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COVER: JASON EDWARDS/GETTY IMAGES



*Engineering Inc.* promotes the advocacy and business interests of ACEC by offering news, legislative analysis and business practice information to member firms, clients, opinion leaders and policy makers.

#### FROMACECTOYOU

#### 2016: Exemplary Year for the Council

t the ACEC Board Meeting at the Fall Conference in Colorado Springs, we welcomed ACEC/Rhode Island as the final state to join the ACEC federation. We also reported on a broad range of recent Council accomplishments including:

- Outside auditor's report that the Council is in excellent financial shape "among the best-managed of over 8,000 nonprofits" the auditor serves.
- Advocacy achievements including advancing major water infrastructure legislation and killing the proposed weekly reporting requirement in the Department of Labor's sick-time rule.
- Growth of Member Firm employee numbers to a record 579,539.
- Release of our contracting-out study to 28 participating states—showing it's less expensive to contract out than insource work at state DOTs.

ACEC will stay focused on key industry priorities into the fall, including final passage of WRDA and energy bills, modifying onerous regulatory mandates such as those on overtime pay and blacklisting, and addressing tax compliance issues, including challenges with the R&D tax credit.

On the professional front, this issue of *Engineering Inc.* takes an in-depth look at the role of engineers in port modernization projects throughout the nation in preparation for larger cargo ships that can now pass through the new Panama Canal *(see page 10);* how to maximize the potential of Building Information Modeling *(see page 20);* and an update on the Institute for Sustainable Infrastructure's Envision Rating System in setting a new best practices standard *(see page 16).* 

The annual Fall Conference wrap-up (*see page 42*) highlights the powerful lineup of political and business speakers and top business management programs recently enjoyed by more than 900 members. (They rated the Conference as "excellent" in a post-Conference survey). Your next chance to participate in a premier engineering business and networking event is our Annual Convention in Washington, D.C., in the spring.

As the year comes to a close, we wish you and your family a happy holiday season.

Peter M. Strub ACEC Chairman



David A. Raymond ACEC President & CEO



# **ENGINEERING** MC

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STAFF EDITOR	Andrea Keeney akeeney@acec.org 202-682-4347	
SENIOR COMMUNICATIONS WRITER	Gerry Donohue	
ACEC PUBLIC RELATIONS AND EDITORIAL ADVISORY COMMITTEE		
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#### IMAGINATION

MANAGING EDITOR	Tim Gregorski
ART DIRECTOR	Jeff Kibler
PROJECT DIRECTOR	Amy Stephenson Fabbri

#### ADVERTISING SALES

Leo Hoch ACEC 1015 15th Street, NW, 8th Floor Washington, D.C. 20005-2605 202-682-4341 lhoch@acec.org

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#### **Evolving Site Remediation Market Forcing Engineers to Adapt**

n its surface, environmental remediation is a strong, steady and stable market for engineering firms. It accounts for about \$8 billion annually and has been growing at a 3 percent rate each year. Analysts forecast it will continue to grow at about that same rate for the next several years. "It's a very mature market, but one that remains solid and continues to evolve," says Jeanne Litwin, senior vice president at CDM Smith. "While growth is largely flat, the need for remediation services will be consistent for the foreseeable future."

Beneath the surface, though, constantly shifting market forces, galloping technological developments and increasing competition have created new and significant challenges for firms.

"You have to be nimble and flexible and well-balanced in this market," says Paul Favara, global practice director of CH2M's Site Remediation and Revitalization practice. "You have to be ready to reprioritize your focus very quickly."

#### SHIFTING CUSTOMER BASE

The federal government remains a dominant client in the environmental remediation market, but it's not the customer it once was. Although the Department of Defense and the Department of Energy continue to clean up their contaminated sites, the Environmental Protection Agency—through its Superfund program—has slipped down the pecking order because of a lack of funding.

According to an analysis by the Center for Health, Environment & Justice, the level of funding for the program has decreased by almost half (in constant dollars) since 1999, and the number of active Superfund cleanup sites fell from 20 in 2009 to just eight in 2014.

"The EPA is still a factor, but its role continues to be redefined," says Dan Schneider, a senior environmental program manager and chair of Terracon's Remediation group. "EPA is focusing on health and the human risk of emerging contaminants, continually evaluating cleanup levels and being the overseer and watchdog of the program. At the same time, the states are becoming more independent, taking more ownership to manage their own programs."

