MARCH/APRIL 2019

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New House Transportation and Infrastructure Committee Chairman

ER

A tough advocate for infrastructure investment



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Rep. Peter DeFazio

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TIME TO BITE THE BULLET

In an exclusive interview with *Engineering Inc.*, Rep. Peter DeFazio, D-Ore., chairman of the House Transportation and Infrastructure Committee, explains how Congress can achieve longterm, sustainable infrastructure investment.

ACEC MERICAN COUNCIL OF ENGINEERING CONTRACT

ANNUAL CONVENTION

EGISLATIVE SUMMI

FEATURING TWO PROMINENT POLITICAL COMMENTATORS SHARING THE STAGE TO DISCUSS:

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THE POLITICAL CLIMATE AND A LOOK AHEAD

DONNA BRAZILE, Renowned Political Strategist and Commentator, Former Interim Chair of the Democratic National Committee

DANA PERINO, Former White House Press Secretary, Political Commentator, New York Times Best-selling Author, and Host of Fox's The Daily Briefing with Dana Perino

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Visit the ACEC Website – www.acec.org – for more information on the Convention including schedule and registration information



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ACEC's award-winning bi-monthly 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.

The articles and editorials appearing in this magazine do not represent an official ACEC position or policy unless specifically identified as doing so.

ACEC/PAC: Increasing Strength in Growing Numbers

eightened awareness about the value of political engagement, combined with new and creative fundraising strategies at the state level, helped propel ACEC/PAC into its third consecutive recordingbreaking year.

The National PAC totaled \$1,090,683 in contributions in 2018—a new record—and the third year in a row that the Council's political program has topped more than \$1 million.

Also, a record 45 states reached their fundraising goals, up from 43 states the previous year. ACEC/PAC remains the largest PAC in the design-build industry, and it ranks in the top 3 percent among all PACS.

This issue of *Engineering Inc.* takes an inside view at the innovative ways member organizations and their member firms fueled the record fundraising year.

The ACEC/PAC wrap-up additionally presents its "Honor Roll" of all PAC contributors, including Capitol Club (\$5,000), Chairman's Club (\$2,500) and Millennium Club members (\$1,000). Thanks to all who recognize how much PAC-giving matters! *(see page 28).*

Our cover feature is Rep. Peter DeFazio, D-Ore., the new chairman of the powerful House Transportation and Infrastructure Committee. In the exclusive interview DeFazio reveals his plans to secure robust investment for all infrastructure. *(see page 14).*

It is not too late to register for the upcoming 2019 ACEC Annual Convention—May 5–8, at the Marriott Wardman Park Hotel in Washington, D.C., which features nationally noted speakers; such as political strategist and commentator Donna Brazile; former White House Press Secretary Dana Perino; and Futurist Salim Ismail.

Six-time Emmy Award-winning comedian, author and TV host Ross Shafer returns to emcee the 52nd Engineering Excellence Awards Gala, Tuesday, May 7, where 196 projects—an all-time record—will be honored for their wide-ranging examples of engineering innovation.

This is an event you won't want to miss!

Manish D. Kothari ACEC Chairman

Linde Hour Dan

Linda Bauer Darr ACEC President & CEO



ENGINEERING^{INC.}

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Engineering Inc., Volume 30, Number 2 (ISSN 1539-2694), is published bi-monthly by the American Council of Engineering Companies (ACEC), 1015 15th Street, NW, 8th Floor, Washington, D.C. 20005-2605. Periodicals postage paid at Washington, D.C., and at additional mailing offices. Annual subscriptions are \$24 for members (included in dues as a non-deductible amount); \$45 for U.S. non-members; \$65 for institutional subscriptions. Back issues are \$15.

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Water Infrastructure, Renewable Energy Providing Best Opportunities Among Public Markets

By Gerry Donohue

hile the U.S. economy has grown strongly over the past several years, public infrastructure spending has not kept pace. As a share of the U.S. gross domestic product (GDP), public infrastructure spending has trended down since the Great Recession, when it hit 2.69 percent in 2009; in 2017, it

accounted for 2.28 percent of GDP.

In inflation-adjusted dollars, the high-water mark for public infrastructure spending came in 2003, when combined federal, state and local spending on water and transportation infrastructure topped \$480 billion. Except for a brief upsurge during the Great Recession, public infrastructure funding has been flat or declining ever since. In 2017, it stood at \$440.4 billion.

Funding for federal transportation and water in 2017 was \$98.4 billion, about the same amount as provided in 1998. State and local infrastructure spending in 2017 totaled \$342 billion, about the same level as 2002.

As a percentage, the federal share of infrastructure spending has bounced between 21.8 and 26.7 percent. Over the past several years, it has hovered near the bottom of the range.

Looking ahead, with the federal deficit exceeding \$1 trillion in 2018 and little appetite for raising revenues in Congress or the administration, analysts doubt that the funding taps will open any time soon. "The biggest constraint on congressional action on infrastructure right now is how we would pay for any major new federal investment," says Debra Knopman, principal researcher at the RAND Corp.

To get a sense of what might happen in public infrastructure financing for transportation, water—and renewable energy over the coming five to 10 years, *Engineering Inc.* spoke with leading analysts in those fields: Robert Puentes, president and CEO of the Eno Center for Transportation, an independent transportation think tank in Washington, D.C.; Knopman, lead author on the recent RAND report "Renewing America's Infrastructure, An Agenda for Federal Transportation and Water Policy" on the future of water and transportation funding and finance; and Marlene Motyka, U.S. and global renewable energy leader and principal at Deloitte.

TRANSPORTATION

"There will be some kind of federal transportation funding program coming out of Congress, but it is tough to imagine any massive federal infusion," says Puentes. "There is the immediate challenge of a big short-term hole in the Highway Trust Fund, but I am confident they will be able to fill that with budgetary calisthenics."

In the longterm, he says that while the federal gas tax "is not going to go away, numerous studies have shown that it is unsustainable." Coming to the fore, Puentes forecasts, will be a vehicle miles traveled system. "It is inevitable. Cars are becoming more fuel efficient, driving habits are changing. We need a system that adapts to that reality."

Puentes expects state and local governments to shoulder an increasing share of the transportation funding burden. "They are not waiting around for Washington to come to the rescue," he says. "States, cities and metropolitan areas are doing lots of different things, experimenting with partnerships and financing tools."

Looking back at the November 2018 election when several hundred transportation measures were on ballots, Puentes says the trend is moving away from raising user fees and toward broader funding measures, such as sales taxes or bond measures.

Puentes does not see the private sector becoming a major player in infrastructure funding. "Public-private partnerships will increase, but they are not the solution for our transportation woes," he says. "They are interested in some things, but there are an awful lot of things—such as upkeep and maintenance—they will not find attractive."

At the same time, Puentes sees the public and private sector working more closely together to come up with innovative solutions to transportation problems. "We are already seeing it in transit-oriented developments and private investment in highway off-ramps to open up land," he says.

One big change Puentes would like to see is the federal government incorporating transportation planning into the larger economic framework. "Every other developed country does it that way. They figure out what they want to accomplish and then determine transportation's role. We need to widen the aperture of the discussion."

WATER

"Infrastructure for water and wastewater utilities is 96 percent funded at the state and local level," says Knopman. "The federal government plays a relatively small role in direct funding."

While the federal government may not be a big part of the funding, it has an oversized impact on the costs. Through the federal Safe Drinking Water Act and Clean Water Act—as well as state laws—water systems must comply with a host of water quality standards, some of which require major capital expenditures.

It is largely the ability of the nation's 52,000 community water systems to meet those standards where the funding challenges arise. According to the U.S. Centers for Disease Control and Prevention, 80 percent of the 286 million Americans hooked up to community systems get their water from only 8 percent of the systems.

"The large systems have a lot of pipes to replace," says Knopman, "but they generally have the rate base and asset management plans to recapitalize and modernize their systems."

The smaller systems face a daunting challenge. They incur the high capital costs necessary to meet the federal and state standards, but do not have the service base to cover them.

The federal Water Infrastructure Finance and Innovation Act, which provides long-term loans to water and wastewater systems, provides some help. "It is a very small slice of the pie right now," says Knopman, "but I expect the program to grow because it is a relatively efficient mechanism for increasing the flow of capital into water systems."

Knopman says the most positive step Congress could take would be to make changes to the primary financing vehicle for water systems, the \$3.8 trillion tax-free municipal bond market.

"It is a very healthy market, but it primarily serves the investment needs of high-income people looking to reduce their tax liabilities," she says. "These bonds are not appealing to other investors who would be most attracted to infrastructure, such as the big public pension funds. They are looking for returns on their investments, and the interest on municipal bonds is too low. They end up investing in infrastructure in other countries."

One possible remedy would be changing the nature of the federal subsidy in the municipal bond market. "Rather than providing a tax break for the individual, the federal government could directly subsidize the local government, which could then issue bonds at a competitive market rate," says Knopman.

> This was the premise behind the Build America Bonds, which were introduced in the American Recovery and Reinvestment Act in 2009. "They were hugely popular, but they were only authorized for two years," she says. "There are some issues to work out, but it would be a way to expand the market."

RENEWABLE ENERGY

To a significant extent, renewable energy has outgrown its public funding, which was primarily in the form of federal tax credits.

"The federal subsidies were very important, instrumental in putting

renewable energy on a competitive footing," says Motyka. "The subsidy is less of a crutch now. They still help, but there are more and more instances where renewables can compete without them."

As a result, she does not expect the subsidies to be renewed and extended.

The public sector, however, still has a huge part to play in the renewable energy market, specifically through state renewable portfolio standard (RPS) programs.

"Over the past two decades, nearly 50 percent of the growth in the renewables sector was driven by those state mandates," says Motyka. "Half of the states with RPS programs expect to reach them by 2021, and numerous states are deciding whether they want to increase them."

For example, Hawaii and California have set goals of 100 percent renewable energy generation by 2045. "I do not see this momentum tailing off," says Motyka.

Cities are also getting into the mix, with many smart city programs incorporating significant renewable components. "If a city wants to enhance quality of living and sustainability," she says, "renewable energy is a great opportunity."

Gerry Donohue is ACEC's senior communications writer. He can be reached at gdonohue@acec.org.

Hawaii and California have set goals of **100 percent** renewable energy generation by **2045**

LEGISLATIVEACTION

FAA Proposes Favorable Changes to Unmanned Aircraft Regulations

he U.S. Department of Transportation (U.S. DOT) has proposed changes to federal rules governing commercial use of small unmanned aircraft systems (UAS) to permit flights over people on the ground and at night, under certain conditions. ACEC has consistently called for more permissive UAS regulations and is supporting the change to allow A/E firms to conduct expanded operations in those environments.

Under existing Federal Aviation Administration (FAA) rules, commercial drone operators can apply for a waiver to fly drones over people or at night, but the exemption process can be slow and

restrictive, especially for operations over people.

The proposed rule would create a new framework with three categories of permissible UAS operations over people not involved in the operation, based on the risk of injury. The FAA developed a tiered, performance-based standard designed to take into account the combinations of weight, speed, altitude, materials and fail-safe measures.

UAS manufacturers would be required to demonstrate compliance and label the vehicles according to which categories they meet. Operators would then be responsible for complying with the operational parameters applicable to the three categories. The U.S. DOT also reiterated the prohibition on operating UAS over moving vehicles, but the notice requests comments on whether that restriction should also be lifted.

ACEC has sought authorization for UAS over people on the ground and in moving vehicles because many A/E applications may involve work in those types of environments, including building and bridge inspections, construction site monitoring and surveying.

For use at night, the regulations would also be modified to amend pilot certification knowledge testing and training standards for nighttime operations and require the UAS to have anti-collision lighting visible for at least 3 statute miles.

The FAA has stated that a final rule regarding operations over people will be contingent on finalizing a separate, parallel rule on remote identification of small UAS in order to address the related security concerns.

Final Passthrough Tax Deduction Rule Issued

n January, the Treasury Department released the final rule to implement Section 199A of the Tax Cuts and Jobs Act, a 20 percent passthrough tax deduction. Advocacy by ACEC and its Member Firms ensured that engineering and architecture are fully eligible for the deduction.

The Tax Cuts and Jobs Act lowered the corporate tax rate from 35 percent to 21 percent, which provides significant tax relief for engineering firms organized as C corporations, including personal services corporations. The law also created the Section 199A, 20 percent tax deduction for passthrough firms, including S corporations, partnerships and sole proprietorships.

ACEC submitted comments in support of the proposed Section 199A rule in September 2018, and the final rule largely reflects the proposed rule. Additional examples were provided in order to assist taxpayers with compliance.

One improvement in the final rule clarifies that engineering and architecture are not considered to be consulting services, which is one of the specified services fields that are not fully eligible for the deduction. This language will address questions that some CPAs have raised with their engineering firm clients.

ACEC members can contact Katharine Mottley, senior director of tax and regulatory affairs, at kmottley@acec.org or 202-682-4306, for further information.

ACEC Joined Broad Coalition Effort to End Shutdown

CEC joined the U.S. Chamber of Commerce and a broad coalition of business organizations in January calling on Congress and the administration to end the shutdown affecting several federal agencies, including the U.S. Department of Transportation.

The Council joined with the Chamber and others on a letter to President Donald Trump and the House and Senate urging swift action, noting that the government shutdown—the longest in American history—caused significant, and in some cases, lasting damage to families, businesses and the economy.

Congress and the administration eventually agreed to reopen affected agencies, while the administration looks for new ways to fund border security.



	WHAT'S NEXT
New 20 percent passthrough leduction, other tax reform provisions	Further implementing regulations expected in advance of April deadline
Proposed drone rules	Final rule possible in the spring
Bonding bill for public buildings	Possible inclusion in future infrastructure package

ACEC-Backed Private Activity Bonds Bill Reintroduced

ongressmen Earl Blumenauer, D-Ore., and Mike Kelly, R-Pa., have reintroduced legislation that would create a new financing mechanism to support the design and construction of schools, court houses, libraries, and other public buildings.

H.R. 1251, the Public Buildings Renewal Act, would add public buildings to the list of facilities that qualify for private activity bonds (PABs). Under the legislation, up to \$5 billion in PABs would be available to state and local governments to construct a variety of governmentally owned buildings, providing needed infrastructure funding and encouraging public-private partnerships in this area.

The bill was introduced with strong bipartisan support, attracting 10 original sponsors from both sides of the aisle.

ACEC and its membership organizations are working to build support for the legislation to be included in a larger infrastructure package that Congress is expected to consider this year.



Rep. Earl Blumenauer, D-Ore.



Rep. Mike Kelly, R-Pa.

ACEC Joins With Clean Water Council in Call for Congressional Action on Water Infrastructure

CEC signed a joint letter from the Clean Water Council (CWC) to congressional leadership urging investment in water infrastructure as part of any comprehensive infrastructure legislation.

According to the Environmental Protection Agency, \$472.6 billion will be needed over the next 20 years to maintain and improve drinking water systems, and \$271 billion will be needed for wastewater and stormwater treatment systems.

The CWC letter cites a recent study by the College of William & Mary Public Policy Program, which found that "a single dollar spent on drinking water infrastructure generates hundreds of dollars in public health benefits." A CWC study found that "\$1 billion invested in water infrastructure has the potential to create 20,003 to 26,669 jobs."

CWC is a national coalition of organizations representing underground utility construction contractors, design professionals, manufacturers, suppliers and labor representatives committed to ensuring sound water infrastructure.



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

PRIVATESIDE



DESIGNATED OPPORTUNITY ZONES INCLUDE:

- 24 MILLION JOBS
- 1.6 MILLION PLACES OF BUSINESS
- 75 PERCENT ARE IN ZIP CODES WITH 2011-2015 EMPLOYMENT GROWTH
- < 4 PERCENT HAVE EXPERIENCED HIGH LEVELS OF SOCIOECONOMIC CHANGE
- 50 YEARS = MEDIAN AGE OF HOUSING STOCK

SOURCE: ECONOMIC INNOVATION GROUP



By Erin McLaughlin

here is a new client type for engineering firms on the horizon: Opportunity Zone funds.

Referred to as "the biggest tax cut you've never heard of" by *The Economist*, the Opportunity Zone tax incentive is

the first new national community investment program in 15 years. It provides flexibility to develop and redevelop a variety of commercial and residential project types from much-needed workforce housing to well-located brownfield sites in metropolitan areas. The incentive allows investors significant tax breaks in exchange for investments in census tracts that have been designated by each state's governor, with investors being rewarded for staying capitalized in projects for 10 years or more.

For engineering firms, connecting with state and local organizations working to attract Opportunity Zone development, and exploring with clients potential properties that may fall into these zones, are excellent strategies to position for future work. There have been 9,000 communities designated as Qualified Opportunity Zones—including many in transitoriented, urban locations.

The federal government continues to release guidance on the new tax benefit—and although some want more details before they move forward—it has not stopped many states and localities from organizing. One example is the state of Maryland and Baltimore City, which announced in January 2019 they are establishing operations to facilitate investment in Opportunity Zones. Many other municipalities are beginning to identify and market sites in designated Opportunity Zones.

Investors are also not waiting on more guidance, with both traditional and nontraditional commercial real estate firms starting companies to create funds and target Opportunity Zones for investment and development.

To learn more about where Opportunity Zones are located, visit the interactive map on the Economic Innovation Group's website: https://eig.org/ opportunityzones.



Capitalizing on the 'Nexus' of Water and Energy

Two markets are increasingly connected for engineering firms: water and energy.

Engineering firms that serve both markets are in a unique position to have a more holistic view, and bring new solutions to municipal, utility and energy clients.

Energy clients are realizing their need for water expertise; water clients are searching for new energy sources; and both are aiming for resiliency. Statistics and recent events back up "the water-energy nexus" and the need for joint solutions.

Large quantities of water are necessary for the energy activities of mining, fuel production, hydropower and power plant cooling. Energy is needed for collecting, pumping, treating and distributing or discharging water and wastewater. In California, the transportation and treatment of water accounts for nearly 19 percent of the state's energy usage. With recent wildfires and droughts in the West, hurricanes and superstorms on the Gulf and East coasts, and growing natural gas extraction by hydraulic fracturing, the critical connection between water and energy is clear.

