation (VDOT). These included the Transform 66 Outside the Beltway Project, the I-395 Express Lanes Extension project, and the I-95 Express Lanes Extension project.

Emerging Leader of the Year: Ali Lauzon

The Emerging Leader of the Year has already made a significant impact in her first 10 years working in the U.S. transportation P3 sector. Lauzon, a recent Yale University School of Management graduate, is a “leader of emerging leaders,” the awards committee noted. In VDOT's P3 Office, she helped organize ARTBA's annual emerging leaders track at the P3 conference and served as co-president of Young Professionals in Infrastructure. She will continue these efforts in her upcoming role as an adviser with McKinsey.

Innovation of the Year: Consolidated Rental Car Center at LAX, Nossaman

The award spotlights an idea within a P3 project that demonstrates how the development and/or application of new, innovative, and unique concepts help provide value for the users of P3s. The nation's largest consolidated rental car center at LAX, ConRAC, will relocate and centralize 23 existing car rental facilities scattered around the airport away from the central terminal and provide direct access to major freeways. Ultimately the facility will connect to an Automated People Mover (APM) to provide travelers with quick access to terminals. The combined projects, with a collective contract value in excess of $7 billion, will transform the airport and dramatically improve the experience for travelers at the world’s fifth busiest airport beginning in 2023.

Community Impact of the Year: Central I-70 Project Denver, Colo., Kiewit Meridiam Partners, LLC

The award winner demonstrates economic, philanthropic, or humanitarian benefit to the public and an improved quality of life for the community and/or users of the asset. As part of the $1.2 billion Central 70 project, contractors Kiewit Meridiam Partners will reconstruct a 10-mile stretch of I-70, one of Colorado’s “economic backbones.” A new express lane in each direction, removal of an aging 54-year old viaduct, a lowered interstate between major boulevards, and a 4-acre park over a portion of the lowered interstate near an elementary school are all part of the project’s plans.

In keeping with the community impact of the project, partners held a school supply drive for a local elementary school, built a sound barrier directly behind another school and included “playful art” for the children to look at while playing outside, partnered with high schools to teach the younger generation about careers in construction, and worked with a resident-led area non-profit to increase and expand educational paths for at-risk students to complete high school and college.
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