The private sector is also playing a bigger role in the market.

"There has been movement in how customers report their environmental liabilities because of changes in accounting standards," Favara says. "Some customers are moving from a 'probable and reasonably estimable' basis to a 'fair value measurement' basis, and this may increase reported liabilities.

"Also, companies want to bend the trajectory of their environmental reserves more downward after seeing them relatively flat over a period of time," he adds. "Because of these two factors, we are working with clients more on the pace of cleanup to pay down their long-term liabilities."

Another big driver has been the surge in infill development, Schneider says. "We're seeing a lot of private equity coming in, attracted by the low interest rates, the strong economy and popularity of urban infill and transit-oriented development," he says.

The huge run-up in property values in many major U.S. cities

has prompted developers to take a second look at brownfield sites that were once bypassed because the remediation costs were too high.

"A lot of these sites have been on the books for many years," Schneider says. "We have tremendous amounts of data on them, and now we have new risk models and remediation technologies that can help us bring these sites to closure and redevelopment."

#### INCREASING COMPLEXITY

The rapid development of new technologies has also changed the face of environmental remediation. On the client side, improved analytical capabilities have extended the regulatory reach to levels that couldn't previously be measured.

Take, for example, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), which were used for several decades in a variety of applications, ranging from the manufacture of Teflon to firefighting foams at airfields. In 2009, the EPA set provisional health advisory levels for PFOA in drinking water at 0.4 parts per billion (ppb) and PFOS at 0.2 ppb.

"Just this year, in part because we're now able to see contaminants at levels we couldn't detect before, that level was lowered to 70 parts per trillion (0.07 ppb) for a combined concentration of PFOA and PFOS," Favara says. "Vermont has lowered those numbers further to 20 parts per trillion (0.02 ppb)."

Even as engineers and scientists are developing new ways to

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"Innovative tools and technologies... often generate less waste and reduce overall project implementation costs."



deal with both established and emerging contaminants, they're learning how deep those efforts must go.

"As we've progressed down the environmental remediation road, we have a better understanding of the true risks of contaminants and better tools to assess the risks," Favara says. "Instead of cleaning a site to where it was before it was contaminated—which

at times is not achievable—we can take it to the point where we can be comfortable with the risks after remediation."

All of these factors make for more complicated projects. "A lot of these emerging contaminants are recalcitrant, hard-to-treat groups of compounds," Favara says.

There's yet another layer of complexity to contend with: the growth of sustainable—or green—remediation.

This August, the EPA released a memorandum

on Consideration of Greener Cleanup Activities in the Superfund Cleanup Process, which recommends the kinds of tools and ways to document green remediation programs. While the memorandum technically applies only to Superfund sites, EPA policies reverberate throughout the market.

"Among our clients, we're seeing more focus on making sure that our remediation methods are based on sustainable practices that are good for the community," Litwin says. "Innovative tools and technologies...often generate less waste and reduce overall project implementation costs."

#### **COMPETITIVE CHALLENGES**

In such a dynamic market, single-focus firms can quickly find themselves at a disadvantage. "To be successful in the environmental remediation sector, you need to be diversified across markets, technologies, services and geographies," Favara says.

A firm focusing solely on upstream oil and gas work, for example, would have been doing very well just a few years ago, but it would be facing a stalled market today.

> Because of the benefits of diversification, the segment has seen a rapid consolidation of firms, Litwin says. "A lot of small to midsize firms have been acquired by mega-firms, and I expect to see more of that."

An unfortunate byproduct of that consolidation is clients are seeing environmental firms as more of a commodity, she adds.

Firms looking to differentiate themselves in the market have turned to technology, seeking to bring innovative solutions to clients' projects, but that creates its own set of challenges.

"The difficulty in bringing new solutions to the commercial market is that most clients aren't willing to turn their sites into research projects," Schneider says. "They want demonstrated success before they invest in new technology."

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

The number of Superfund cleanup sites fell from 20 in 2009 to eight in 2014

#### **LEGISLATIVE**ACTION

#### Council Highlights Long-Term Transportation Needs in 2017 Tax and Infrastructure Plans



CEC has expressed strong support for advancing a permanent solution to persistent shortfalls in the Highway Trust Fund in the context of debates

over tax reform and infrastructure investment proposals.