The U.S. Department of Energy report, "The Water-Energy Nexus: Challenges and Opportunities," acknowledges that "at the national and international levels, energy and water systems have been developed, managed and regulated independently." But for new technologies and designs to become commonplace, those independent silos must break down.

Articulating possible alternative processes to clients, such as those featured in the graphic to the right, may help those in both markets understand the increasing opportunities for cooperation and innovation.



"Technology-

based

leapfrogging

remains

elusive," as

there are

only

4.5 billion

smartphones

in the world, and **more** than

half of humanity

has never

gone

online

U.S. Leads in Overall Global Economic Ranking, but is 9th in Infrastructure

The World Economic Forum (WEF) named the United States the lead country overall in its annual "Global Competitiveness Report 2018." However, the U.S. only ranks ninth under the index's measurement of infrastructure.

The Global Competitiveness Index measures the factors that drive long-term growth and prosperity, helping policymakers identify challenges and strengths to aid in designing the economic growth strategies for their countries. In the report, WEF cites four factors of growing and high significance-which are similar to the key factors relevant to the business of engineering: human capital, innovation, resilience and agility. In addition, the index measures 12 pillars including infrastructure.

The report warns that policies addressing inequality through reversing globalization are counterproductive to sustainable economic growth, and that government and industry leaders should focus on improving the conditions of those specifically impacted by the modern economy.

"Although global economic growth has been robust over the past two years, it remains fragile in this changing economic and political context," Klaus Schwab, founder and executive chairman of the World Economic Forum, wrote in a preface for the "Global Competiveness Report 2018."

Additionally, WEF notes that although the leading countries offer robust economic environments where factors such as infrastructure are valued, innovation and development are still not global.

WEF Global Competitiveness Rankings		
Top 10—Overall	Top 10—Infrastructure	
1. United States	1. Singapore	
2. Singapore	2. Hong Kong SAR	
3. Germany	3. Switzerland	
4. Switzerland	4. Netherlands	
5. Japan	5. Japan	
6. Netherlands	6. Republic of Korea	
7. Hong Kong SAR	7. Germany	
8. United Kingdom	8. France	
9. Sweden	9. United States	
10. Denmark	10. Spain	





Energy & Utilities Partnerships (P3s) The Private Side is a regular department of Engineering

Inc., focusing on the privatesector markets listed above, and information and insights on publicprivate partnerships and economic data relevant to the industry. For more on these topics, subscribe to ACEC's bimonthly Private Industry Briefs: https://programs.acec. org/industrybrief/.



WEBINARS ON DEMAND

To download webinars on the privatesector market, as well as other popular engineering business management topics-and earn PDHs in the process-visit: https://www.acec.org/education/ on-demand-online-classes

Erin McLaughlin is ACEC's senior director of private market resources. She can be reached at emclaughlin@ acec.org.

Representative Opportunities for Energy and Utility Clients Using 'Nontraditional' Water Sources and Alternative Processes

"Nontraditional" Water Sources:

- Oil & gas-produced water
- Water from carbon sequestration
- Brackish groundwaters
- Municipal wastewaters
- Desalination brines
- Seawater

Possible P	rocesses:
------------	-----------

Resource Recovery:

membranes Capacitive deionization

Desalination:

Nano-

Membrane

distillation

Forward osmosis

Dew vaporation

Hybrid systems

=

Possible Usage:

- Thermoelectric cooling
- Irrigation
- Industrial uses
- Drinking water
- Hydraulic fracturing
- Energy storage

- **Biosolids**
- Energy: produced waters
- Gas cleanup

hydrolysis Anammox

Thermal

Anaerobic

membrane

bioreactors

processes UV LED

Wastewater

Treatment:

- disinfection
- Inorganics

Fuel cells Algal bioenergy

INTHENEWS

WSP's Miller Co-Authors National Climate Assessment

awlings Miller, principal at WSP, co-authored two sections of the congressionally mandated "Fourth National Climate Assessment," which provides a comprehensive summary of the present and likely impact of climate change on the United States.

Miller co-wrote the Transportation chapter and the section on the Northeast region.

"We were tasked with documenting how climate change has affected, and is projected to affect, the United States," says Miller. "The information is mainstream and written in a way that is digestible to the general



The report's multiple authors focused on their specialties—Miller wrote on the urban transportation network—

public."

but there was dialogue between the authors as well as reviews of each other's work. Additionally, there was a lengthy public comment period and review by agency officials.

Miller believes the 1,524-page report will have an impact on upcoming infrastructure legislation.

"The report can clear up some of the misinformation about climate change that is counterproductive to protecting our country," says Miller. "If the report is used in a way to inform the public, we may move from a country that is debating simple science to one that deals with climate issues that collectively are very concerning."

To view the report, visit: http:// bit.do/2018-natl-climate-assessment-full-report.

HNTB Survey Finds Broad Support for Public Transportation

According to the 2018 HNTB survey, more than half (52 percent) of respondents said the primary benefit of public transportation is "helping those who cannot drive."



early 9 in 10 Americans believe the government should help fund public transportation, according to the 2018 HNTB survey "America Thinks: Public Transportation in the U.S."

Results show support was highest in the West (88 percent), followed by the Northeast (87 percent), South (85 percent) and Midwest (83 percent).

Among age groups, millennials were most supportive with 93 percent calling for the government to fund transit, followed by Generation X (85 percent), baby boomers (80 percent) and seniors (61 percent).

More than half (52 percent) of respondents said the primary benefit of public transportation is "helping those who cannot drive." Other benefits were "a safer way to travel" (32 percent), "more convenient access to amenities that otherwise would not be available" (31 percent), "a relaxing way to travel"



(27 percent) and "create jobs and/or provide access to jobs" (25 percent). The random nationwide survey of 1,019 Americans was conducted

in August 2018. To view the HNTB survey, go to: http://bit.do/2018-HNTB-survey.

If your firm has an item to submit to *In the News*, **please contact Gerry Donohue at gdonohue**@acec.org.

Mentoring Can Strengthen Firm, Unclog Leadership Pipeline

n his first day working at Mott MacDonald in 2008, Vatsal Shah met Nicholas DeNichilo and they struck up a conversation over their alma mater, the New Jersey Institute of Technology (NJIT). It was not until a month later that Shah learned that DeNichilo was the CEO and president of the firm.

Over the ensuing months and years, as reported in the *NJIT Magazine*, the two developed a mentor/ mentee relationship, with DeNichilo providing advice and guidance.

Shah, who is now a senior project manager, says DeNichilo helped him make focused, smart decisions that allowed him to excel in his profession at a young age. "Years later into my career, my focus has shifted from managing my own goals to more responsibility and managing the needs of others," Shah says.

"I was very fortunate in my early years to have good mentors who have helped me along the way," says DeNichilo. "I get a tremendous sense of satisfaction in knowing that I may have had a small part in advancing someone's career."

DeNichilo adds that mentoring offers a broader benefit. "Supporting mentorship at Mott MacDonald enables me in my role as CEO to unclog the leadership pipeline by preparing others to take over when you are no longer leading the business."

Promoting Gender Equality in the Workplace



Megan Lisbon, a structural engineer in Stantec's New York City office, took part in the seventh annual S.H.E. Summit. Held in October, the summit brought together several hundred participants from all walks of life to promote and achieve gender equality in the workplace.

Lisbon notes three takeaways from the Summit:

1. Find a champion. "Studies show that women are not as good as men at praising themselves," Lisbon says. "Women should find a 'brag buddy' who will sing their praises and brag on their behalf in professional settings."

 Be willing to fail. "The best way to succeed in a new role is to make mistakes and learn from them," she says. "Women need to begin to build the confidence to take risks professionally and leave the notion that they are not good enough for a new role at the door."
 Be a sponsor. "If you are in a leadership position, take it upon yourself to sponsor a knowing (or unknowing) younger professional who has a different background than yours. Everyone should have someone in the company besides themselves to help foster their career growth."

Kennedy Jenks Celebrates 100-Year Anniversary



Keith London



"Our success is built on a solid foundation of integrity, technical excellence, innovation and personalized client service that has earned us an enviable record of 90-plus percent repeat business," says Keith London, KJ president & CEO, and ACEC vice chairman. "We are obviously proud of the high level of client satisfaction and trust we have maintained over our century of service."

Among the countless innovative water infrastructure solutions KJ has delivered over the years was the design of water and wastewater systems for the 1960 Winter Olympics in Squaw Valley, California.

KJ has nearly 400 staff, including engineers and scientists in 27 offices across 13 states throughout the nation.

For more information about the history of KJ, go to: **www.kennedyjenks.com**.

Kennedy Jenks

Rep. Peter DeFazio, D-Ore., is the new chairman of the powerful House Transportation and Infrastructure Committee, which has jurisdiction over highway and transit programs, water resources, the U.S. Army Corps of Engineers, railroads, aviation, the U.S. Coast Guard and the Federal Emergency Management Agency. DeFazio, who was first elected to Congress in 1986, is now the longest-serving House member in Oregon's history.

DeFazio has been a member of the House Transportation and Infrastructure Committee since he entered Congress and has served as chairman or ranking member of four of the six subcommittees: Aviation, Coast Guard and Maritime Transportation, Highways and Transit, and Water Resources and Environment. He has taken a lead role on several multibillion-dollar surface transportation and Federal Aviation Administration reauthorization bills and worked to strengthen Buy America standards.

In an exclusive interview with ACEC's *Engineering Inc.*, DeFazio discusses his plan to secure robust infrastructure investment that translates into significant job creation, increased safety, economic efficiency and strategic growth.

TIME

REP. PETER DEFAZIO, D-ORE., DISCUSSES IDEAS FOR LONG-TERM, SUSTAINABLE INFRASTRUCTURE INVESTMENT

ACEC: Everyone is talking about infrastructure investment as an area for bipartisan cooperation in 2019. What are the prospects, and how broad in scope do you expect the package to be?

Rep. Peter DeFazio: Congress must ensure that investments made today will meet the needs of the next generation of Americans. We cannot just maintain what we have; we also need to modernize how we plan and build transportation projects. We need stronger, more resilient transportation facilities that will have a longer life span and withstand the changing climate. We must identify ways to ensure that our states and local partners can deliver projects quickly and efficiently—without undercutting safety, critical environmental protections or worker rights.

In the 116th Congress, we inherit a decade of underinvestment in surface transportation. We simply have not kept up a level of investment to allow our transportation systems to work for future generations, kept our growing population moving and our economy competitive. This problem has been exacerbated by the fact the federal funding source for highways, bridges, transit, safety, bicycle and pedestrian infrastructure, congestion

mitigation and transportation planning—the Highway Trust Fund—has been in the red since 2008. Previous Congresses have avoided addressing this revenue shortfall, electing instead to pass funding transfers and other short-term fixes. At the federal level, we cannot support states and cities—and move America forward—without identifying additional revenues.

ACEC: Will you be able to convince congressional leaders and the administration to support long-term, sustainable revenue solutions for the Highway Trust Fund and other infrastructure programs?

DeFazio: We have to bite the bullet and pay for the long-term, sustainable revenue we need—it is one of the most important things

we can do in an infrastructure proposal. That means providing real funding, and not borrowing, implementing gimmicks, leveraging or devolution or selling off assets. We must go beyond the status quo in terms of spending, if we want to both maintain the assets we have and modernize our infrastructure.

I am open to any ideas on that front, but I have proposed three solutions that provide the revenues needed for real investment.

First, the A Penny for Progress Act provides approximately \$500 billion for infrastructure investment to improve the conditions of our nation's highways, bridges and public transit systems; address state-of-good-repair backlog; and meet estimated future highway and transit needs. We can achieve this level of investment by indexing the gas and diesel tax. We can provide a boost in investment by bonding off the indexation revenues and bringing those revenues forward. We are also exploring ways to take into account growing electric vehicle use in the future.

Second, the Unlocking the Harbor Maintenance Trust Fund

Act amends current budgetary controls to allow the Army Corps of Engineers to spend the funds collected in the Highway Trust Fund each year, thereby providing more than \$18 billion for our nation's coastal and inland harbors over the next decade without raising taxes or increasing the deficit.

Finally, the Rebuilding America's Airport Infrastructure Act will generate billions of dollars each year to help our airports rebuild and rehabilitate aging terminals, runways and taxiways, and keep pace with increasing demand in the 21st century without raising taxes—by raising or eliminating the cap on the passenger facility charge.

ACEC: Engineering firms are being tasked to design structures and systems to withstand and adapt to increasing extreme weather events, rising sea levels, and other natural and manmade disasters. What federal policies, in addition to the changes made in the Disaster Recovery and Reform Act of 2018, are needed in the infrastructure arena to help address future risk mitigation?

DeFazio: What is really important is not only designing, engineering and building for resilience—it is building to an insurable standard. If an infrastructure project is uninsurable due to a known risk, we should really be asking if there is a cost-effective way to mitigate that risk; otherwise the federal government is eventually going to be on the hook again to pay for any future damages.

Some will argue that climate change is not real until they are drowning from sea level rise, but it is undeniable to argue that our nation has witnessed and experienced significant environmental changes over the last few decades. From a federal funding perspective, Congress cannot continue to pay to reconstruct uninsurable infrastructure—that is just wasting taxpayer dollars.

In the 2018 National Defense Authoriza-

tion Act, Congress and the Department of Defense (DoD) agreed to build all critical infrastructure on DoD properties worldwide to 3 feet above the base flood elevation and noncritical infrastructure to 2 feet above the base flood elevation. That is a great first step, but it does not apply to non-DoD federally funded infrastructure.

We know that mitigation in the built environment—whether to lessen the impacts of flood, seismic, wind, terror, etc. events—is a massive cost savings to the public in the long run. We need to constantly be looking for ways to incentivize more mitigation to strengthen resilience in the built environment.

ACEC: Technological advancements are dramatically changing the face of transportation, from smart cities to autonomous and connected vehicles to unmanned aircraft. How can federal policies keep up with this dynamic and disruptive environment? DeFazio: Cities and states are leading the way in innovative new

According to the Congressional Research Service, the overwhelming majority of federally assisted highway projects— **90 percent** proceed under a categorical exclusion



Rep. Peter DeFazio (center) meets with ACEC President and CEO Linda Bauer Darr (right) and ACEC Chairman Manish Kothari (left) at his Capitol Hill office to discuss plans for securing long-term infrastructure investment.

approaches to moving people such as transportation network companies, scooters, bike share, microtransit (first mile/last mile connections) and autonomous vehicles. At the federal level, we need to support policies that allow innovative mobility solutions to thrive. At the same time, Congress must consider and address negative impacts from these new solutions such as increased congestion, emerging safety challenges and potential job losses.

We will also need adaptable infrastructure in the future that will overcome the crippling congestion problems we face. We should be directing investment to the most efficient, cost-effective and environmentally sustainable ways to move people.

ACEC: Your predecessor on the House Transportation and Infrastructure Committee re-established a practice of doing a Water Resources Development Act (WRDA) every two years. Do you plan to continue that practice, and will WRDA continue to feature water infrastructure such as the Clean Water and Drinking Water State Revolving Fund programs and Water Infrastructure Finance and Innovation Act expansion, in addition to the Corps of Engineers programs?

DeFazio: I was pleased to work with former Chairman Bill Shuster, R-Pa., in enacting a new, bipartisan water resources development bill every two years over the past three Congresses, and fully expect to continue that tradition in the 116th Congress. Regular enactment of a water resources bill provides predictability to local sponsors in ensuring that vital flood control, navigation and environmental projects and studies are authorized when ready and allows the committee to conduct regular oversight of the Corps of Engineers' implementation of these projects.

It is also my hope that this year, Congress can finally reauthorize the Clean Water State Revolving Fund program—the primary source of federal funds for our nation's wastewater infrastructure. This popular program, which routinely gets bipartisan support, has not been reauthorized since 1987. I will work to ensure that its reauthorization will move with Congress' efforts to enact a comprehensive infrastructure package later this year.

ACEC: Congress enacted an array of project delivery permitting reforms in Moving Ahead for Progress in the 21st Century Act (MAP-21), the Fixing America's Surface Transportation Act (FAST), WRDA and other infrastructure bills. What is the status of implementation of those reforms, and what is your perspective on what additional legislative changes might be necessary for facilitating efficient project delivery while ensuring adequate environmental and regulatory protections?

DeFazio: After years of delays, the Department of Transportation (DOT) has finally completed work on the majority of the 42 actions it was required to take to implement the streamlining provisions that Congress approved as part of MAP-21 and the FAST Act. However, the DOT has yet to assess the effectiveness of these streamlining provisions.

According to the Congressional Research Service, the overwhelming majority of federally assisted highway projects—90 percent—proceed under a categorical exclusion. Only 4 percent of projects require the preparation of an Environmental Impact Statement, the most detailed review document. A recent report, commissioned by the Department of the Treasury, identified 40 economically significant transportation and water projects whose completion has been slowed or is in jeopardy. The report found that "a lack of public funding is by far the most common factor hindering the completion of transportation and water infrastructure projects." Further, the report found that delays resulting from environmental review and permitting were identified as a challenge to completing less than a quarter of the projects.

We cannot streamline our way out of our funding shortfall. I am open to additional ways to ensure projects are delivered as quickly and efficiently as possible, provided that we do not roll back environmental protections.



BY SAMUEL GREENGARD

THE CHALLENGES OF UNDERWATER ENGINEERING ARE REMARKABLE, BUT TECHNOLOGY IS DRIVING INNOVATION

THE WAVES

ngineering has always revolved around the idea of expanding and extending the reach of humans. However, in the ongoing quest to build better transportation systems, more elaborate energy infrastructure and advanced telecommunications networks, it is easy to overlook a basic fact: Many projects involve underwater elements—and the scope of these projects is often complex

and challenging.