In the run-up to the presidential election, the Council joined 33 other business, labor, transportation and travel groups in urging both major party candidates to include long-term, sustainable transportation-funding measures as part of their infrastructure plans. Both candidates supported dramatic increases in infrastructure investment during their campaigns, and it has been identified as a likely initiative in the early days of a new administration.

"We believe that an infrastructure package needs to include, as a foundation, additional sustainable revenue to ensure the permanent solvency of the Highway Trust Fund," the groups wrote. "The additional revenue sources must be long-term, reliable, dedicated and focused on the users and beneficiaries of our transportation network to support the increased investment provided under your infrastructure proposal."

With the possibility of tax reform on the congressional agenda for 2017, the Council has also highlighted the need for transportation revenue to be included in any tax discussions. In a letter to the House Ways and Means Committee, ACEC and its partners in the Transportation Construction Coalition noted that every adjustment to Highway Trust Fund revenue in the last 30 years has been done in the context of a tax or budget deal. Incorporating transportation funding in a broader tax reform package would allow lawmakers to consider the impact on individuals and the economy while giving state and local agencies the long-term certainty they need to effectively plan and implement their programs.

ACEC is encouraging legislators not to wait until the expiration of the FAST Act and another Trust Fund shortfall to pursue solutions to transportation program funding.

#### ACEC Submits Comments on Tax Reform Plan

ACEC has submitted comments on the tax reform blueprint released earlier this year by House Republican leaders.

The centerpiece of the plan is a reduction of the top corporate rate to 20 percent, the top rate for pass-through businesses to 25 percent, and the top individual rate to 33 percent. ACEC stressed the need for true comprehensive tax reform with the same top rates for C corporations and pass-through businesses, which include S corporations and partnerships. Although the blueprint lowers the corporate and pass-through rates by the same percentage, the disparity would continue to disadvantage three-quarters of the Council's Member Firms.

Another highlight of the letter is the Council's continuing effort to preserve the cash method of accounting for engineering firms. The letter noted that the blueprint is based on the idea of moving from an accrued income base for our tax system to a consumption-based system. ACEC believes the use of the cash method of accounting dovetails with this new approach to the tax code.

ACEC also mentioned other key issues, including the Section 199 domestic production activities deduction, employee ownership and sustainable infrastructure funding.

Action on the blueprint is not expected until 2017, but the House Ways and Means Committee is already working to translate the document into tax legislation for Congress to consider.



ACEC is urging Congress to approve a spending package for F.Y. 2017 that fully meets the funding commitments of the FAST Act.

Transportation programs are operating under a short-term "continuing resolution" that holds spending at 2016 levels through Dec. 9. This has temporarily deprived state and local transportation agencies from the funding increases approved under the FAST Act. ACEC and its stakeholder partners in the Transportation Construction Coalition are advocating for passage of a full-year transportation appropriations bill before the end of the calendar year to unlock highway and transit funding increases authorized in the FAST Act for 2017.

The groups are also strongly opposing a \$2.2 billion rescission of unspent highway funding authority that was included in the Senatepassed version of the bill. Such a measure would impede the ability of states to allocate federal funds to meet their program needs. The House version of the bill did not rescind any highway funds.

"The FAST Act was an important step forward to assuring states and the private sector the federal government is a reliable partner in our shared effort to improve the nation's surface transportation network," the coalition wrote in a letter to every member of Congress. "Timely enactment of a F.Y. 2017 transportation appropriations bill that fully funds the FAST Act's highway and transit authorizations and contains no rescission of unobligated highway contract authority would help ensure that progress continues."

ISSUES ON THE MOVE	WHAT'S NEXT
Tax Reform	House leaders expected to push in 2017
Water Resources Bill	Final passage after Election Day
Blacklisting Rule	Action on corrective legislation possible in November/December

#### COURT INJUNCTION DELAYS BLACKLISTING RULE; BOOSTS ACEC'S LOBBYING EFFORT

ACEC and business coalition allies received a major boost in October when a U.S. District Court imposed a preliminary injunction that delays implementation of the U.S. Department of Labor's so-called "blacklisting" rule. The injunction bans the federal government from implementing the problematic elements of the rule, giving lawmakers in Congress additional time to limit or eliminate the rule permanently.

The Council is backing legislation included in the House and Senate versions of the National Defense Authorization Act (NDAA) that will limit the scope of the rule. ACEC is also backing language in the House version of the Financial Services appropriations bill that would prohibit funding for the rule while also requiring an analysis and impact statement before it could be implemented.

The final rule would phase-in responsibilities for all federal contractors to report violations of federal labor laws (including alleged violations) while competing for and carrying out federal contracts. Before the injunction, the rule would have applied to prime contracts greater than \$50 million on solicitations issued between Oct. 25, 2016, and April 24, 2017. After April 25, 2017, the rule would become applicable to contracts greater than \$50,000. The reporting period was also to phase-in, starting with violations and alleged violations within the previous year and increasing to three years by Oct. 25, 2018. Subcontractors would also be covered and required to self-report via a government run portal.

#### House, Senate Pass WRDA Bills in Drive for Final Passage



Both the House and Senate passed their respective versions of the Water Resources Development Act of 2016 in September, setting the stage for negotiations and the possibility of final passage after Election Day.

The House version of WRDA authorizes approximately \$5 billion for 28 Corps of Engineers water projects in 17 states, including dams, locks, flood protection and environmental restoration. The Senate version of WRDA, which passed earlier in September, includes additional funding for water and wastewater projects, including assistance to Flint, Michigan, and other communities impacted by lead in municipal water systems. The Senate bill also expands Qualifications-Based Selection to the State Revolving Fund program for drinking water projects.



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



LARGE POST-PANAMAX CARGO SHIPS ALONG WITH LARGER LOCKS ON THE PANAMA CANAL ARE PROMPTING U.S. PORTS TO UNDERGO MODERNIZATION PROJECTS

**BY SAMUEL GREENGARD** 

Aerial view showing the new Panama Canal expansion at the

Gatun Locks in Colon, Panama.

hen

engineering and construction crews completed the massive Panama Canal modernization project in June 2016, it was a defining moment in global commerce.

The \$5.25 billion upgrade, which allowed new and significantly larger ships to pass through the series of new locks, represented nothing less than a sea change for shippers and ports worldwide.

"There's a recognition that ports must support larger ships and improved economies of scale," says Jeff Schechtman, vice president at WSP | Parsons Brinckerhoff, which specializes in port modernization. "It's something that impacts the entire port industry."

#### **Panama Canal Facts** and Figures At a Glance

Groundbreaking: Jan. 1, 1880 Canal Opened: Aug. 15, 1914 Cost: \$350 million Length: 51 miles **Original Width of Canal: 110 feet** Original Length of Locks: 1,050 feet Original Depth of Locks: 39.5 feet Miles Saved: 7,872 through the Drake Passage or Strait of Magellan at the tip of South America First Year Traffic: 1,000 ships Annual Traffic: Between 12,000 and 15,000 vessels (about 40 ships per day) Passage Time Through the Canal: 8 to 10 hours Passage Time for Locks: 3 hours Highest Toll: \$330,000 (Disney cruise ship in 2008) Highest Elevation: 85 feet Cost of Modernization: \$5.25 billion Width of Post-Panamax Canal: 160 feet Length of New Locks: 1,200 feet Depth of Post-Panamax Locks: 50 feet

Source: Panama Canal Museum

As shippers switch to larger vessels-including so-called post-Panamax ships-there's a need for deeper and wider berths, larger cranes, upgraded port infrastructure and changes to railways and highways that connect to the ports. These projects, which involve everything from dredging channels and building new container yards to installing new cranes and computer software, typically run into the billions of dollars and require precise coordination among numerous companies and agencies, including the Army Corps of Engineers, state and local officials, and private companies.

"There's been an infrastructure investment race taking place, particularly on the Eastern Seaboard of the United States, to meet the demands of larger vessels," says Patrick King, global director, Ports & Maritime at CH2M, the program manager for the Panama Canal project. Not surprisingly, the scale of this type of work is enormous-sometimes spanning a decade-and involves a great deal of engineering and construction acumen, not only to modernize the port but also to keep it operating while improvements are taking place.



the Panama Canal circa 1913. Below: A modernization of the canal locks was completed in June 2016, 斗

According to the American Association of Port Authorities (AAPA), ports and their partners are investing \$155 billion over the next five years in infrastructure improvements. Yet, at the same time, it found that one in three U.S. ports requires at least \$100 million in intermodal upgrades to handle projected 2025 cargo and freight volumes. All of this creates new challenges and opportunities for A/E/C firms.