"There is a great deal of innovation that goes into constructing, maintaining and repairing underwater structures and systems," says Terry Browne, vice president of safety at Collins Engineers, Inc., a full-service civil engineering firm that specializes in underwater projects.

Underwater engineering is not for the faint of heart—or the short of breath. Dropping transoceanic cable at several thousand meters or sending divers to inspect bridges or deep-water oil platforms in near-zero underwater visibility is not only rife with difficulties, it can delve into the realm of dangerous and expensive. These projects require advanced know-how, sophisticated technology and a willingness to push the boundaries of conventional thinking and engineering. Venturing beneath the surface of a river, lake, reservoir or ocean is far different than the engineering and construction that takes place on terra firma. "Unseen situations equate to unknown conditions of critical infrastructure, along with unknown hazards," says Browne.

How do firms specializing in underwater engineering accomplish seemingly impossible tasks? How do they put innovative concepts and leading-edge technologies to work?

Using an array of tools and expertise—from sophisticated dive suits and submersibles to sonar, acoustical imaging, LiDAR, electromagnetics and big data analysis—engineers navigate adverse pressures, poor visibility and strong currents in order to build and maintain the bridges, oil platforms, wind farms and ninglings that keep the



and pipelines that keep the world functioning.

"These projects involve complex and expensive infrastructure," says Nicholas Welz, director of submarine cable systems for Tetra Tech, Inc., an engineering firm that specializes in major ocean and reservoir projects.

A DIFFERENT WORLD

Underwater engineering can encompass a diverse array of tasks, including:

- Design-stage data gathering
- Environmental permitting and archeological studies
- Subsurface construction monitoring and quality control
- Maritime threat assessments
- Rapid condition assessment following a seismic event, storm or accident
- Erosion detection and documentation
- Evaluating existing infrastructure

"Any work that is done above water may be accomplished below water with the proper planning, training, approach and understanding that there are additional obstacles that must be overcome," says Shanon Chader, chief of the Coastal/Geotech Team and district dive coordinator for the U.S. Army Corps of Engineers (USACE) in Buffalo, New York.

Although the fundamentals of engineering remain the same on land or at sea, the way that underwater specialists approach projects can vary considerably. It is not unusual for teams to work in conditions where they cannot see components and equipment, where currents and pressure present extreme difficulties and dangers, and where forces and physics affect structures in entirely different ways.

Chader points out that limited visibility, water temperature, varying air temperature, wind, waves and other environmental factors can further ratchet up the challenges and risks. Teams may work in icy or polluted water and confront dangerous creatures.

"My dive team has had to deal with snakes, fire ants, dolphins, sharks and large alligators to name a few," he says.

Of course, building and maintaining bridges, tunnels, dams, pipelines, oil and wind platforms, cables and other infrastructure also require specific technical acumen—and the right equipment.



"Today's equipment and technology allow us to go deeper beneath the surface and obtain critical project information faster and better."

> MICHAEL J. GANAS VICE PRESIDENT AND DIRECTOR OF UNDERWATER AND MARINE ENGINEERING PROJECTS BOSWELL ENGINEERING



"Unseen situations equate to unknown conditions of critical infrastructure, along with unknown hazards."

TERRY BROWNE VICE PRESIDENT OF SAFETY COLLINS ENGINEERS, INC.

"The technology and processes are often very different than projects taking place on the land," says Michael J. Ganas, vice president and director of underwater and marine engineering projects at Boswell Engineering. The company performs underwater inspections and designs and manages or monitors underwater construction, inspections, maintenance and repairs of waterfront facilities such as dams, piers, bridges and other waterbased structures. The firm has worked extensively with the New York State Department of Transportation, the Port Authority of New York and New Jersey and various other entities.

What makes the task more challenging is the fact that there is an "out of sight and out of mind" perception of these projects by marine facility owners, whereby information obtained by a servicing entity on the condition of a submerged structure must be accepted on good faith, though that information may essentially be erroneous. As such, underwater inspection is one of the most abused areas of civil engineering, according to Ganas. Underwater structures and equipment often deteriorate faster and more severely than comparable structures exposed to the atmosphere. This can lead to additional maintenance costs, damage, risks and dangers. Additionally, building these highly specialized structures and spotting defects is only part of the challenge.

"Personnel must not only be proficient in commercial diving techniques to gain access to submerged structural elements, they must also possess a firsthand knowledge of a wide array of deterioration processes and their causes," Ganas says.

WORKING UNDER PRESSURE

At the heart of underwater engineering is a basic fact: Advances in materials, methods and technology have radically changed the way firms approach projects. According to Welz, processes take place faster, more efficiently and within a safer framework than a decade or two ago.

"In the 1980s and 1990s, engineers used paper charts taped together and a wax pencil to plan transoceanic cable systems," Welz says. "The planning process could take weeks or months to complete. Now you have GIS systems that can generate a contour map of the bottom and can model the way you are going to install the cable. The system can tell you exactly how much slack you are going to need to reach over bottom contours—and ensure that

Anatomy of an Underwater Project

The logistics, planning

and coordination required for a major underwater engineering project are significant. For example, when Boswell Engineering landed a contract to install a scour monitoring system at the Indian River Inlet Bridge near Delaware Seashore State Park, a complex mix of tasks, technologies and processes was required

Working under contract with the Delaware Department of Transportation, Boswell engineers used a sonar device to gauge the progression of developing scour holes that could potentially destabilize bridge piers located in the water. However, installation of the system required three divers work on the

seaward side of the bridge, where water conditions are rough and hostile.

Knowing it would be impossible to mount the system to the pier stems when the swift and turbulent current was at its worst, Boswell Engineering divers had to utilize narrow slack tide windows when the flow was ebbing and reversing. Teams had to plan in advance by referencing Indian River Inlet tide tables.

The divers relied on surface-supplied commercial diver support equipment with diver-to-surface communication to perform the installation. Using a 68-foot crew boat to provide stability in the powerful flow, the team used hydraulically powered hammer drills and welding gear to mount two prefabricated sensor support frames to the pier stems at fixed elevations underwater, one per water-based pier on the shoulder facing the seaward side.

Working in murky conditions, the team ultimately installed fendering frames to each pier stem above the sensor frames at elevations just above mean high water. These structures provide additional protection to the sensors against boats and floating debris. The project was completed in about three weeks. The system now provides an additional layer of safety for motorists who use the bridge.



"With all this data, it is possible to understand what challenges or problems exist and make an informed decision about a project."

NICHOLAS WELZ DIRECTOR OF SUBMARINE CABLE SYSTEMS TETRA TECH

you have exactly the right amount of cable going over the stern as you lay the cable."

These systems also depict underwater surfaces, including scour depressions, debris accumulation and exposed pier footings. As a result, engineers and other specialists, such as data scientists, must understand how to use sonar, LiDAR and other systems to develop reports and visualizations that aid in a project. The accuracy of data is crucial.

"There is a tremendous amount of liability associated with underwater operations, and firms should adequately risk-assess operations, constantly improve staff capabilities and embrace technological innovations," says Browne.

However, the technical, practical and logistical challenges do not stop there. Assembling all the equipment and systems required for a project can prove daunting. It is often necessary to transport specialized vessels—ranging from zodiacs to specially equipped boats—to a site. This may mean transporting a boat across land or sea, or locating a suitable vessel near a job site. Once at the location, there is often a need to hire a local captain who is familiar with the waters and how to navigate through them smoothly and safely. In addition, it is sometimes necessary to transport high-tech equipment and engineering systems by airplane or helicopter.

"This may involve security and customs clearances," says Browne. "Further complicating matters, different industries and countries have different requirements and regulations."

Finally, at an underwater job site, an engineering firm may require advanced communications systems for both voice and data. There is often a need to share a display of geospatially submerged data points or underwater images in real time with clients and contractors located in a different city, country or continent. Setting up these systems requires specific expertise.

"No two sites are the same," says Browne.



A Boswell Engineering diver prepares to perform an underwater inspection. In addition to being proficient in commercial diving techniques, a diver must also possess the knowledge of a wide array of deterioration processes and their

A DEEP DIVE

Technology may be changing the way engineers approach underwater projects, yet the human element remains. It is often necessary to send divers into the water to inspect systems, install pipes, weld equipment, tighten bolts and replace components. Although most projects take place in water that is no deeper than 100 feet, divers sometimes travel to depths as great as 2,000 feet.

"In many cases, divers must work in murky conditions where they cannot see their hand in front of their face, and they must deal with surges and crosscurrents that make an installation or replacement of a system more difficult. It is often slow and tedious work," says Ganas, who has worked on underwater projects over the course of three decades.

Make no mistake, venturing underwater to tackle complex engineering and construction tasks requires highly specialized skills and gear. Divers require extensive training to handle a variety of underwater conditions and adhere to OSHA requirements for safety, but they must also learn specific engineering and construction methods. This includes understanding how to operate sophisticated devices and equipment used for underwater projects.

"We now use updated diving gear that includes remotely operated vehicles, Superlite helmets with lights, cameras, constant surface communications, advanced dry suits, hot water suits and fully outfitted dive trailers," Chader says.

It is no small matter. "Being an effective engineer diver requires years of training, a special skill set, ability to effectively work with your dive team as well as individuals located at the dive site and a willingness to work in a variety of arduous above and below water conditions," Chader says. USACE, for example, requires divers to pass an initial basic scuba course from a reputable agency, an advanced scuba course and obtain an initial three-week dive safety school certification. USACE also has a dive program that allows a diver to become comfortable with the gear and the team approach the agency uses.

"Many of our divers have additional above and underwater training in bridge inspection, diver survival, deep diving, dry suit diving, rescue diving and search and recovery," adds Chader.

Remotely controlled submersibles have also changed the way engineers approach underwater projects. In many cases, these vessels—sometimes as small as 10 feet long and as flat as a surfboard—can travel to greater depths than divers and eliminate the need for divers to undergo decompression, something that can take hours or even a few days. They can also serve as a second set of "eyes" to locate lost gear. For example, one model of submersible can tilt and turn while using cameras and various sensors. It can handle inspections, underwater mapping and 4D geospatial visualizations.

"With all this data, it is possible to understand what challenges or problems exist and make an informed decision about a project. You no longer have piecemeal data and different groups of engineers toggling between data sets. You have all the visualizations and data you need to make the right decision," says Welz.

In the end, Ganas says that while marine technology and equipment have advanced remarkably—and powered dramatic improvements in design, engineering and construction—the basic objectives of underwater engineering have changed very little.

"Today's equipment and technology allow us to go deeper beneath the surface and obtain critical project information faster and better," he explains. "Yet, constructing a project and maintaining or repairing systems still requires the same basic engineering skills and expertise."

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



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ADOPTING LEAN PRINCIPLES IS ALL ABOUT CREATING VALUE FOR FIRMS AND THEIR CLIENTS

For Haley & Aldrich, Inc., it started in 2006 as the sustainability movement—doing more with less and preserving resources—was gaining momentum. In 2010, DiPrete Engineering was in the throes of the Great Recession and implemented this new concept as a way to reorganize internal workspaces and to streamline workflow. Buehler Engineering, Inc.'s, initial exposure occurred 10 years ago when the firm became involved in a complex construction project in California.

While their respective introductions were distinct, the ACEC Member Firms were adopting the organizational concept of "Lean," which at its core is about maximizing customer value while minimizing waste. The Lean philosophy and the array of tools for applying it originated in manufacturing decades ago and has spread widely across that sector.

Lean gradually made inroads among a few other industries, most notably health care, and in recent years gained traction in the A/E/C industry. While Lean may not be easy to implement, the firms that have done so sing its praises.

"The engineering community is starting to respond to the positive results they are seeing, that Lean is not a fad and is improving how we deliver projects," says Ron Migliori, senior principal at Buehler Engineering, Inc.

"If you are interested in Lean as a way to create more value for your customers and to respect your people and give them greater opportunities, you will be successful," says Larry Smith, president and CEO of Haley & Aldrich, Inc. "Furthermore, you will reduce your costs and be more profitable."

For the curious and uninitiated, simply defining Lean is instructive.

"Lean is a culture of respect and continuous improvement aimed at creating value for the customer while identifying and eliminating waste in the processes," says Kristin Hill, director, education programs at the Lean Construction Institute (LCI), which was formed in 1997 by Glenn Ballard and Greg Howell as a way to develop and disseminate new knowledge regarding the management of work in projects.

BIRTHPLACE OF LEAN

Toyota is regularly cited as the birthplace of Lean manufacturing beginning in the early 1980s in Japan. What is referred to as The Toyota Way is based on many years of continuous improvements. Toyota's objective: "making the vehicles ordered by customers in the quickest and most efficient way, in order to deliver the vehicles as quickly as possible."

Based on those origins, Migliori defines Lean as a way of thinking about always adding value, which, however, can be described differently.

"Some say Lean is all about eliminating or mitigating waste," says Migliori. "I would respond that if you are always looking at adding value, then you are automatically eliminating waste. You are looking at each process step as advancing toward the goal."

According to Migliori, the Lean tenet of continuous improvement is about always questioning the ways of doing things and looking at the value proposition, no matter what. The continuous improvement mantra, based on manufacturing and The Toyota Way, is plan, do, check, adjust—or PDCA.

"If you are making continuous improvement on something, test it, look at the results, then adjust if you need to," says Migliori.

Buehler Engineering, Inc., was first exposed to Lean in 2008, when collaborating with two other integrated project delivery teams with the federal receivership on a multiyear, health care facilities construction project for the California Department of Corrections and Rehabilitation.

"They brought in Lean gurus from LCI to teach us the principles," says Migliori. "We learned together and implemented every



"You need to focus on how you run the system and the inputs. If you get those right, then profit and growth are positive outcomes."

LARRY SMITH PRESIDENT AND CEO HALEY & ALDRICH, INC. day. It was an 'aha!' moment, and it was so obvious. Why have we not been doing this before?"

What Migliori learned has been applied across the firm's five offices. Furthermore, Buehler Engineering has used some of LCI's practical tools and methodologies for implementing Lean principles on several other health care construction projects.

LCI's essential tool is the Last Planner System, a production planning system designed to produce predictable workflow and rapid learning in programming, design, construction and commissioning of projects.

"Firms often do not plan work well, and some people on teams do not have time to do their work effectively to meet the schedule," says Hill. "That is not optimizing the whole, respecting people and flowing information. Teams need to understand everybody's process."

A LEAN JOURNEY

Haley & Aldrich, Inc., started what Smith calls its "Lean journey" in 2006. At the time, he was the firm's COO and believed Lean aligned perfectly with the sustainability principles Smith wanted the firm to embrace. Ultimately, he hired a consultant to help Haley & Aldrich, Inc., implement Lean.

"It was a challenge the first couple of years to make the transformation of Lean philosophy into a professional services setting," Smith says. "We have roughly 740 employees, 1,000 clients and work on up to 5,000 projects a year. It was about stepping back, thinking about the fundamentals and how to apply Lean to what we do."

The firm started out by training small groups of individuals on Lean principles. Those groups then worked with project teams to embed those principles on projects.

"The first couple of years, people were excited, but missing was a connection across the firm and more broadly the creation of standard approaches to doing things," says Smith. "We work in geotechnical, environmental engineering, and do a lot of subsurface investigation. So if you make an improvement and make something standardized in subsurface investigation, it has to be adopted by the entire firm in order for it to be of value. Then, when you innovate, you make the improvement and everyone adopts it, instead of everybody innovating independently."

The next step was to understand what value means to clients and how **ENGINE** to meet their value expectations, according to Smith.

"It gets down to what is important to our customers," says Smith. "If your goal is to make your service offerings as efficient as possible—better, faster, cheaper than anyone else's—that will help in terms of standardization. But if you are not delivering what the customer wants and needs, all that work is for naught."

LEAN BY NECESSITY

DiPrete Engineering's Lean journey began somewhat by necessity, says Christopher Ready, the company's CFO. Before joining the firm in 2007, he worked in manufacturing for more than a decade and learned Lean methodologies. When the recession hit, the previously booming business dropped off precipitously and half the staff had to be let go.

"But cost-cutting efforts after the recession only got us so far," says Ready. So he introduced the Lean concept to founder and CEO Dennis DiPrete, and convinced him to see it in action at a local manufacturer's facility. The boss was sold.

A Lean consultant was brought in and began implementing Lean tools. One was borrowed from the Toyota playbook about reorganizing workspaces for more efficiency.

"Everything has a place, and everything is in its place," says



"The engineering community is starting to respond to the positive results they are seeing, that Lean is not a fad and is improving how we deliver projects."

RON MIGLIORI SENIOR PRINCIPAL BUEHLER ENGINEERING INC.

Ready. "Someone used to spend 10 minutes looking for a threehole punch or a stapler in the common area, and now there is literally a shadow line for them like you would see on a wellorganized tool wall."

DiPrete Engineering also established a team to learn and work on process mapping, a Lean planning and management tool that visually describes the flow of work, showing who and what is involved at each step of a process.

"Lean allows you to think through the things that are not adding value to a process and to visualize it with less waste, more efficiency and with the right people performing the right roles," says Ready.

Project teams put a workflow map on the wall, with sticky notes showing the different steps in a process.

"People can visually see something that had maybe 150 steps go down to 45 steps, and to know who is accountable for various activities," says Ready.

DiPrete Engineering eventually applied the tool to its proposal writing process. The firm has more than 150 different activities it can perform on a given project, which were previously written out from scratch.

"We created a text library of all those activities and now have pre-written descriptions that we can drag and drop into a document, giving us standardized, DiPrete Engineering-branded proposals," says Ready. "By the way, this did not just catch on easily. As in any organization, with any kind of change initiative, people are fighting years of habit."

That speaks to a challenge when introducing Lean, according to Hill. "You need support from the top and to support the people who do the work," she says. "It takes commitment from the top to support the people who do the work. Management's critical job is to support teams through stressful times and small failures. Allow people to stumble with it and help get them back on track."

After some initial resistance, DiPrete Engineering's staff has bought in to Lean, and the firm has shown year-over-year growth since 2011.