"These projects change ports and the surrounding areas in significant ways," says Jamie Gwaltney, vice president at Moffatt & Nichol, which has handled economic forecasting, planning, engineering and construction management for the Georgia Ports Authority (GPA) and other ports and terminal operators.

#### MAKING WAVES

It's no secret that business and commerce have become increasingly global. AAPA notes that about \$6 billion worth of goodsautomobiles, appliances, electronics, furniture, petroleum and myriad other products-move to and from overseas markets



"There's been an infrastructure investment race taking place, particularly on the Eastern Seaboard of the United States, to meet the demands of larger vessels."

PATRICK KING, CH2M

The cost of shipping goods to the U.S. East Coast, and some key inland cities, from Asia through the Panama Canal could lower by 25 percent or more

#### **524 million tonnage** is estimated to flow through the Panama Canal in 2020

every day. The overall impact of U.S. seaports on the domestic economy is more than \$4.6 trillion, which has resulted in larger cargo and tanker ships.

"The shipping industry has had to continually reboot and adjust its business model to accommodate larger ships," says John Young, director of freight and surface transportation policy at AAPA. In 1956, a typical vessel carried about 500 containers. Even a decade ago, a typical vessel carried about 5,000 20-foot equivalent units (TEU). Today, the largest ships accommodate up to 20,000 TEUs in 20- to 40-foot containers, Young says.

The ships aren't going to get smaller. By the end of 2017, about 60 percent of the world's container ship capacity will be on vessels larger than those that the old Panama Canal could accommodate, says Jim Newsome, president and CEO of the South Carolina Ports

Authority. The new Panamax ships are sometimes as long as 1,200 feet and require a channel depth of about 50 feet.

That means the ports have to keep up. The shipping industry isn't waiting for major ports to expand before building and deploying larger ships designed to lower costs and increase efficiency.

In 2006, the Panama Canal Authority estimated 37 percent of the world's container ships would be too large to pass through the locks by 2011. This meant that many vessels would instead embark on a longer trip through the Suez Canal and sail around the Cape of Good Hope in Africa or Cape Horn in South America. The subsequent expansion of the Panama Canal, which took place from 2007 to 2016, added two new flights of locks adjacent to two existing sets of locks (there are now three parallel sets of locks at the canal). The new locks are 1,400 feet long, 180 feet wide and 60 feet deep. The improvements will allow the Panama Canal to increase the tonnage flowing through it from a record 340.8 million tons in 2015 to an estimated 524 million tons in 2020.

Now several U.S. ports—including Baltimore, Miami, New York/New Jersey, Los Angeles, Seattle, Oakland (California), Houston, Norfolk (Virginia), Charleston (South Carolina), Savannah (Georgia) and Philadelphia—are following suit and modernizing facilities so that they can handle the larger ships. But it's no small task.

For example, The Port Authority of New York & New Jersey is in the final stages of a multiyear project to accommodate post-Panamax cargo vessels. It is dredging the harbor to a 50-foot depth, raising the Bayonne Bridge to allow ships to pass, and

#### **Evolution of Container Ships**



**TEVE McCRACKEN** 

#### Who's Ready for Post-Panamax? Navigation channels equipped for post-Panamax vessels

Port	Depth
Delaware River	45
JAXPORT (Jacksonville, Florida)	47
Port of Baltimore	50
Port of Boston	47
Port of Charleston	52
Port of Corpus Christi	46
Port of Houston	45
Ports of Los Angeles/Long Beach	>50
Port of New Orleans	45
PortMiami	50
Port of New York/New Jersey	50
Port of Oakland	50
Port of San Diego	47
Port of Savannah	47
Ports of Seattle/Tacoma	>50
Port of Virginia	50
Depth: 45 feet or greater	

Source: AAPA

investing in a \$600 million intermodal rail program. Meanwhile, the Mississippi Gulf Coast modernization will cost \$570 million, and PortMiami is undergoing \$1 billion in infrastructure enhancements.