"We benchmark against industry standards, and our billings per person are outperforming industry statistics," says Ready. "And while it has not been the only one, there is no doubt Lean has been a factor."

The bottom line results at Buehler Engineering, Inc., have been mostly positive, according to Migliori. The firm has completed eight health care construction projects over the past five years.

"We lost our profit on two, but learned the most on those projects," he says. "Once you drive costs down, you can get up to 150 percent of the profit you put at risk. That is pretty rare, but we have been fortunate to be on several really good teams where we received the maximum profit."

Four Fundamentals of Lean

he Lean journey begins by embracing the philosophy of creating value, within your firm and for your customers, by eliminating waste in processes, achieved by the use of specific tools and methodologies. While there's no one-size-fits-all

formula for adopting Lean in ACEC Member Firms, here are four fundamental principles:

1. Focus on Value from the Customer's Perspective

Because each project is unique, start by sitting down with the client's key decision-makers to ensure you understand their ultimate goals and expectations.

"One important lesson we have learned during 12 years of using Lean is that it is very dangerous to assume you know what a customer wants," says Larry Smith, CEO of Haley & Aldrich, Inc.

2. Deliver Value and Eliminate Waste

Once you have embedded Lean into the proposal and design stages, follow through at each phase of a project to eliminate activities in processes that use resources but do not add value.

"If you are always looking at adding value, then you are automatically eliminating waste," says Ron Migliori, senior principal at Buehler Engineering, Inc.

3. Improve Processes Continuously

Lean encourages constant innovation by always questioning processes. That means allowing people to fail and learn from mistakes. Developing a culture of continuous improvement fosters respect for people and a spirit of collaboration.

4. Utilize Tools and Processes to Shift Thinking While leadership must initially buy into Lean philosophy and encourage it from the top down, implementing the various

tools of Lean throughout the organization will lead to the day-to-day practice of Lean.

At Haley & Aldrich, Inc., Smith takes a Lean approach to profit and growth. "You can only achieve them if the underlying system is designed and operates to deliver them," he says. "You need to focus on how you run the system and the inputs. If you get those right, then profit and growth are positive outcomes."

The firm has gotten it right. Since 2010, it has averaged between 12 percent and 13 percent revenue growth every year.

Bob Woods is a technology and business writer based in Madison, Connecticut.



"Lean allows you to think through the things that are not adding value to a process and to visualize it with less waste, more efficiency and with the right people performing the right roles."

> CHRISTOPHER READY CFO DIPRETE ENGINEERING



ACEC's National Political Action Committee (PAC)

continued to find its groove in 2018. More state PAC Champions than ever realized their own successful fundraising formula that combined leadership, education, teamwork and popular events—each of which continue to yield consistent results.

The National PAC totaled \$1,090,683 in contributions in 2018, a new record for the organization and the third consecutive year the PAC has topped \$1 million in donations. Furthermore, 45 states reached their fundraising goals, up from 43 states the previous year.

Charles Gozdziewski, national PAC chairman and chairman emeritus of Hardesty & Hanover, attributes the rise in contributions to greater awareness.

MASTERZPHOTOIS / ISTOCK / GETTY IMAGES



"People are more aware of the issues, and they understand now the impact that a robust PAC can have on these issues," says Gozdziewski. "On top of that, we do have a pretty strong economy going forward. That helps to energize people."

"ACEC has done a great job of showing how valuable the PAC is to our membership," says John Carrato, national PAC vice chairman and president and CEO of Chicago-based Benesch. "We have been sharing best practices among the Member Organization PAC committees, and that has helped other states do a good job of raising the level of giving and widening the contribution base."

ACEC/PAC plays an essential role in the success of ACEC's advocacy program, backing federal candidates on a bipartisan

basis who support the engineering industry's business agenda in Congress. ACEC/PAC is currently the largest PAC in the design-build industry, and it ranks in the top 3 percent among all PACs. Approximately 91 percent of the candidates it supported in 2018 were elected.

The National PAC totaled \$1,090,683 in contributions in 2018, a new record

Furthermore, ACEC/PAC is the nation's only political organization with engineering firms and their related legislative issues as its core interest. ACEC/PAC is regulated by the Federal Elections Commission and is overseen by a committee of PAC Champions made up of engineering firm executives from throughout the U.S.

Empire State Retains Top Fundraising Spot

he annual battle for the largest individual state ACEC/PAC contribution once again came down to New York and Illinois. In 2018, ACEC/New York retained its No. 1 fundraising crown with total contributions of \$85,923 versus ACEC/Illinois, which contributed \$77,435 in donations.

"ACEC/New York members understand the importance of educating our legislators on the important business interests of our Member Firms," says Thomas Cascino, co-PAC Champion for ACEC/New York and vice president at AECOM. "The funds we raised in New York and other states last year will continue to advance that process."

New York's divide-and-conquer formula has been working. The state PAC, which is overseen by Cascino and Charles Gozdziewski, national PAC chairman and chairman emeritus of Hardesty & Hanover, is divided into eight regions that hold individual PAC events. A golf outing in Long Island raised over \$10,000, while another golf event in the mid-Hudson Valley raised over \$5,000. The upstate New York region hosted a trip to a Syracuse University football game. Lastly, the Rochester, Albany and Buffalo regions each invited individuals at Member Firms to dinner and a theater performance.

"Kudos to New York's co-PAC Chair Charles Gozdziewski, our ACEC/New York committee liaison Campbell Wallace and all of our regional PAC leaders who made this record-setting year possible," Cascino says.

> group. Additionally, Louisiana surpassed its donation goal for the first time since 2011, due to the persistence of PAC Champion Kenny Smith.

"Louisiana is like most states, where individuals are very engaged and they individually support candidates, but collectively not so much," says Smith, president and CEO of Houma, Louisiana-based T. Baker Smith. "You have to convince people that it is even better to contribute to a focused PAC versus individual contributions. That is always a tough sell."

In 2018, after four years of shortfall, Smith found a successful path. "The ACEC/Louisiana board decided they all were going to be engaged, so we had unanimous contributions from all the board members. That was the starting point," says Smith.

ACEC/Louisiana PAC leaders went deeper into organizations with its calls for contributions. "We tried to get the idea of contributing to the PAC off the desk of the CEO and onto the desks of the project managers and other professionals in the organizations, through the emerging leaders program or project

GOAL ACHIEVERS

A record 45 states reached their national PAC contribution goals in 2018, up from 43 states in 2017. New Hampshire made its goal for the first time ever in 2018, driven primarily by its Emerging Leaders



"We have been sharing best practices among the Member Organization PAC committees, and that has helped other states do a good job of raising the level of giving and widening the contribution base."

JOHN CARRATO NATIONAL PAC VICE CHAIRMAN PRESIDENT/CEO, BENESCH managers program," says Smith.

The plan helped Louisiana surpass its fundraising goal. Contributions were scattered throughout multiple firms and individuals.



"We tried to get the idea of contributing to the PAC off the desk of the CEO and onto the desks of the project managers and other professionals in the organizations."

"That speaks vol-

umes," says Smith. "It is truly getting down and off of the CEO's desk. This strategy is much more sustainable."

GEORGIA'S SUCCESS FORMULA

ACEC/Georgia's PAC program exceeded its goal again in 2018, and it continues to outperform most other states. PAC Champion Kevin McOmber attributes the state's performance to creation of a PAC Leadership Circle four years ago that continues to motivate individuals to contribute to the national PAC.

"We have found something that is working well for us," says McOmber, senior vice president at Clark Patterson Lee. The PAC Leadership Circle creates benefits for the companies whose employees individually participate in the National PAC.

Individual contributions add up for companies to earn bronze, silver, gold and platinum status in the Leadership Circle. Benefits range from bragging rights that can be used in marketing and advertising at the bronze level, to invitations to meet with elected officials and help distribute PAC funds for the higher levels reached in the Leadership Circle.

"Right now, we are the only state doing it," says McOmber. Because of ACEC/PAC is currently the largest PAC in the design-build industry, and it ranks in the top 3 percent among all PACS

the success of the program, ACEC/PAC National leadership invited McOmber to speak about Georgia's Leadership Circle at ACEC's 2018 Fall Conference in Las Vegas.

"The other thing we do really well in Georgia is—instead of relying on one PAC Champion to do all the work—we have got a dozen or more people actively involved in getting the word out and helping get the commitments to meeting those goals," says McOmber. "It is personal one-on-one contact through our personal networks that make it happen."

CALIFORNIA'S BEST YEAR

California tallied \$63,735 in contributions in 2018, the most in its history and \$11,000 more than the previous year. Though the contributions represented just 72 percent of California's goal, PAC Champion Stephanie Wagner is happy with the state's continued progress over her five-year tenure leading ACEC VICE CHAIRMAN AND LOUISIANA PAC CHAMPION PRESIDENT/CEO, T. BAKER SMITH

the PAC. In 2014, California had raised just \$27,270.

"It was all about education," says Wagner, president of Wagner Engineering & Survey, Inc. She gave presentations at quarterly state directors' meetings, where leaders from 22 California ACEC chapters were represented. ACEC/California Executive Director Brad Diede and PAC committee member Jason Matson also visited state chapters to explain the PAC process, according to Wagner.

She would also conduct presentations or visit smaller chapters to speak about the National PAC. "Every chapter has different questions," Wagner says. "They do not understand where the money is going or how it was distributed. We were teaching people how legislators are selected to get contributions."

Some Member Firms were invited to face-to-face meetings with legislators and presented the PAC disbursement checks themselves, according to Wagner. "It was worth it, because I really believe that once they learn about our entire National ACEC/PAC process, people spread the word," she says. "They now understand that it is up to us to contribute and to get legislators onboard who are supportive of us. This is not political party driven, but issues driven."

The state also held several fundraising events, including a rooftop cocktail party in San Diego and a Napa wine-tasting and karaoke competition. Wagner will leave her PAC Champion position this year, and she offered some parting advice to the person who will succeed her, Jason Matson of Kimley-Horn: "Keep educating, be persistent and make it fun."

OFFENSE AND DEFENSE IN 2019

In 2019, Gozdziewski says the PAC will remain focused on its primary legislative goals, including passage of a comprehensive infrastructure package.

"It will be one of our top priorities," says Gozdziewski, who added that ACEC/PAC would also be sharpening its defensive game. "People do not realize that we play a lot of defense, too. Sometimes there is bad legislation—an anti-Qualifications-Based Selection bill, a no-contracting-out bill or a bad regulatory bill—and it takes the same amount of effort to play defense."

"With the political climate, people are understanding that they have to get engaged," says Smith. "If your organization is not engaged, you are in the minority now, and you are getting left behind."

Stacy Collett is a business and technology writer based in Chicago.

2018 ACEC/PAC HONOR ROLL

For the third consecutive year, ACEC/PAC achieved its million-dollar goal. The record-breaking PAC included 3,049 individual donors and 45 states reaching their fundraising goals. The following is a complete listing of 2018 donors.

Ryan Carlson

*Means state made its 2018 PAC goal

Bold means PAC Champion(s) for the state **Bold underlined** designates 2018 Capitol Club Member (\$5,000 donor)

- Designates 2018 Chairman's Club Member (\$2,500 donor)
- + Designates 2018 Millennium Club Member (\$1,000 donor)
- **\$\$** Designates Diamond Club (\$5,000 PAC-to-PAC Contribution)
- S Designates Gold Club (\$2,500 PAC-to-PAC Contribution)

Jason Matson^

Lisa Maurath

ALABAMA*

Bob Barnett+ Kevin Blake Renee Casillas Jeffrey Cowen Drew Davis Daniel Deal Alain Gallet+ Gregory Gillian Jerry McCarley Jim Meads Jay Morgan+ Barry Mott Heather Page Robert Portera John Smith Steven Speaks+ **Ouinn Stewart** Becky White

ALASKA*

Dennis Berry Kyle Brennan Aaron Christie Royce Conlon Floyd Damron+ Steven Kari Chris Miller Mark Musial Stewart Osgood James Potts William Preston David Rabe+ Matthew Stone Willem Van Hemert Timothy Vig Paul Witt

ARIZONA*

Maya Abou-Eid Alejandro Angel Mojtaba Ardebili James Barr Michael Bechtel Amerigo Berdeski Janice Burnett Dawn Cartier⁺ Michael Chase Donna Chiappini Timothy Crall Gregg Creaser James D'Andrea Keith Dahlen

John Derr Kent Dibble Len Evie William Ferris Rebecca Flv Doug Folk+ Uday Gandhe Greg Gesicki Chidambaram Gnanasambanthan Gregory Haggerty Andrew Haines Bruce Hallsted Mark Hartig Dan Hartig Sam Heffelfinger Daniel Heller Paul Jezzi Michael Johnson Nancy Johnson Lance Jones Gerald Katafiasz Bruce Kay Jay Koesters Douglas Lamont Iulie Leid Dan Levan William Linck Yogesh Mantri James Martin Russell Moore Philip Mouw Philip Noonan Kent Norcross Karl Obergh Sergio Oliden Ahmad Omais Ramon Padilla Bruce Paton Christopher Patton David Peterson+ Benjamin Porritt Craig Ramsey Richard Redmond Steven Rex Darwin Reynolds Justan Rice Kevin Roberts

Michael Schiller+

Scot Schlund

James Schoen

Melissa Serven

Thomas Smith

Andrew Smigielski

Curtis Slagell

Rebecca Timmer Stephen Todd Daniel Washburn Christopher Williams Elijah Williams Troy Wurth Mark Yalung

ARKANSAS*

Steven Beam Delton Brown Mike Burns Angie Cooper Robert Crafton Paul Crawford Lane Crider Andrew Dibble Roger Dodds Dennis Ford+ Jeffrey Geurian+ **Brad Hammond** Jonathan Hamner Byron Hicks Jerry Holder Brent Massey Keith Matthews James Montgomery Herbert Parker+ Stephen Pawlaczyk John Rogers Mike Stengel Timothy Tieaskie Dan Williams

CALIFORNIA

Mousa Abbasi Lee Abramson+ Shahnawaz Ahmad Dawn Antonucci Gary Antonucci+ Roger Ball+ Bryce Bauer Justin Becker Michael Beltran Grace Blackburn Thomas Blackburn+ Jonathan Blanchard David Bloxom Jack Boda Gene Bougdanos Terry Brennan **JD** Brosnan David Brown Tricia Buritica

Elbert Chang Arvin Chaudhary Shenping Chou William Clemans Robert Close Robert Close Sean Colorado Michael Cooper Mike Cooper Barry Cowan Jamie Cravens Kristen D'Agostino Sasha Dansky Travis Deane Garrett Dekker Robert DeWitt Christopher Diaz+ Brad Diede+ Donald Druse Kelly Druse Mary Erchul+ Allen Evans Gina Giacone Lorie Grebe **Ralph Guida** Ron Halbert Michael Hartley Leyla Hedayat Robert Henry Matthew Hicks+ Jay Holombo Steve Huff Michael Jeane George Jurica David Kennedv+ Francis Kennedy+ Karl Kienow Simon Kim Steven Klick Stephan Kuehn Matthew Kyler Mark La Bonte Raul Laborin Peter Lescure Ted Levin Henry Liang Hugh Linn David Loftus Keith London^ David Long Joaquin Lopez Garrett Low Susana Maciel Thomas Martin

John May Chuck McCallum+ Ian McClain Matt McCormick Bernie McInally Parag Mehta Ieff Meiter Ken Meme Chris Metzger Jerry Michael Dace Morgan Dave Moritz Terence Murphy+ Bernardo Navarrete Andrew Nickerson Eric Noel Erin Noor Analette Ochoa Walter Okitsu Richard O'Neill+ Harvey Oslick Miranda Patton Jason Paul Lisa Penna **Kevin Peterson** Chad Phillips Anthony Podegracz Jon Porterfield Bruce Presser+ Walt Quesada Kai Ramer Lenny Reidling Dana Remington Grant Revnolds Camilo Rocha Dina Rochford Jane Rozga James Salvito Douglas Scheidt Creighton Sebra Jeff Shaw Michael Sheehy Clifford Simental Brian Stewart Melvin Sukow Richard Sullivan Eric Swenson Adam Terronez Aundrea Tirapelle Byron Tobey Edgar Torres Larry Truman+ Christopher Turnage

Jesus Urquidi Frederik Venter Mark Vinluan Mariam Virani Anissa Voyiatzes William Wagner Paul Wagner Stephanie Wagner^ Ieff Walker Frank Wang Robert Weber Lee Whiteley Laura Worthington Forbes Alvin Yim Kurt Yoshii**+** Lydia Zabrycki Thomas Zehnder John Zumwalt

COLORADO

Andrew Amend Matthew Andrews Thomas Anzia Michael Banasiak Travis Boone Kyle Branham Gary Brierley+ Matthew Brown Allan Brown Brandon Bugarin Peter Carlson Ralph Christie+ Nancy Clanton Gray Clark Dave DiFulvio Dan Donegon Brad Dovle Mark Eberly Scott Epstein Lauren Evans+ Mary Floyd Neville Gaines Lisa Goodbee William Green Mark Hamouz Michelle Hansen Joseph Hart Tammy Heffron Richard Hepworth William Hoffmann David Huelskamp+ Jonathan Kelly Jeff Kobriger

Big Goals Big Results: 2018 State Goal Status Map



Jeffrey Kullman Brant Lahnert Galina Leiphart Anthony Marcello Michael Martin David Merritt Steve Mystkowski Steven Pawlak Gerald Prusik Stephanie Rasmussen Marilen Reimer Carin Richardson Gayle Roberts+ Greg Roush+ Saeid Saeb+ Christopher Sherry William Siegel John Sikora James Spillman Elizabeth Stolfus+ Gregg Ten Eyck+ Karlene Thomas Wayne Thompson Michael Unger Ronald Vasquez Bryant Walters Craig Watts+ Janet Williams Brandon Willis Shan-Tai Yeh

CONNECTICUT*

John Adams Jacob Argiro Dean Bagdasarian Franco Balassone Lionel Bejean Ben Berger Richard Bray David Breza Robert Carr Anthony Ciriello George Cooper Donald Costello Charles Croce Michael Culmo Gordon Daring Subal Das Scott Delesdernier Lauren DiGovanni Donald Doeg Steve Drechsler Richard Ezyk Dan Foley Rudy Franciamore James Fuda+ Gerald Furrier John Gilmore Robert Gomez Christopher Granatini Daniel Hageman John Hapkiewicz Steven Ĥarlacker Ben Hawthorne Zach Hellvar Allen Herring Dana Huff Kevin Hussain Muhammad Iqbal George Jacobs Michael Lonergan Michael McCarthy Dean McLear **Ricky Mears** Jay Messier Tony Moretti James Ohlheiser David O'Leary Harisharan Panta Michael Patenaude Clay Patterson Richard Pettinelli Shelley Plude Caleb Pruzinsky Ionathan Richer Carrie Rocha Ron Sacchi Paul Schmidt Daniel Schneider

Tim Schwartz James Sherwonit Ronan Shortt Theodore von Rosenvinge Fraser Walsh Christopher Wester Nick Wild Tim Wilson Lisa Winkler Rob Yirigian Alex Zalewski

DELAWARE*

Barry Benton Vicki Bowman Zachary Brander Chris Brendza Michael Burcham Chad Carter Elizabeth Chandler Sharon Cruz Chris Duke David DuPlessis+ Douglas Eitelman Ryan Flickinger Andrew Ford Ross Fortner Steven Fortunato Matthew Goudy Erik Hughes Ted Januszka+ Stephen Johns Eric Kramer Dakota Laidman Ring Lardner Sonia Marichic-Goudy Alan Marteney Patrick McGrory Alex Meitzler Scott Rathfon Michael Reed Mike Riemann Jon Sabatino

Alex Schmidt Kate Smagala Michael Steimer Jonathan Street Mark Strickland Daniel String Bruce Thompson Lawrence Walsh Ted Williams Kim Willson

FLORIDA*

Mudassar Alam Kumar Allady Leonard Arnold Elie Assi John Atz Rick Baldocchi Russell Barnes Robert Behar John Bell William Bradford Ricky Branton Don Brown Steven Burnett David Campbell Jill Capelli David Coleman John Coombe Andrew Cummings Kimberlee DeBosier Mark DeLorenzo Fermin Diaz Tony DiGregorio Allen Douglas Greg Dover Daniel Dunham



Katie Duty Jeffrey Easley Mario Echagarrua Angelina Fairchild Nancy Faller Brown Andy Frank Charles Geer^ Douglas Geiger Kenny Geisendorff Scott Gilner Terrance Glunt Scott Gombar⁴ Sergio Gonzalez Jordan Haggerty Judith Hayden Myron Hayden Thomas Hayden+ Christopher Heggen Shahin Hekmat Charlie Herndon samantha hobbs George Huddleston J.W. Hunter Maria Jackson Leila Jammal+ George Kramer Raj Krishnasamy+ Bryan Lawson Raymond Lee Joseph Losaria Larry Madrid Larry Maron Scott Martin Laura McGovern+ Stephen McGucken Greg Mendez Robert Mizell+ Mark Mongeau Aaron Moon Peter Moore[^] Darvl Myers Gary Nadeau+ Michael Noesen Leonardo Offredi Peter Partlow+ Carlos Penin^ Clint Pletzer Stephen Precourt Randell Prescott Mark Prochak

Sergio Quevedo Alan Rainer David Rancman Mark Renninger Lisa Robert+ Eric Rose Frank Sasso Kevin Schanen Adam Schildmeier Bill Schilling Ann Schiola Michael Schwartz Nelson Shaffer Peter Sheridan Ido Shimony Jose Sotomayor Michael Spruce Whitney Stevens David Sweeney^ Richard Temple Kevin Thibault Ralph Verrastro Ken Vogel David Walthall David Wantman <u>Jason Webber</u> Christopher Wild William Wilson+ Joey Wood

GEORGIA*

Dan Zrallack

Reza Abree⁴ Jeffrey Adams Kris Allegood Randall Bagwell+ Chad Becker Kent Black Randall Booker Jody Braswell Gregg Bundschuh+ Steve Bupp Robert Bush Will Cantrell Tabatha Carlton Tom Cetti David Collings+ Jim Collins Paul Cook+

Keith Costley Bradley Cox Thomas Crochet+ Russ Danser James Davis Jason Dickerson Josh Earhart Lee Edmond Linda Edwards Michelle Erste Bryan Evans Charles Ezelle+ Richard Fangmann Andrew Farmer Chris Farnie Nithin Gomez Lorraine Green Larry Gregory Richard Gurney Jeff Halliburton lim Hamilton Mark Hanselman Mark Hanson John Heath+ Mark Hellerstedt William Hicks Jason Hill . Todd Hill Laury Hodges Rodney Hoke Peter Hortman Sasan Hosein Ken Houseman Thomas Hruby Robert Hughes Michael Hughes Rob Jacquette+ Srinivas Jalla Michael Jeffreys Chris Jenkins Marc Johnston Benny Jones Graeme Kaiser Doyle Kelley Jeanne Kerney Gary Leach Robert Lewis+ Jill Ligon+ Pamela Little Nathan Long

Eric Lusher Joseph Macrina+ Mike Magahey Samuel McCachern^ Kevin McOmber[^] Shaugn McReynolds Emily Meador Jeff Meier Joseph Mercer David Miller+ Aimee Miners Steve Moes Michael Moffitt Scott Monson Emmy Montanye Erin Murphy Peter Oram Ron Osterloh Tony Parker Tamre Passmore Michael Planer+ Carolina Pria Alan Rainer Shawn Reese Michael Roach Brad Robinson Walter Robohn Darrell Rochester+ Barry Roziewski Bobby Shayan Diwan Singla Kevin Skinner Bayne Smith Clay Smith Grady Smith Kevin Smith Theron Stancil Joseph Stitt Micĥael Sullivan Anthony Taylor Daniel Taylor Susan Thomas Mindy Toole+ William Toole+ Tom Tran Steve Willenborg+ **Bob Williams** Edgar Williams Doris Willmer+ Deborah Wilson



Rep. Jim Banks, R-Ind. (second from right), meets with ACEC/Indiana members at a September 2018 fundraiser in Indianapolis (left to right): Ben Beer, USI Consultants; Phil Beer, USI Consultants; Mark Miller, GAI Consultants; Rep. Banks; and Scott Hornsby, GAI Consultants. Ashley Wolverton Jay Wolverton Buck Wright Taylor Wright Thomas Ziegler Thomas True

HAWAII*

Rov Abe Michele Adolpho Terrance Arashiro Paul Arita **David Bills** Timothy Blackwood+ Kathy Bow John Chen Donohue Fujii Matthew Fujioka Tracy Fukuda Gavin Ganal Revn Hashiro DeAnna Hayashi+ Beverly Ishii-Nakayama Ieff Kalani+ John Katahira Ken Kawahara Robin Lim Lance Manabe Ianice Marsters+ Garret Masuda Paul Matsuda Michael Matsumoto Corey Matsuoka Derek Mukai Jon Muraoka June Nakamura Eva Ng Ion Nishimura+ Lennox Nishimura+ Sheryl Nojima Pete Pascua Dennis Peters Gerald Seki Kyle Shinyama Simone Simbeck Sean Sugai+ Taryn Takiguchi Kekoa Tam Nimr Tamimi Daniel Tanigawa Emi Tanitomi John Thielst Victor Torres Brandon Uejo Ginny Wright Roy Yamashiro

IDAHO*

Tim Blair^ Mark Bowen David Butzier Dustin Commons Tracy Ellwein Steve Frisbie Jon Gellinas Jack Hand+ Rex Hansen Vance Henry Steve Holt Richard Jacobson Greg Loscher Ryan Olsen Teri Ottens **James** Porter

John Ringert Brent Schiller Cameron Waite Paul Wasser Darin Youngstrom

ILLINOIS*

Don Adams Tanya Adams Kristy Allen John Ambrose Eric Bachman+ Matthew Baldwin Jeffery Ball+ Eric Barnes Dave Bender^ Reginald Benton Darrel Berry Geri Boyer Rebecca Bover Brian Buchheit Jeremy Buening Bruce Bushnell Brandon Buzzell John Carrato Jarrod Cebulski Daniel Cecchi^ Ken Chastain Joseph Chiczewski Jeff Church Catherine Claassen John Clark David Clark Michael Collins **Thomas Collins** Jeff Connelly Jeremy Connor Brian Converse Greg Cook Chip Craddock^ Joseph Crowe Ilene Dailey Kerri Daniels James Daum Phillip Davidson Robert Davies Steven Donahue+ Stacie Dovalovsky Roger Driskell Emily Druckrey Bill Dvorak William Epp James Ewers Coventine Fidis C. Neil Finlen Deborah Finn Kevin Fitzpatrick P.J. Fitzpatrick+ Michael Folkening Darren Forgy John Fortmann Darcie Gabrisko Louis Gallucci^ Joseph Geyer Steve Gillen Janet Gonzalez Nate Granger Marc Grigas Minal Hahm Chad Hammerl Stan Hansen Douglas Hansen Scott Harding Mark Harms Anne Harney

Mike Hartoin Gregory Hatlestad Louis Haussmann Jamie Headen Thomas Hein**+** Alicia Hermann Rafael Herrera Pamela Hobbs Natalia Homedi Phil Houser[^] Carlos Huddleston Robert Israel Hayat Issa+ Charles Juneau Timothy Juskiewicz Brenda Karhoff Michael Klingner+ Kara Knuffman John Kosiba Lisa Kramer Ted Lachus Matthew Letson Tom Liliensiek Michelle Lipinski Joseph Lorenzini Kathy Louder ReJena Lyon Michael Mack David McDonald Laura McGovern+ Stephen McLaughlin Peter Mesha^ Kevin Myers Bobby Myers John Nelson+ Graig Neville Randal Newkirk Thomas Nutter Jay Olson John O'Neill+ Greg Osborne Bret Paden Jerry Payonk Satch Pecori Jean-Alix Peralte Paula Pienton Bill Pongracz Gary Powell Charles Quandel Lori Quigg Amar Rajpurkar Scott Rakers Stephen Randolph Jeannette Ray Sainath Reddivari Farhad Rezai Brad Riechmann Sadhu Rikhiraj Michael Ring Scott Rodseth Andrew Runde Mohammed Saleem Gerardo Sanchez Bradley Sanderson Matthew Santeford Sheilia Scharfenberg Bruce Schopp+ Timothy Schroeder Amber Seiber Dipak Shah Harvind Singh William Sleeman

Tom Smiles

Erica Spolar

Robert Staed

Anthony Standish Allen Staron Michael Streff Scott Sutton Bruce Talbot Todd Ude Orhan Ulger+ Chris Ulm Jonathan Vana Michael Waldron Brooke Wallace Brian Welker Kay Whitlock Claire Williams John Wills Derek Wold Mary Young John Zeman

INDIANA*

Anthony Akles William Bailey Beth Bauer Mark Beck Phil Beer[^] Andrew Bender John Brand[^] Keith Bryant Marvin Burns Adam Burns Carl Camacho Cash Canfield+ Walter Charles Wes Christmas Willis Conner^ Joshua Cook Michael Cox Chervl Cunningham Daniel Cutshaw Jacob Dammarell Jeff DeWitt Salvatore Dibernardo Thomas Dick Rachel Doba+ Elizabeth Dwyre Mark Eckert Michael Eichenauer Ken Fleetwood Gabriel Franco Brent Friend Chris Gale David Garwood Timothy George Stephen Goddard Robert Gray Steven Gress Michael Guzik William Hall Mark Harrison Kurt Heidenreich Gregory Henneke+ Robert Hesler Kevin Hetrick Shari Hinds Mike Hinton^ Matthew Hobbs Scott Hornsby Paul Hummel Rajiv Huria Greg Ilko Steven Jones Thomas Karis Bradley King Marlin Knowles Peter Kohut

Philip Kuntz Gary Ladd David Lahev Harold Lewis Kevin Loiselle James Longest^ Thomas Longest^ David Matson Michael McCool Colleen Merkel Brad Miller Timothy Miller Chad Modesitt Trent Newport Michael Obergfell Richard Olson+ Steve Osborn Chester Parsons Sanjay Patel+ Hans Peterson Gary Pohl^ Christopher Pope Ralph Power Jennifer Pyrz William Quebe David Richter Michael Rowe Todd Schultheis Paul Shaffer Brian Slagle Ross Snider Natalie Stephen Jon Stolz Shelby Swango Bradley Watson+ Ronald Webb Chris Wheatley Michael Wigger Patti Yount Warren Zwick

IOWA*

Lance Aldrich Brvan Bross Milton Butzke Jeffrey Cloyed Troy Culver Fouad Daoud David Dougherty Brenda Durbahn Patrick Eikenberry John Gade Andre Gallet Michael Geier Wade Greiman Brian Higginbotham Keith Hobson Mitchell Holtz Taylor Hopper Douglas Judge Mark Land David Logemann Shawn Lueth Blair Metzger Eric Miller **David Moeller** Timothy Monson Sherri Moore George Parris Mark Perington Jennifer Ruddy David Scott Will Sharp Jean Sheets Steven Sweet Ron Tekippe Derek Thomas Gregs Thomopulos^ Steve Trover Steve Van Dyke Marlon Vogt

KANSAS

Todd Anderson Brad Austin Lee Baer Rvan Branfort Bradley Edmundson Troy Eisenbraun J.B. George Tyler Glissman leff Hancock Iames Heavin Scott Heidner Kevin Honomichl Justin Klaudt Kurth Lancaster Kristen Leathers Brett Louk Kenzil Lynn Michael McKenna Matt McQuality

Scott Randle Timothy Ross+ Linda Rottinghaus John Ruckman Kyle Schomaker Tim Sloan Clifton Speegle Darrin Splittgerber Joe Surmeier Robert Ubben Matthew Volz Richard Worrel Rod Young

KENTUCKY*

Charles Craycraft Ben Edelen Ben Fister Nicole Galavotti Clint Goodin+ Brad Gregory Mike Hansen Harvey Helm Robert Hench David Lindeman Mark Litkenhus+ Stephen McDevitt+ Brad Montgomery+ Rob Mullins Shannon Provance Ben Quinn+ Russell Romine+ John Schneider+ Randolph Scott+ Robert Smallwood Chris Stewart Shawn Washer+ Karen Wood+

LOUISIANA*

Chad Bacas Wilfred Barry Lawrence Blanchette Robert Boagni Doreen Brasseaux Sam Briugilo Laura Campa Craig Campbell Virginia Cisneros Lisa Cookmeyer

Andree Cortez+ Andrew Craig Micha Duffy David DuPre Jack Duvernay Kurt Evans^ William Fenstermaker Sergio Girau Colby Guidry Chad Held

Nathan Junius Ralph Junius+ Dev Krishnan Randy Landry Sherri LeBas Casey Liner Michael McGaugh Alison Michel Daniel Mobley Anthony Mumphrey Frank Nicoladis+ Dustin Rabalais Raymond Reaux Tony Rivera Kevin Rizzo Steven Robertson+ Lynne Roussel Robert Schmidt **Kenneth Smith** William Smith+

Michael Thomassie Janet Tomeny Don Weathers

MAINE*

Mark Adams Carolyn Bird Steve Blais Arthur Bolduc Timothy Boyce Tim Boyce Craig Burgess Dan Danvers Richard Davee Daniel Diffin Peggy Duval Amber Ferland JoAnn Fryer Scott Graham William Haskell Henry Hess



Rep. Brad Wenstrup, R-Ohio (center), meets with ACEC/Ohio members during a Cincinnati fundraiser in September 2018 (left to right): Steve Bergman, Mannik and Smith Group; Rod Sommer, LJB, Inc.; Rep. Wenstrup; Jake Stremmel, HDR; and Joan Wenstrup, the representative's mother.



CEC/New York President Jay Simson; ACEC/Tennessee Executive Director Kasey Anderson; and National AC Vice Chairman John Carrato, president and CEO, Benesch, at the ACEC/PAC TopGolf Tournament at ne 2018 ACEC Fall Conference in Las Vegas.