The Port of Charleston illustrates just how complex it is to modernize a port. It is undergoing more than \$1.3 billion in upgrades over a 10-year span. "A project of this magnitude requires more than simply deepening the channel," Newsome says. "We built terminals to handle containers in the 1980s, and we never envisioned that we would be facing 2,000 to 4,000 TEU ships." Deepening the harbor by 7 feet to a total of 52 feet is only the start. South Carolina Ports Authority refurbished the entire over-the-water structure of the wharfincluding adding pilings and building a new fendering system that absorbs the force of the ships when they berth and strike surrounding structures. It has also meant upgrading to new cranes with a lift height of 155 feet rather than 115 feet and rebuilding an intermodal container transfer facility. The state of South Carolina has also invested about \$200 million to improve surrounding roads.

At the 1,200-acre Garden City Terminal, the Port of Savannah is undergoing a massive \$706 million modernization that is scheduled for completion in 2020, which will push capacity from about 4.5 million 20-foot equivalent container "It's extraordinarily challenging to build infrastructure improvements when you have over 10,000 trucks a day, 40 vessel calls per week and multiple trains moving through the terminal."

> JAMIE GWALTNEY, MOFFATT & NICHOL

units to 6.5 million TEUs. The harbor already has 22 neo-Panamax ship-to-shore cranes in place, and it will have 30 by 2018, says Griff Lynch, executive director of the GPA. At the same time, the Savannah Harbor Expansion Project, currently underway, will deliver a river channel that is 47 feet at mean low water and 54 feet deep at high tide. In addition, the state has opened a limited access truck route extending from Interstate 95 to just outside the gates of Garden City Terminal, and the federal government has funded \$44 million in rail improvements surrounding the facility.

"A major challenge facing U.S. ports is sufficient infrastructure to accommodate today's larger ships," Lynch says.

#### SAILING FORWARD

As the post-Panamax era takes shape, there's growing competition for ships, cargo and dollars.

Yet, engineering solutions and retrofitting, in some cases, push the boundaries. Because the Army Corps of Engineers handles dredging and other channel-related work, ports are dependent on the

> agency to tackle this critical part of the modernization process; however, the Army Corps usually doesn't handle dredging that takes place between the channel and the actual berth at the terminal. That's the responsibility of the port authority or terminal operator. "Coordinating these efforts can prove somewhat challenging," WSP | Parsons Brinckerhoff's Schechtman says.

> Meanwhile, some improvements such as upgrading cranes aren't as simple as finding equipment with the required height and reach. These changes often require new rail systems, electrical modifications, computer automation, terminal operating system updates, and reconfigured yard space. "Designing a terminal to handle two or three times the cargo per ship requires more dedicated yard space and better densities, but also different traffic flows," Schechtman adds.

> And the difficulties don't stop there. "It's extraordinarily challenging to build infrastructure improvements when you have over 10,000 trucks a day, 40 vessel calls per week and multiple trains moving through the terminal," Moffatt & Nichol's Gwaltney says.

> Because these projects touch so many areas, there's a need for engineering firms to take a highly

million in intermodal upgrades to handle projected 2025 cargo and freight volumes \$1.3 billion

One in three

U.S. ports

requires at

least **\$100** 

is being spent to upgrade the Port of Charleston over a 10-year span



#### "There's a recognition that ports must support larger ships and improved economies of scale."

JEFF SCHECHTMAN, WSP | PARSONS BRINCKERHOFF

collaborative approach and view their firm as part of a group effort. "You really have to take a one-bite-at-a-time approach because they are multifaceted and multiyear efforts," says Schechtman, who emphasizes the importance of experienced engineering consultants and project managers. "They can help owners break down a massive undertaking into manageable pieces and lay out the sequence and the schedule for what activities need to be undertaken when," he adds. "They also can identify approval checkpoints and undertake a schedule analysis to better understand what's necessary at and between different points in a project."

The Panama Canal—and post-Panamax era—will almost certainly create winners and losers within the existing U.S. port system, as well as globally, as ports upgrade and shipping routes change. For example, vessels traveling from the U.S. East Coast to Asia can avoid a longer route through the Suez Canal. Using the Panama Canal, they can shave two weeks or more off transit time. Similarly, Asian shippers might pass over U.S. West Coast ports and send goods through the Panama Canal to U.S. East Coast ports. The Panama Canal Authority estimates this could lower the cost of shipping goods to the U.S. East Coast, and some key inland cities, from Asia by 25 percent or more.