Dana Humphrey Shane Kelly Paul Kohler Kate Malloy Sarah Maloney Rick McCarthy **Owens McCullough** Robert McSorely Dale Mitchell John Nelson+ Theresa Patten Tamarah Risser Gregg Ritter Eugene Shephard James Wilson Ryan Wingard Raymond Wingert

MARYLAND*

Matt Allen Art Barrett+ Nicholas Barrick Nathan Beil James Blake David Borusiewicz Kenneth Briggs Barry Catterton Daniel Cheng Brian Crowell Steven Cumor James Deriu **Jim Dorsev** Steve Drumm Mark Dumler Michael Ebner Michael Finck Harvey Floyd+ Anthony Frascarella John Furman Adam Gardner Debra Gordon Kevin Greene Christopher Griffith Billie Hall Heidi Hammel Steven Hawtof Robert Healy John Hudacek Jerry Jannetti Joel Keels Dana Knight Christine Koski Manish Kothari+

Gregory Lang Paul Lee William Lyman Robert Macov Joseph Makar Angela Marchetti Antonio Mawry Jeffery McBride Sean McCone Susan Miller Samuel Minnitte John Moeller -Thomas Mohler Ray Moravec Derek Mostoller Michael Myers

Leon Kriebel

Terry Neimeyer

Gregg Noha Kwabena Ofori-Awuah Jim Otradovec Christopher Overcash Mike Perrotta Melinda Peters Charles Phillips Vince Pielli Nadia Pimentel John Porter David Raymond

Kerry Rexroad Scott Riddle Stuart Robinson Ronald Rye Nathan Schwarz Robert Scrafford Eric Sender James Shumaker Vic Siaurusaitis Francis Smyth Thomas Sprehe Harry Stephen Kenneth Stratemeyer Alan Straus Raymond Streib Stuart Taub Gus Truedson Michael Wiercinski James Wilson . Timothy Wolfe Khalil Źaied

MASSACHUSETTS*

Dennis Baker

Mark Bartlett Robert Belitz David Bohn Sandra Brock Lisa Brothers+ Gary Bua Matt Card Cynthia Carleo Michael Carragher **Dennis Coffey** David Cohen Dawn Connelly Joan DeLorey Alex Diotte Lisa Dolan Nicola Ferzacca Paul Gabriel Marie Gertje Ileen Gladstone Abbie Goodman Joel Goodmonson+ Brett Gough Peter Grabowski Robin Greenleaf[^] William Hadge Kevin Hanley William Hardy Mike Herlihy Francis Hoev Jennifer Howe Fayssal Husseini Ko Ishikura+ Kurt Jelinek Abdelmadjid Lahlaf Frank Leathers+ Timothy Letton Filomena Maybury Scott Miller Colleen Moore Judith Nitsch+ David Pinsky Douglas Reed Marc Richards John Schmid Michael Scipione Elizabeth Tyminski Steven Ventresca David Vivilecchia Michael Walsh Mark Walsh-Cooke+ Susan Wisler Paul Yarossi[^] David Young

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Mark Kramer+

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Robert DeGroot Bradley DeWolf John Dillingham Jaclyn Dylla Jennifer Entwistle David Fairchild Jeff Gebhard Randall Geerdes Ken Holte Jason Hoskins Keith Jacobson Doug Jaeger Robert Janssen Kathleen John Michelle Julius Cameron Klos George Kluempke **Timothy Korby** Ronald LaMere Melissa Langowski Daniel Larson John Lee Timothy Lenway Tom Losey Brian Malm James Manning David Martini Stefanie Massignan Patrick McGraw Martha McNey David Montebello Al Moore Robert Moore Brett Morse Daniel Murphy David Oxley Andrew Rauch Matt Ruble Sirish Samba Glenn Schreiner Kristine Scott Gene Sieve John Smith Seth Spychala Jeff Stewart Thomas Stoneburner Catherine Stott Terrance Swor James Thomson Katherine Toghramadjian Avedis Toghramadjian Lana Tullis Bret Weiss Tina Wyffels John Zimmerman

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Dustin Herman Hayden Kaiser Gerrod Kilpatrick David Machado Darrell Martinek Mauricka McKenzie Blake Mendrop James Morrison Mark Seymour Ricky Simon Stanley Spradling Eddie Templeton Kyle Wallace Charles Williford

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Meredith Houston Kelly Hughes Craig Hyman Montell Irvin+ Paul Jacob Ramey Kemp Kraig Kern Paul Koch Shantanu Kongara Alison Koss Susan Lake Tracy Lamb Rob Larson Eric Leonhart Roy Lindland Wesley Little Jonathan Locklear John Lucey Kevin Lugo Brian Lusk Dave Madonia William Martin Josh Massrock Gene Matthis Stu Matthis Gene Matthis Sean Mayo John McAdams Jessica McClure Ron McKaskel Brad McLester+ Randy McNeill Eric Medaugh Glenn Medlin Paul Meehan Steven Miller Ryan Mitchell Larry Mitchell Calvin Moody Amos Moore Andrew Moriarty Timothy Morris Kevin Nadeau Randall Neuhaus



John Nunnally Eric Olsen Matthew Olsen Roger Parker R.K. Parker Ryan Parrish Nikole Pastore Russell Pearlman David Perez Jason Peterson Susan Petry Joseph Pfeiffer Blake Phillips Elizabeth Phipps Joe Piccirilli Lisa Podeszwa David Pond Jeremy Potter Daniel Puryear Tony Quiroz Terrance Rayfield Thomas Raymond Justin Reeder Tim Reid James Rice Andy Ritter Katherine Robinson Amit Sachan Stephen Safran Greg Sallee Douglas Saunders Eric Shaffer **Bobbie Shields** Tracie Shoenwald Michael Slusher James Smith Jason Smith Kenneth Smith Paul Smith Jody Spaugh Gregory Spaugh Adam Spiller Christopher Squires

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Rep. Jim McGovern, D-Mass. (second from right), ranking member of the Rules Committee, meets with ACEC/Massachusetts members during the ACEC 2018 Annual Convention in Washington, D.C. (left to right): Mike Walsh, ACEC/Mass, president, CDM Smith; Joel Goodmonson, former ACEC senior vice chair, Architectural Engineers, Inc.; Abbie Goodman, ACEC/Mass. executive director; Mike Scipione, ACEC/Mass. past-president, Weston & Sampson; Rep. McGovern; and Scott Miller, ACEC/Mass. vice president, Haley and Ward.

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Mark Lang Christopher Latreille Benjamin Lavon+ Carl Lehman Stuart Lerner Michael Leydecker Michael Liona Herbert Litts Joshua Lluch Gary Loesch^ Shawn Logan Patrick Lynch Orrin MacMurray+ Michael Mangione Charles Manning Jessica Mariani Mark McAnany^ William McCarthy William McCormick+ Christopher McDermott Iames McDuffee Richard McFadden^ Thomas McLaughlin Donald McMahon Bernard McNeilly Joseph Menzer David Meyer Jon Miller Brian Miller+ Christina Minkler Gary Morris Bill Murray Mia Nadasky Sanjay Naik Andrew Narus Hannah O'Grady Christopher Paolini Fotios Papamichael Thomas Pericak Richard Perrin **Richard** Peters Sanjeev Popli Rajashekar Ravilla Linda Reardon Brett Reynolds Milo Riverso+ John Robson+ Ronald Roman Lorenzo Rotoli Tom Ruggiero Mary-Beth Rumble Lee Sacket+ Mike Schaff Roseann Schmid Matthew Schooley Samuel Schwartz Martin Schwartzberg+ Kamal Shahid+ Mike Shamma Linda Shumaker+ Lyle Shute Mitch Simpler Jay Simson⁴ Chris Sklavounakis Scott Smith Ken Standig Mark Stier Alex Strasenburgh Richard Straut David Taillon David Tanenbaum Peter Teliska Philip Thayaparan Rory Tice Douglas Tokarczyk



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Rep. Peter DeFazio, D-Ore. (third from left), meets with ACEC members and staff during a Washington, D.C., fundraiser in December 2018 (left to right): ACEC Chair Manish Kothari; Ed Regan, CDM Smith; Rep. DeFazio, Brian Tynan, AECOM; Matt Reiffer, ACEC; Bob Gross, STV; ACEC President and CEO Linda Bauer Darr; Cathy Connor, WSP USA; Matt Chiller, Jacobs; and Eric Frary, Michael Baker.

Kirsten McCullough Shannon McGarrah Kevin Moore Timothy Morgan Ken Morris Mike Morrison Matthew Moshiri Brent Neece David Neuhauser Sam Pappas Daniel Pulliam Karthik Radhakrishnan George Raymond Gary Ridley Kensey Russell Jenny Sallee Brian Schmitt Brent Schniers Shay Smith Chris Snider Jimmy Sparks Jeremy Stahle James Sullins Trov Travis Susan Tryon Michael Vahabzadegan Dayne Weierbach Ronald Weltzheimer Adam West Cort Westphal Maria Wilson Mark Zishku Ezra Zoschke

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Christopher Brehmer Marc Butorac+ Chris Carpenter Ed Chamberland Marshall Coba Peter Coffev Gabe Crop Alison Davis Michelle Dodgson Stephen Eagar Tonya Finley Lawrence Fox+ Steve Fox George Freitag Benjamin George Joshua Grenzsund Hans Hadley Guy Hakanson Lindsi Hammond Gerry Heslin Darren Hippenstiel Daniel Houf John Howorth Iason Kellv Greg Landau Mark Leece Xiqin Long Ransford McCourt Travis McFeron Michael Mever+ Brandon Nevers Christine Nickerson Gavin Oien Timothy Oliver Wade Ósborne Michael Peebles Erik Peterson+ Cindi Polychronis Allison Pyrch Garv Ravor Michael Reed Michael Revnolds

Richard Roche Tonv Roos+ Gregg Scholz

Rodney Schultz Mel Sears Matthew Shanahan Craig Sheahan Alex Soo Ken Stoneman Mark Swank Karen Tatman Iason Tell Kevin Timmins Daniel Trisler Gene Tupper Larry Van Dyke Mark Vandehey Ronald Vandehev Lawrence Wagner Scott Wallace Thomas Westover **Jeff Whitson** John Willis Fred Wismer Jon Yamashita Anthony Yi Krey Younger

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Rep. Ron Estes, R-Kan. (third from left), who serves on the House Ways and Means Committee, meets with ACEC/Kansas members in August 2018 (left to right): Ty McGown, Burns & McDonnell, Scott Randle, Terracon; Rep. Estes; Mark Buckingham, MKEC; Rod Young, PEC; Jacob Borchers, WSP USA; Brett Letkowski, TranSystems; Brian Meier, Burns & McDonnell; and George Tannoury, Terracon.



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David Winter+

Scott Woerman Mike Wray Julie Wukelic Jeff Yirak Steven True

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WISCONSIN*

Rvan Amtmann John Boldt+ David Brose+ Philip Budde+ Rusty Chesmore Stephanie Christensen+ Michael Felker **Ieff Hanson** Gilbert Hantzsch+ William Holder+ Greg Jewell John Kissinger+ Chris Klein Jeffrey Kronser+ Jason Lietha Kim Lobdell+ Thomas Ludwig William Mielke John Mitby

Rosalie Morgan+ Andrew Platz+ John Rathke+ Matthew Richards+ Paula Schultz+ Rajan Sheth^ Amy Squitieri+ Michael Statz+ Ioshua Straka Stanley Sugden Paul Tarvin+ Jill Treadway Randal Van Natta Kenneth Williams Brian Wilson Steve Wurster Jan Zander

WYOMING

Dayton Alsaker Anthony Barnett Michael Brown Travis Conklin+



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All Manuel

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SEPTA installed onboard Positive Train Control equipment in nearly 400 vehicles as a part of implementing the system on the regional commuter rail system.

Positive Train Control

PROJECT: SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY POSITIVE TRAIN CONTROL SOUTHEASTERN, PENNSYLVANIA

FIRM: BURNS ENGINEERING PHILADELPHIA

n May 2017, the Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail system became the first commuter railroad east of the Mississippi, and the second in the nation, to implement Positive Train Control (PTC) on its Regional Rail system.

The train signaling system is designed to prevent crashes, derailments and track worker injuries resulting from railroad speed and signal violations. With a total project cost of roughly \$340 million, SEPTA installed more than 1,200 transponders and equipped nearly 400 vehicles with onboard PTC equipment.

Burns Engineering served as systems integrator and lead for the wayside

engineering—no small task, considering the SEPTA system consists of 13 rail lines and 155 stations that provide service to and from Center City Philadelphia and operates 770 weekday Regional Rail trains over 474 track miles.

"Integrating the technology

using the existing wayside signal technology and technology that was still under development was the biggest challenge," says Daren Petroski, vice president, railroad and transit for Burns Engineering. This required a unique approach that included extensive development work, integration with other railroads, lab- and field-testing, troubleshooting and system validation.

"The volume of equipment, diverse technical staff and stakeholder coordination added to the complexity of this project," says Petroski, noting that multiple engineering services worked together to build the PTC system.

An understanding of the five train types played a key role, as braking standards vary for each train. Track topography was evaluated for each train to determine the proper distance required to reduce a train's speed or stop it. A geographical survey also



Daren Petroski Vice President, Railroad and Transit Burns Engineering

was required to build a database map of the rail system. The track typography and geographic survey data were loaded into transponders along the tracks, which hold this information and identify each train's railroad, line, track number, current location within the set of other tran-

sponders, distance to next speed restriction or upgrade target, and speed of next restriction or upgrade target.

Interoperability among different trains and freight lines also was challenging: SEPTA's PTC integration required working knowledge of railroad operations involving three separate sources: a remote location, such as an office, for protection of work crew or hazardous conditions; a local source, such as a signal displaying a "stop" or a switch improperly lined for a safe movement; and a transponder providing permanent speed restrictions due to track geometry.

SEPTA is continuing its efforts to establish interoperability with CSX and Norfolk Southern freight lines that operate along portions of SEPTA territory, and is scheduled to complete this task in the near future.

Colorado's Smart Highway System

PROJECT: CDOT V2X DEPLOYMENT PROJECT ON I-70 COLORADO

FIRM: APEX DESIGN DENVER

n November 2016, the Colorado Department of Transportation (CDOT) and Panasonic Corp. of North America announced a partnership to develop a system that will enable vehicles to connect to everything around them, a capability referred to as V2X. Such connectivity includes three types of communication vehicle-to-infrastructure (V2I), for data collection; infrastructure-to-vehicle, for data dissemination; and vehicle-to-vehicle, for real-time interaction. This type of system is expected to enhance safety, improve traffic flow and assist in maintenance decisions.

With the goal of creating a statewide

V2X Data Ecosystem, the first step is a five-year implementation to turn a 90-mile stretch of the I-70 Mountain Corridor from the Denver metro area to the town of Vail into a smart highway.

Under contract to equip an initial deployment footprint on this first project, Panasonic engaged Apex Design to lead the V2X field infrastructure design and construction. With the project planning and system design phase complete, the next phase—V2I infrastructure installation—is underway.

"We are on the field deployment side of the project as a sub to Panasonic," says Scott Thomas, principal with Apex Design. This design-build approach enables a turnkey field deployment and a fully integrated team. "While Panasonic and CDOT are managing the whole program and building their central software, we are focused on the engineering plans, getting the plans permitted so we can install the equip-

ment along the roadway and then installing it," he says. By 2019, approximately 100 V2X roadside units will be deployed along the route, providing signal coverage for about 90 percent of the roadway.

In addition to the stationary infrastructure required to support the project, CDOT and Panasonic are equipping 2,500 fleet vehicles that frequent this stretch of highway with the onboard technology necessary to communicate with the system.

"CDOT and Panasonic have started to outfit maintenance trucks, snowplows and other vehicles that drive on the corridor frequently. They are already starting to collect valuable data," says Thomas. Additional CDOT and partner fleet vehicles also will be equipped with V2X technology as a first step to scaling the program statewide.

The development of the ecosystem continues and will serve as the epicenter for smart mobility within the state. CDOT's proactive approach of readying itself for the pending market penetration of onboard

> connected vehicle equipment will enable the traveling public to realize the benefits of these technologies sooner rather than later.



Scott Thomas Principal Apex Design

> The installation of approximately 100 V2X roadside units along Colorado's 1-70 between Denver and Vail is creating the state's first smart highway.

Driverless Passenger Service

PROJECT: AUTONOMOUS SHUTTLE STUDY LINCOLN, NEBRASKA

FIRM: HDR OMAHA, NEBRASKA

he city of Lincoln, Nebraska, and HDR are collaborating on an Autonomous Shuttle Study that may soon provide driverless passenger service in the downtown area. Designed to support the city's continued growth, the project is enhancing mobility, reducing traffic congestion and improving air quality through the integration of new technologies. The initial study involved identifying how the service should operate, how it should serve the community and the framework for the city to begin implementation.

The concept for the project includes four autonomous shuttles deployed dynamically along a 2.6-mile downtown route chosen based on the anticipated origins and destinations of passengers. The project is intended to bridge the gap between traditional fixed-route transit operations and new transportation network company models that provide on-demand service.

"The system would be demand responsive, which differentiates it from other pilot projects that are popping up around the country," says Ralph Batenhorst, senior project manager for HDR. The

city was not interested in having shuttles circulate on a fixed route, stopping at every station regardless of whether or not there were riders. Rather than moving constantly, the vehicles will remain in staging areas until a user requests a ride—using a smartphone app or a standing kiosk—and the shuttle then will go to the stop nearest to that person. "The autonomous shuttle

drives in a travel lane on a street, just like other cars, operating in what is known as mixed traffic," says Batenhorst. "It will be going through intersections, stopping at red lights and stop signs." For the Lincoln pilot project, the shuttle connects the University of Nebraska, the state Capitol and other government buildings, and an entertainment district in the downtown area known as the Haymarket. Although the shuttle uses a fixed route, shortcut options built into the system enable system optimization

> to ensure people are on the shortest route possible. Future deployments could include circulator routes; replacements for short, existing transit lines with low ridership; and firstand last-mile connections for high-capacity transit lines.

In the summer of 2018, more than 1,500 stakeholders and the general public had the opportunity to ride the shuttle and participate in surveys, mapping exercises, educa-

tion sessions, focus groups and in-depth interviews.

"One of the questions the city asked the public and the stakeholders was, 'Is there any part of this that you fear?' In general, the answer was 'no," says Batenhorst. "As long as it is safe, convenient, efficient and priced right, they were onboard."



Ralph Batenhorst Senior Project Manager HDR



The public was invited to try out an autonomous shuttle in July and August 2018 as it navigated a course set up in a Lincoln, Nebraska, parking lot. Communications equipment mounted on three of Albany, New York's, tallest buildings provides line-of-sight WiMAX communication for the city's traffic control system.

Greenlighting Done Right

PROJECT: ALBANY TRAFFIC SIGNAL AND ITS IMPROVEMENTS ALBANY, NEW YORK

FIRM: CREIGHTON MANNING ENGINEERING

ALBANY, NEW YORK

raffic is moving smoothly along five main corridors in Albany, New York, due to a multimodal project that improved pedestrian safety while also enhancing vehicle progression through signal optimization and coordination, emergency vehicle pre-emption and transit signal priority capabilities.

Creighton Manning Engineering provided design and construction inspection services for traffic signal improvement, a new centralized traffic management system, com-



Jeff Pangburn Chief Engineer Creighton Manning Engineering

munications equipment at three tower sites, ADA improvements and intelligent transportation system equipment along 9 miles of city streets.