Smaller ports will be impacted as well. Some lack the harbor size, physical yard space or the funding to accept post-Panamax

container vessels—and they might see traffic and revenue decline. Yet, some smaller and midsize ports may actually benefit by adopting a more specialized or boutique approach, King says. For example, the Port of Gulfport, which was heavily damaged by Hurricane Katrina in 2005, has diversified—going after alternative markets while playing to its strengths, according to CH2M's King. It is wooing Panamax-sized vessels but also noncontainer ships for bulk and break-bulk cargoes. "They have also focused on supporting the petroleum industry and gas liquids exports to the Caribbean and Latin American market," he adds. "The port is geographically well-positioned for these markets."

In the end, one thing is clear: Many ports are making big bets with no certain future. Although international trade has continued to swell and larger ships have made waves, there are no guarantees. "It's impossible to predict whether even larger cargo ships and greater automation will impact ports in the future," Newsome says. For now, he and other executives at ports are simply focused on taking their facilities into the post-Panamax era. "You have to continually advance as the industry advances," he adds.

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



#### THE 4-YEAR-OLD ENVISION RATING SYSTEM IS BECOMING A BEST PRACTICES MODEL INDUSTRY WIDE FOR SUSTAINABLE INFRASTRUCTURE

**BY BOB WOODS** 



in infrastructure design is hardly a new concept in the engineering world. What city or firm wouldn't want a highway or bridge to hold up for a long time? But the emphasis on pairing the two has recently turned into a top priority and a hot topic. Sustainable infrastructure was the focus of Envision, introduced in 2012 as a new rating system to promote best practices in planning, designing, building and maintaining public roads, bridges, tunnels, water systems and other civic entities. The program was created by the aptly named Institute for Sustainable Infrastructure (ISI), a nonprofit organization jointly founded a year earlier by ACEC, the American Society of Civil Engineers (ASCE) and the American Public Works Association (APWA). ISI also collaborated with the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design to develop Envision.



"Our commitment to Envision starts at the top and filters down." Psomas was awarded an Envision platinum award for the 9-acre, multipurpose South Los Angeles Wetland Park in Los Angeles County. The park, which serves as a stormwater treatment wetland, was constructed on a former brownfield redevelopment site. The park includes riparian habitat, trails and boardwalks, viewing platforms, an outdoor classroom, educational signage, recreational space and picnic benches.

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**MINI** 



The Envision rating system addresses a full range of environmental, social and economic impacts of sustainability in project design, construction and operation. Labeled "credits," these impacts are classified under five categories: quality of life, leadership, resource allocation, natural world, and climate and risk.

Completed projects are evaluated by ISI and recognized for their credit achievement levels with either bronze, silver, gold or platinum honors.

During its first four years, Envision has been employed to enhance hundreds of infrastructure projects—primarily in the U.S., ISI says—and nearly 5,000 engineering practitioners have added the system to their skill set by earning the Envision Sustainability Professional accreditation (ENV SP). As with any new way of doing things, however, acceptance has been incremental.

"First, people needed to get educated on how they can use Envision," says Denise Nelson, ISI's vice president for public education. "Then they needed to use it to see for themselves how it could impact their projects." ISI had initially considered making certain credits mandatory but dropped that idea in order to make Envision flexible and adaptable, she adds. The primary goal, regardless of how many credits are pursued, is to incrementally increase the sustainability of a project. supply and treatment, at Arcadis U.S., the Denver, Coloradobased unit of the Dutch parent. "Our clients are demanding it to help them develop sustainable solutions."

Arcadis, which is on the advisory board of the Zofnass Program, became a charter member of ISI. When Envision was launched, the firm was among several companies that committed to train and credential at least 100 ENV SPs within the year, a figure that stands at around 130 people. "We see the value of having people trained so they know how to think differently as they're doing their designs," Venner says. "Most learn a more traditional approach in school, but we want them to consider factors such as how the project may impact a community and use less resources."