The intelligent transportation system ties the system together, allowing for the control of signal timings and other adjustments from one central location. The system monitors each intersection and allows city traffic personnel to remotely monitor operations and adjust traffic signals, which are connected through a WiMAX wireless communication system. Antennas mounted on centralized radio towers are located on several of Albany's tallest buildings to provide the line-of-sight connectivity WiMAX requires. "Due to the tree foliage in the city along these corridors, achieving line of sight was definitely tricky at times, hence we looked for multiple antenna options," says Jeff Pangburn, chief engineer for Creighton Manning Engineering.

The interconnection of the traffic signals allows for coordinated progression to move groups of traffic through the corridors at safe speeds, with specific time-of-day plans developed for efficiency based on the posted 30 mph speed limit. Among the benefits of the coordinated signal timing are decreased vehicle delay, increased safety and reduced fuel consumption and emissions.

The system is designed to accommodate future expansion and communication with the city's remaining 200-plus traffic signals through the simple addition of wireless subscriber units. Since completion of the original three corridors, the city has incorporated two additional corridors into the system and plans to bring several more online.

The upgraded signal system includes controllers and equipment designed to provide transit signal priority to the Capital District Transportation Authority's Bus Rapid Transit vehicles. The limited stop service was initiated in 2011 to connect Albany with Schenectady, New York.

The project also included installation of emergency pre-emption equipment at the traffic signals to provide a green signal in the direction the emergency vehicle is traveling. New signal control equipment, vehicle traffic signal heads, pedestrian signal heads and countdown timers, pedestrian push-buttons and vehicle detectors were designed and installed at each intersection. Accessible pedestrian signals with audible tones and vibro-tactile feedback were included at complex intersections with high-volume pedestrian crossings.

"The new system is very helpful in dealing with pedestrian crossing times, which can be much different than the time it takes a vehicle to cross an intersection," says Pangburn. "The Americans with Disabilities Act has its own requirements that we need to follow, and this system accommodates the requirements."

Tom Klemens is a freelance writer based near Chicago and is a registered Professional Engineer in Illinois.



EMPHASIS ON THE

Jeff Boltz and Lou Barinka rest prior to crossing the Mississippi River during Race Across America (RAAM) 2017. This year, EA will field another ultra-cycling team for RAAM as part of its fundraising in support of Water For People.





Scott Underwood takes part in native grass plantings at Prime Hook National Wildlife Refuge in Delaware with other personnel from EA's Abingdon, Maryland, office.

Riley Mahnke (back) and Mitch





PUBLIC GOOD

BY CALVIN HENNICK

As part of its transition to a public benefit corporation, EA Engineering, Science and Technology formalized its giving and volunteer programs

Five years ago, while EA Engineering, Science and Technology (EA) was in the process of becoming a 100 percent employee-owned firm, company leaders saw an opportunity for another change. In 2014, EA also became a public benefit corporation-a legal classification that cements the for-profit company's mission of environmental stewardship as a top priority.

"Because we are environmental consultants, we were already doing positive things via our clients," says Ian MacFarlane, president and CEO of EA. "For us, it was a no-brainer."

As part of the change, EA formalized its corporate social responsibility (CSR) program, creating a centralized structure to support employee giving and volunteering efforts. The firm's CSR program is now organized around three pillars: the environmental benefits that result from its everyday work with clients; community support through volunteering, with paid volunteer time for employees; and charitable giving, with an ongoing effort to raise funds and awareness for Water For People.

According to MacFarlane, by becoming a public benefit corporation EA ensured these programs remain at the forefront of the company's work.

"It is no longer a side project. It is a larger commitment," he says. "Our board of directors talks about CSR at every meeting. Before, it was more piecemeal, but this change allowed us to set up a program across the company, with real commitments."



MacFarlane says the increased emphasis on giving back has led to higher employee engagement, especially among younger workers. Gallup surveys of EA employees show a marked uptick in employee engagement over the past three years.

"The program has been more successful than I could have ever imagined—both in terms of achieving our CSR goals, as well as how the employee base has stepped up," says MacFarlane. "It has helped me, as a CEO, to rally the company around something. I love this stuff. I am fired up."

FOCUSED FUNDRAISING

In December 2015, EA launched a formal partnership with Water For People, kicking off a company-wide effort to raise money for the charity, which helps provide access to clean drinking water and sanitation facilities in developing countries. EA's campaign with Water For People raised \$48,000 in 2016, \$56,000 in 2017 and \$50,000 in 2018.

"It is a unifying campaign for the company," says Jeffrey Boltz, a senior vice president at EA. "Every office does something they believe can make a little bit of money and puts it toward the same cause. We are in the environmental and engineering fields, and it is something that everybody can identify with."

In 2017, Boltz led EA's team in the Race Across America, a nonstop bicycle race from California to Maryland. Boltz and three other cyclists took turns pedaling, making it across the country in just over eight days, raising approximately \$10,000 for Water For People.

"Employees were tracking our progress," says Boltz. "It brought EA together around a common cause—to have a successful EA's campaign with Water For People raised \$48,000 in 2016, \$56,000 in 2017 and \$50,000 in 2018



event and promote this cause that is near and dear to our hearts as a company."

Boltz and his team members will be back in the saddle in 2019. This year, their fundraising goal is \$100,000. And they will have one especially motivated team member: Eleanor Allen, CEO of Water For People.

"I am a cyclist already, but this is way bigger than anything I have ever done," says Allen, who is working with a coach to prepare for the race. Allen calls EA an amazing partner to Water For People.

"We cannot do our work without the support of partners, so we are very grateful," Allen says. "The fact that EA employees are passionate about promoting awareness of global water issues and raising funds for Water For People is extra special. They truly go above and beyond their everyday jobs to support this important cause."

HOURS OF POWER

In 2015, EA introduced paid volunteer time (PVT) to the company's paid time off program. Each year, all full-time employees in the company receive eight hours of paid time to participate in mission-aligned volunteer efforts that support organizations of their choice.

The program has proved popular, with more employees participating each year. In 2016, 24 percent of employees used some portion of their PVT hours. In 2017, 35 percent participated. Originally, EA set a 2020 goal of half of employees using PVT hours to volunteer, but the organization surpassed that number partway through 2018, with 52 percent of employees participating.

"The program has been more successful than I could have ever imagined—both in terms of achieving our CSR goals, as well as how the employee base has stepped up."

> IAN MACFARLANE PRESIDENT AND CEO EA ENGINEERING, SCIENCE AND TECHNOLOGY

"Volunteering has become a group social event," says Riley Mahnke, an engineer in EA's Lincoln, Nebraska, office, who coordinates the office's volunteer programs. "We want to make it fun. We want people to want to put that time in."

While individual employees in Lincoln give their time to several causes—including the Boy Scouts of America, outreach at the University of Nebraska, Lincoln, church events, the YMCA and charity fun runs—Mahnke strives to schedule group activities related to water and the environment. One of the first events in which the office participated was a groundwater festival for elementary school students learning about conservation.

Employees have also volunteered at the city's biannual Waterfest, an event that raises awareness about how residents can reduce pollutants in local streams and lakes.

"The Lincoln office also attended Waterfest in 2012 and 2014," says Mahnke.

EA's Lincoln employees also have participated in stream cleanups, helped judge a middle-school science fair, taught fifth graders about soil and water properties and cleared out invasive musk thistles from prairie land.

In addition to benefiting the community and the environment, volunteering has helped to build connections between EA employees, according to Mahnke.

"It is nice to get out of the office and talk to colleagues whom we might not normally interact with," she says. "In our office, we have engineers, geologists and other scientists who mostly work separately. This is a good way to mix the pot and have everyone in one setting and working together."

Since the start of the PVT program, more than 80 percent of EA's Lincoln office utilizes a portion of their eight PVT hours annually. "I was pretty happy with that," Mahnke says. "I hope we increase that number even more."

Above and Beyond

Along with participating in the firm's formal CSR programming, EA employees throughout the nation organize additional volunteering and fundraising events. Here are highlights from the past year:

Playing Dirty: Employees in the Albuquerque, New Mexico, office participated in the 23rd Annual Carrie Tingley Hospital Foundation Mudd Volleyball Tournament, which raised a total of \$500,000 for children with chronic physical impairments and developmental disabilities.

Filling Pantries: In Hunt Valley, Maryland, employees set up donation boxes to collect nonperishable food items for area families in need, delivering the donations to a local food pantry every three to four months.

Recycling for Kids: Employees in the Syracuse, New York, office collected money from returnable bottle and can deposits throughout the year to purchase items to benefit the Toys for Tots program in Oswego County.

Disaster Recovery: In the Lewisville, Texas, office, employees collected supplies for people impacted by Hurricane Harvey.



"People enjoy getting out and doing something that benefits others. There is encouragement from the company, and that helps."

APRIL BALLWEG PROJECT MANAGER AND SENIOR CIVIL ENGINEER EA ENGINEERING, SCIENCE AND TECHNOLOGY

CREATING A CULTURE OF RETURN

At EA's suburban Dallas office in Lewisville, Texas, employees participate in a number of different events. They collect materials for recycling drives, and they bring back miniature soaps and shampoos from hotel stays to donate to children in need. But the bulk of the office's volunteer hours go toward helping Keep Lewisville Beautiful, a service organization that runs cleanup, waste reduction, education and other community improvement programs.

April Ballweg, a project manager and senior civil engineer, is on the Keep Lewisville Beautiful executive board of directors. Like a number of EA employees in the Dallas office, Ballweg tries to maximize the use of the allotted eight PVT hours each year and then continue to volunteer on her own time.

"People enjoy getting out and doing something that benefits others," Ballweg says. "There is encouragement from the company, and that helps."

Amy Wells, executive director of Keep Lewisville Beautiful, says EA employees have cleaned up a combined 18,000 pounds of trash in the community since 2012. Wells says she can trust EA's workers to safely clean up even particularly challenging sites.

"Every time we have a big event, there is a competition for the most trash collected. EA has quite a collection of trophies," Wells says. "They see it as a fun challenge, where somebody else may say, 'There is no way I am going to try to do that.' EA goes above and beyond. I know a lot of people say that about volunteers, but this group really does. They always get it done and have a smile on their face while they are doing it."

Ballweg says she appreciates EA's growing emphasis on community involvement. "It is nice to see that they are recognizing the value of volunteering," she says. "I like to think it influences other offices to get out there and do the same thing."

In addition to its progress in 2018 noted above, EA's focus in 2019 and beyond is the continued improvement of its programs that include a commitment to the annual Global Reporting Initiative, incorporation of Sustainable Development Goals and further emphasis on supply chain interactions. This focus on continual improvement and commitment to the CSR program earned EA a 2018 gold rating from EcoVadis, a globally recognized independent third-party consultancy that evaluates supply chain environmental, social and governance performance.

Calvin Hennick is a business, technology and travel writer based in Milton, Massachusetts.

MERGERSANDACQUISITIONS

Record Deal Making Closes Out 2018

BY NICK BELITZ

lobal merger and acquisition (M&A) activity in the A/E industry hit record levels in 2018, reaching 389 transactions. The activity was driven by robust demand among buyers to add new services and geographies to their portfolios, a generally strong economy making deal-making attractive to sellers and rising interest from private equity firms seeking to establish and grow platforms in the sector.

All told, global deal volume in the industry rose 24 percent over 2017, while M&A activity in the United States grew a robust 33 percent to reach 288 transactions over the course of the year.

Within the U.S., the West Coast and South-Central regions of the country remained strategic priorities as deal-making in California and Texas reached its highest level in the last 10 years. California claimed the top spot for M&A activity in 2018, with 44 firms sold in the state. The figure represents 15 percent of all U.S. deals executed during the year.

Among notable 2018 transactions in the Golden State was the November acquisition of ACEC member **Kleinfelder** (San Diego) by private equity firm Wind Point Partners (Chicago). Kleinfelder, the 1,800-person, engineer-construction management firm, ranked No. 60 on *ENRs* list of Top 500 firms in 2018 and reported \$267.3 million in revenue in 2017. While notable for its sheer size, the transaction is also indicative of a larger trend in the industry.



Since 2013, Morrissey Goodale, LLC, has tracked 208 deals completed by private equity buyers. Last year saw 49 acquisitions by private equity firms or private equity-backed design firms, representing 17 percent of total deal volume. Early indications in 2019 suggest this number could grow even higher as private equity firms

have identified the engineering sector as suitable for consolidation. While many industry acquirers have their sights set on opportunities in California, the Lone Star state remained popular with buyers. Driven by high population growth expectations and a wellfunded state department of transportation, Texas ranked second in deal-making activity in 2018, with 27 sales constituting 9 percent of deals in the U.S. Texas has picked up the pace thus far in 2019, leading all states with six deals through the first month of the year. Notable deals in 2019 include **WGI's** (West Palm Beach, Fla.) acquisition of **BIG RED DOG** (Austin, Texas) and **Pape-Dawson** **Engineers, Inc.'s** (San Antonio) acquisition of **ArborLeaf Engineering and Surveying, Inc.** (Tomball, Texas).

INFRASTRUCTURE A DRIVER OF M&A

Another trend of 2018 expected to gain steam in 2019 is the emergence of multibillion-dollar infrastructure funds, which are making headlines with increasing frequency. Through the first nine months of 2018 (the latest time period data is available), infrastructurefocused investment vehicles closed nearly \$28 billion in fundraising, according to PitchBook, including funds of \$5 billion at Blackstone and \$7.2 billion at Stonepeak Infrastructure Partners.

What are the implications of these funds for A/E firms? The investment dollars generally target three distinct buckets, each of which may affect our industry in different ways:

- Infrastructure service companies. These private equity investments target engineering firms serving public-sector infrastructure clients. These are the financial buyers that have contributed to the increased M&A activity over the last year. Bernhard Capital Partners (Baton Rouge, La.) is one such firm making waves in the industry after acquiring three infrastructure management companies in 2017: Moreland Altobelli Associates, PAVETEX Engineering and Engineering Testing Services. Together, these businesses combined to form ACEC member Atlas Technical Consultants (Austin, Texas). Atlas has been responsible for several deals over the last 12 months, including the most recent acquisition of SCST (San Diego), a provider of environmental science and engineering services.
- **2. Infrastructure assets.** Investments of this type historically tend to be concentrated in assets that have a specific, defined revenue stream. This includes the water/wastewater and energy sectors, with their reliable, user-paying bases. While transportation infrastructure has yet to truly shine as a reliable revenue-generating asset, available funding for infrastructure projects should improve the outlook for engineering design firms and may provide an indirect lift to M&A.
- **3. Producers of infrastructure-related products.** While less relevant to engineering firms specifically, this is another area where private infrastructure funds see opportunity to create value. One recent example includes Wind Point Partners' acquisition and subsequent merger of Clock Spring (Houston) and Neptune Research (Riviera Beach, Fla.), two providers of infrastructure rehabilitation and repair products.

With capital from multiple sources ready to be deployed, we expect 2019's deal-making to surpass the number of transactions in 2018.

ACEC DEAL-MAKERS JANUARY 2019

ACEC member **Delta Engineers, Architects & Land Surveyors** (Endwell, N.Y.) acquired MEP specialist **Lewis Engineering** (Albany, N.Y.). ACEC member Alan Plummer Associates (Fort Worth, Texas) acquired **FEI Engineers** (Greenwood Village, Colo.), a water and wastewater engineering firm.

ACEC member **Parsons** (Pasadena, Calif.) acquired **OGSystems** (Chantilly, Va.), a solutions provider with advanced technologies in geospatial intelligence, big data analytics and threat mitigation.

ACEC member **Woolpert** (Dayton, Ohio), an architecture, engineering and geospatial firm, acquired **Waller, Todd & Sadler Architects** (Virginia Beach, Va.).

ACEC member **Wetland Studies and Solutions, Inc.** (Gainesville, Va.), a subsidiary of Davey Tree Expert Co. (Kent, Ohio), acquired **Kerr Environmental Services Corp.** (Virginia Beach, Va.), an environmental consulting firm.

ACEC member **KCI Technologies** (Sparks, Md.) acquired **Keith & Schnars** (Fort Lauderdale, Fla.), a consulting firm specializing in engineering, construction inspection, surveying, landscape architecture, planning and environmental science.

Global infrastructure and engineering firm **Gannett Fleming** (Camp Hill, Pa.) acquired **Bowman, Barrett & Associates**, **Inc.** (Chicago), a transportation engineering firm. Both firms are ACEC members.

ACEC member **Terracon Consultants** (Olathe, Kan.) acquired **St. John-Mittelhauser & Associates, Inc.** (Downers Grove, Ill.), an environmental consulting, investigation and remediation services firm.

In continued expansion in the energy market, ACEC member **NV5** (Hollywood, Fla.) acquired **Celtic Energy** (Glastonbury, Conn.), an energy consulting firm that specializes in energy project management and oversight.

Municipal engineering and land surveying **Phoenix Consulting Engineers** (Mahomet, Ill.) joined **Fehr Graham** (Freeport, Ill.), an engineering and environmental firm. Both are ACEC members.

McKim & Creed (Raleigh, N.C.) acquired **Jehle-Halstead**, **Inc.** (Pensacola, Fla.), a provider of civil engineering and surveying services for land development and infrastructure projects. Both firms are ACEC members.

DECEMBER 2018

ACEC member **Tower Engineering Professionals** (Raleigh, N.C.), a telecom engineering and construction services firm, acquired **Utilis Engineering** (Charlotte, N.C.), a telecom engineering and integration services firm.

ACEC member **Arora Engineers, Inc.** (Chadds Ford, Pa.) entered into an agreement to acquire **Electronic Data, Inc.** (St. Petersburg, Fla.), a business process consulting and technology firm.

Transportation, land use and environmental firm **VHB** (Watertown, Mass.) acquired **Ecological Engineering** (Cary, N.C.), a 16-person natural and water resources firm. Both are ACEC members.

ACEC member and full-service design firm **Huitt-Zollars** (Dallas) expanded their capabilities with the addition of **Hoskin Ryan** (Phoenix), a hydrology, civil engineering and surveying firm.

Geotechnical, engineering, materials testing and environmental consulting firm **Construction Sciences** (Brisbane, Australia) acquired ACEC member **Raba Kistner, Inc.** (San Antonio), an engineering consulting and program management firm.

ACEC member Cardno (Brisbane, Australia) acquired TGM

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.



Group (Ballarat, Australia), an engineering firm serving urban development, building and infrastructure projects.

ACEC member **WSP** (Montreal) acquired **Irwinconsult** (East Melbourne, Australia), a provider of engineering consulting services for building and infrastructure projects.

Dawood Engineering, Inc. (Harrisburg, Pa.) acquired **Surveying and Mapping Consultants (SMC)** (Braintree, Mass.), a regional surveying, mapping and scanning firm. Both are ACEC member firms.

NOVEMBER 2018

ACEC member **Smith Seckman Reid**, **Inc.** (Nashville, Tenn.) acquired **Strategic Hospital Resources** (Atlanta), a medical equipment planning firm.

ACEC member **COWI** (Lyngby, Denmark) acquired **Arkitema Architects** (Aarhus, Denmark), a housing, urban design, office buildings, health and educational building firm.

Sain Associates (Birmingham, Ala.) acquired Vision and Planning (Columbia, Md.), a transportation planning and engineering firm. Sain, an ACEC member, offers civil engineering, construction engineering and inspection and GIS services.

ACEC member **EA Engineering, Science and Technology, Inc.** (Hunt Valley, Md.) acquired **EnviTreat** (Springdale, Ark.), a laboratory testing and consulting company.

ACEC member **Environmental Resources Management** (London) acquired **Kathy Jones and Associates** (North Sydney, Australia), a specialist stakeholder engagement and communication consultancy.

Toole Engineers (Augusta, Ga.) merged with ACEC member **Alfred Benesch & Co.** (Chicago). Toole Engineers offers transportation, land development, municipal and water resources services.

ACEC member **Delta Engineers**, **Architects and Land Surveyors** (Endwell, N.Y.) acquired **Southern Tier Surveying**, **Inc.** (Binghamton, N.Y.), a firm that serves municipal, private, and construction clients.

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.

A Culture of Business Excellence: LEVERAGING EMPLOYEES TO ACCELERATE GROWTH AND PROFITS

BY JUNE R. JEWELL, CPA

n today's fast-paced environment, running the business side of an engineering firm can take a back seat to executing on projects. As firms transition from small to midsize, the challenges of continuously adding new employees and clients can put a strain on existing processes, systems and business practices. This can lead to failure in achieving target profits or getting maximum performance from staff.

LEAKING PROFITS EVERY DAY

Instilling business excellence into a culture focused on quality and keeping clients happy is not easy. Employees develop bad habits and, if left unchecked, these behaviors become entrenched.

Many employees establish personal systems and processes for key business functions such as proposals, estimating and project management that reduce already slim profit margins and cause scope creep.

As silos develop, the firm's culture can feel disjointed. Some leaders are frustrated as they describe their remote offices operating as "fiefdoms." This lack of consistency and failure to adopt best practices slowly becomes the firm's culture and undermines achievement of key strategic goals and financial targets.

ADDRESSING CHRONIC ISSUES

For many firms, the experience of growing and developing business best practices has been incremental. New processes and systems are added and refined as needed without a holistic bigpicture or intentional long-term strategy. Old-school methods of running a business focus on decisions made at the top, with little engagement or feedback from employees to solve problems.

While many A/E firms are evolving toward greater transparency, they often still lack a strategy to take the firm to the next level. The idea of "continuous improvement" is widely thrown around, but very few firms have found a way to implement it effectively—usually only dealing with issues once they become problems or abandoning important business improvement initiatives when internal resources get busy.

WHAT DOES BUSINESS EXCELLENCE LOOK LIKE?

Making business excellence an intentional part of your culture requires engaging with your teams at a deeper level. In working with firms every day to implement business excellence across the organization, I have seen what a high-functioning business can look like and the resulting financial benefits that can accrue in a remarkably short time frame.

A culture modeled in business excellence should demonstrate the following five core characteristics:

1. Bottom-up Leadership: Employees are asked for feedback and ideas to improve business operations.

- **2. Focus on Business Results**: Financial success is a core value, and project profits are expected and measured.
- **3. Strategic Selection of Projects and Clients**: Projects pursued align with strategic and financial goals.



June R. Jewell

- **4. Positive Accountability**: Employees are expected to do what is best for the firm including following processes and systems.
- **5. Foundation of Business Acumen**: All employees are trained on how the firm makes money and the "why" behind the processes.

When these five core principles exist, a remarkable transformation occurs—employees take ownership, client and employee retention is increased, and top-tier profits are achieved.

Without a core foundation of business acumen, employees will be unwilling to change their unproductive daily behaviors. Resistance to change and failure to hold employees accountable cause entrenched patterns to persist.

A CULTURE OF BUSINESS EXCELLENCE

Our research with hundreds of A/E firms over the last five years has produced a three-step approach to address the five core values described earlier. With commitment and focus on bottom line results, A/E firms can transform their culture and employees' daily behaviors to integrate business focus into their work.

- **1. Assess Business Operations**: Survey employees to understand where they are struggling.
- **2. Business Management Group Education**: Implement a combination of highly effective business training content and group discussions to fully engage employees, change the culture and instill accountability.
- **3. Business Process and System Improvement**: Re-engineer key business processes and systems to increase productivity and consistency across the firm.

While transforming your culture and business practices will not happen overnight, a determined and focused effort to leverage the talent and hearts of your employees will dramatically increase business results, create happier employees and clients, and enable your firm to scale to new heights.

June R. Jewell, CPA, is a leading expert on profitability in the architecture and engineering industry, and author of the bestselling book Find the Lost Dollars: 6 Steps to Increase Profits in Architecture, Engineering, and Environmental Firms. Jewell is president of AEC Business Solutions, offering business assessment tools and business management training programs designed to help A&E firms increase profits and groom project managers and future leaders for success. You can learn more about Jewell and her company at www.AECBusiness.com.

FOCUS ON BUSINESS EXCELLENCE!

How a mid-size environmental firm transformed their culture, teams and profits.

In 2014 Hillmann Consulting, a then 100-person environmental consulting firm based in Union, NJ, found itself on the cusp of growth. They started seeing what many A&E firms experience when transitioning from a small local firm to a mid-size geographically dispersed firm - fast growth can be challenging!

Like many A&E firms, their culture was built around technical excellence and keeping clients happy – not financial results. This lack of process, accountability and employee business focus was costing them money! Their projects were leaking profits, and their staff were underperforming. They struggled with proposals, estimating, project management and scope creep.

They knew they needed to train their staff on business best practices to see real impact. They evaluated bootcamps, but found that sending PMs away for a couple days didn't provide the deep behavior and cultural transformation they needed. Several years earlier, Hillmann had worked with June Jewell to implement their Deltek Vision system. The firm executives valued June's book "Find the Lost Dollars: 6 Steps to Increase Profits in Architecture, Engineering and Environmental Firms," and were excited when June developed a training program based on the book. They knew this training was what their team needed.

Soon after, they invested in the Find the Lost Dollars Business Management Training Program offered by AEC Business Solutions. One of the biggest pre-training challenges Hillmann identified was managing scope changes which created tension between their clients and PMs. After the Scope Creep and Estimating courses (just two of the 10 courses in the overall program), they implemented new processes that proved beneficial for clients, and captured additional revenue from out of scope services.

They have seen significant changes in their business management practices as well as in the behavior of many individuals. They now all speak a "common language" that enables them to easily communicate about financial issues with clients and internally.

After employees understood the "why" behind their best practices, they became more proactive and took deeper ownership of their performance. It is because of this that they feel the change in culture has been one of the biggest benefits of the program. They now have systems and processes in place. They have happy clients and they are more profitable!

Hillmann was celebrated as a 2018 Find the Lost Dollars Client Award Winner for finding the most lost dollars from the program, seeing an increase in profit of 9% of revenue from 2016-2017 (the two years after completing the program).

In 2018, Hillmann saw its fastest and most profitable growth ever with over 40% increase in revenue growth and over 30% increase in profit.





"We could not have achieved this kind of fast growth without the Find the Lost Dollars program. It has provided a foundation of business excellence for our team and operations."

-Chris Hillmann, CEO, Hillmann Consulting



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On the Move

M. Gayle Packer is now CEO and president of Olathe, Kansas-based Terracon Consultants, Inc., succeeding David **Gaboury**, who served in both capacities for more than 16 years, recently as CEO. Gaboury continues as Terracon's chairman through 2021. Packer, who joined the company in 2004, was appointed president in June 2018. The company also announced the following promotions: Michael O'Grady was named chief development and safety officer; John Prutsman was appointed chief people officer. Mike Yost is now chief legal officer, previously serving as general counsel for more than 10 years, and Kristi Tahmasiyan is now director of mergers and acquisitions.

Norwood, Massachusetts-based GZA GeoEnvironmental, Inc. (GZA), named Patrick F. Sheehan as CEO, succeeding William E. Hadge, who served in the role since 2013. John C. Murphy was promoted to the new position of COO.

Sheehan has been with GZA for 28 years, Murphy for over 30 years. Both formerly served as one of four operations officers and as members of GZA's executive team.

Robert Belitz was named president and CEO of Westfield, Massachusetts-based Tighe & Bond, succeeding former President and CEO David Pinsky, who retired at the close of 2018 after serving in the position for 13 years and being with the firm for 31 years. Pinsky will continue as chairman through April 2019. Belitz joined Tighe & Bond four years ago as the firm's CFO.

Dan Bruckelmeyer has been appointed president and CEO of Itasca, Illinois-based BLA, Inc., succeeding Craig Lukowicz who retired after 35 years with the company. Bruckelmeyer recently served as vice president.

John Olander was promoted to COO of Kansas City, Missouri-based Burns & McDonnell. He is the company's first COO and will focus on implementing best practices across the company. He will continue as president of the Transmission & Distribution group, along with the Technology Solutions and Strategic Initiatives groups.

Victor Auvinen has been named executive vice president and West Division director of San Diego-based Kleinfelder. Based in the company's Sacramento, California, office, Auvinen will oversee operations throughout the western United States. Auvinen recently served as COO of the Pacific Region at AECOM.

Phil Thiel was promoted to executive vice president of Fairfax, Virginiabased **Dewberry** where he will lead the company's federal market strategy and business development. Thiel has been with Dewberry for 17 years and will continue to lead the firm's national Geospatial and Technology Services practice.



M. Gayle Packer

John C. Murphy



Michael O'Grady



Robert Belitz



John Prutsman



Dan Bruckelmeyer





John Olander



Kristi Tahmasiyan



Victor Auvinen



Patrick F. Sheehan



Phil Thiel

MEMBERSINTHENEWS

Thomas Topolski has been promoted to executive vice president, infrastructure business development at Pasadena, California-based **Parsons**. Topolski recently served as senior vice president for Parsons' rail and transit business development. He is based in company's Centreville, Virginia, office.

Daniel Stauthamer joined New York City-based Thornton Tomasetti as chief human resources officer. He is based in the firm's Madison Avenue office in New York. Stauthamer formerly served as divisional HR leader at Jacobs, overseeing parts of North and South America. He also spent more than 10 years at CH2M, serving as the HR director for the Middle East, Africa and Asia Pacific.

Lowell, Massachusetts-based **TRC Companies, Inc.,** named **Parker Meeks** president of its infrastructure sector. He formerly served as the managing partner of McKinsey & Company's Houston office. He is based in TRC's Houston office.

Doug Willoughby has joined Camp Hill, Pennsylvania-based **Gannett Fleming** as vice president, and rail and transit facilities director in Canada where he will expand the company's services in Toronto and across Canada.



Thomas Topolski



Parker Meeks

Daniel Stauthamer



Doug Willoughby

Welcome New Member Firms

ACEC/Arizona CA Group, Inc. Phoenix **Civil Design Solutions, LLC** Avondale Ricker, Atkinson, McBee, Morman & Associates, Inc. Tempe **TRACE Consulting, LLC** Phoenix ACEC/California Albion Surveys, Inc. St. Helena Ashley & Vance Engineering, Inc. San Luis Obispo **Balance Hydrologics** Berkeley **EEC Environmental** Orange Giuliani & Kull, Inc. Auburn **GMEP Engineers** Lake Forest Hanagan Land Surveying, Inc. Santa Cruz **IQA Solutions** Long Beach Lynx Studio Architecture, LLC Lake Forest **MBS Land Surveys** San Luis Obispo MWA, Inc. Truckee Valley Tech Systems Folsom Water Systems Consulting, Inc. San Luis Obispo WM Group West Engineers, PC Los Angeles ACEC/Colorado Clear Water Solutions, Inc.

Windsor Ecological Resource Consultants, Inc. Evergreen ICON Engineering, Inc. Centennial Lithos Engineering Fort Collins SEI Engineering, LLC Paonia

ACEC/Florida APEX Engineers, Inc. St. Johns Nadic Engineering Services, Inc. Orange Schmidt Consulting Group, Inc. Pensacola Watermark Engineering Group, Inc. Hillsborough ACEC/Georgia

Aretê Engineering & Construction, LLC Kennesaw Goodwyn, Mills and Cawood Atlanta LL Blue Engineering Peachtree City ACEC/Idaho S&C Associates, LLC Ketchum ACEC/Illinois **CERA Solutions** Chicago ACEC/Indiana Trover Group, Inc. Mishawaka ACEC/Louisiana Petra Consultants, Inc. Lafayette **ACEC/New Jersey** Genesis Engineering, LLC Lafayette **MBO Engineering, LLC** Bordentown RailPros, Inc. Newark **ACEC/North Carolina**

Hammond & Associates, Inc.

Cumming

Charlotte Engineers, LLP Charlotte ColeJenest & Stone Charlotte Traffic Planning & Design, Inc. Asheville

ACEC/Ohio J.C. Hines & Associates, LLC Cincinnati LeanTrak, Inc. Maumee QCI-CE, Inc. Bedford R20 Consulting, LLC Cleveland Wessler Engineering Bluffton

ACEC/Oregon Land Mark Surveying, Inc. Roseburg

ACEC/Pennsylvania Earth Engineering, Inc. East Norriton

ACEC/Rhode Island Horsley Witten Group Providence

ACEC/Tennessee ABES Engineering, Inc. Memphis EMC Structural Engineers, PC Nashville FOXPE, LLC Nashville Haltom Engineering, LLC Memphis Oliver Little Gipson Engineering, Inc. Tullahoma Tioga Environmental Consultants Memphis

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ACEC/Washington DJ&A, PC Vancouver

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Information Technology Applied Software

Insurance/Risk Management Professional Liability Agents Network, Inc.

For further information on one of the national affiliate members, go to: http://bit.do/ACEC-natl-affiliatememb or contact Rachael Ng at 202-682-4337 or rng@acec.org.

APRIL

- **3-6** The Business of Design Consulting, Phoenix, Arizona
- 9 Are You Building the Right Website? (online class)
- 16 Working in a Consulting Organization: A Beginners Guide to Achieving Success (online class)
- 17 How to Maximize Profits Using the R&D Tax Credit (online class)
- 23 Maximizing Your Business Development ROI (online class)
- 24 Qualifiers and COAs: Understanding Connections, Mitigating Risks (online class)
- 25 Succession Planning: Rewarding Senior Owners and Opportunities for Younger Employees (online class)

MAY

- 1 What's Driving Your Firm's Valuation? What Matters and Why it Matters (online class)
- 2 RFP Request for Personality: Win People, Win Projects (online class)
- 5-8 ACEC Annual Convention and Legislative Summit, Washington, D.C.
- 7 M&A: Culture, Clients and Staff-Reduce Flight Risks and Protect Revenue (online class)
- 9 The Unspoken Truth of Proposal Strategy (online class)
- 16 Simple Incentive Compensation That Works (online class)
- 21 Take Control of Your Email: Outlook and Email Management Best Practices (online class)

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Revised QBS Guide; BDC Course Scheduled for April

REVISED NEW EDITION OF QBS GUIDE

The newly revised ACEC publication *Owner's Guide to QBS: Qualifications-Based Selection of Design Professionals, Second Edition* is a reference for selecting qualified design professionals and establishing the framework for a successful project.

Updated to meet the challenges of today's engineering firms, the guide offers recommended procedures for conducting a QBS process, defines scope of services and explains how to negotiate fair and appropriate compensation commensurate with the services provided as well as how to prepare a legal agreement.

Readers with and without experience in selecting design professionals and procuring

professional services will find information to help streamline the selection and negotiation process. The publication is available as a complimentary digital download to ACEC members; \$19.95 for nonmembers. Visit: http://bit.do/acec-gbs2.

"THE BUSINESS OF DESIGN CONSULTING" APRIL 3-6, 2019

Managing a thriving A/E business requires a strong management team with technical know-how and a broad working understanding of today's best multidisciplinary business practices. New firm managers especially must know



the rules of finance and how they work in the real world as well as the ins and outs of managing people, risk and resources if they are to be successful.

Offered annually and taught by ACEC's expert faculty of experienced A/E business practitioners, "The Business of Design Consulting" is a three and a half day program that details current strategies on a wide variety of critical management and operational topics that up-and-coming firm managers must know to be successful and to keep a firm thriving. Topics covered include how to manage change and build success in performance management, strategic planning and growth, finance, leadership, ownership transition, contracts and risk management, marketing and more. Attendees will earn 22.5 PDHs.

For agenda, hotel and registration information, visit http://www.acec.org/education/bdc/.

SEI OPENS REGISTRATION FOR CLASS 25

ACEC's Senior Executives Institute (SEI) has focused on a single mission: to turn effective managers into successful executives, and successful executives into forward-thinking leaders of the engineering economy.

SEI's 18-month program works on multiple levels to help executives identify and explore their unique leadership styles as they work toward becoming more effective firm leaders. Participants build core knowledge, skills and overall business acumen. SEI training sparks creative thinking and vision beyond the day-to-day or even year-to-year approach to business management in order to help build greater resilience in an evolving industry environment.

Class 25 begins September 2019 in Washington, D.C., and is limited to 28 participants. For enrollment information, visit: https://sei.acec.org/.



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