Venner is currently working on three wastewater projects utilizing Envision, one of them for New York City's Department of Design and Construction. "They are currently constructing a stormwater wetland for the New York City Department of Environmental Protection, as part of the Staten Island Bluebelt system to more sustainably manage stormwater and alleviate flooding using green infrastructure," she says. In the wake of Hurricane Sandy, New York City made sustainability a prime objective. "Both agencies want to use Envision as a tool to ensure that their projects are more sustainable," Venner says.



"Our clients are demanding it [Envision] to help them develop sustainable solutions."

IFETAYO VENNER, ARCADIS U.S.

#### THE STANDARD LANGUAGE

At the same time, a growing number of ACEC Member Firms are communicating their experience with Envision as a way to differentiate themselves when dealing with cities and other infrastructure owners—an increasing number of which are incorporating sustainability into their projects.

"Many of those firms were creating proprietary tools to quantify their sustainability, but communities couldn't compare one to the other," Nelson says. "Now, Envision can be the standard language." In fact, some communities are asking for Envision in their RFPs and inquiring whether firms have ENV SPs on staff

**5,000** engineering practitioners have earned the Envision Sustainability Professional accreditation and whether they've used the system on projects, she adds.

It's no coincidence that ACEC Member Firms are not only promoting their sustainability credentials but also embracing Envision as a universal guideline.

"The idea of sustainability is embedded in who we are as a company but also in the work we're doing," says Ifetayo Venner, global leader, water

#### **ENVISION AT WORK**

Los Angeles, California-based Psomas was another original adopter of Envision, with Tim Psomas, son of the firm's founder, serving as the first chairman of the ISI board. "Our commitment to Envision starts at the top and filters down," says Kevin Thornton, a senior project manager and director of sustainability at Psomas, which has trained more than 150 employees for ENV SP designation. "We want staff at the project engineer level and above to be certified." Before Envision, Psomas encouraged its practitioners to attain LEED certification, which helped employees think about sustainability, Thornton says.

The strategy has paid off, as Psomas has already earned an Envision platinum award for a water project in Los Angeles County. The South Los Angeles Wetland Park, completed in 2013, is a 9-acre, multipurpose public nature park and sustainable stormwater treatment wetland constructed on a former transportation authority brownfield redevelopment site. Last year, Psomas was also selected as the prime consultant on the Rory M. Shaw Wetlands Park, one of several projects within Los Angeles County's Sun Valley Watershed Management Plan, which recently received an Envision platinum award.

At Watertown, Massachusetts-based VHB, introducing Envision across its network of 23 offices and 1,250 professionals has provided a platform for internal education, says Kari Hewitt,



director of sustainability and leader of the effort. "We have a generational company philosophy, so part of our culture is to foster the growth and development of our younger people so that they take on leadership roles in the future," she says. "Our sustainability efforts are reflective of this philosophy as well—that we should invest in our people in a meaningful way so that our company and our communities are continuously improving."

The younger generation is generally more attuned to environmental and social issues, so they're excited about Envision, Hewitt says. "That energy has been infectious in getting our midand upper-level leaders who've been with the company a long time to think of new ways to approach their projects," she says.

VHB's integrated teams of civil engineers, environmental scientists, planners, water resource engineers and other professionals have to come together to think outside their individual disciplines in order to create effective solutions for clients, she says. "Envision brought a new framework and set of best practices, forcing us to look across socioeconomic and environmental issues in infrastructure projects," Hewitt says. By last August, VHB had trained and certified 114 ENV SPs.

VHB has used Envision for guidance and a framework on numerous infrastructure projects, and clients at transit agencies, local governments and even private developers have been referencing the system in discussions and proposals, Hewitt says. "We're seeing increasing questions about sustainability, and Envision is a tool we can bring to the table and say, 'Here's a clear and transparent system we can apply to your project to help you achieve your sustainability goals.' And that can be a real differentiator for winning projects."



One project where VHB has utilized the system involved redevelopment of a 1-mile section of Greenough Boulevard in Watertown and Cambridge, Massachusetts, which stretches along the west bank of the Charles River. By narrowing the roadway, the public-private Greenough Greenway Project has reclaimed riverside parkland and established a tree-lined path for pedestrians and bicyclists, reducing stormwater runoff as well. "The project is currently being verified for an Envision award," Hewitt says.

#### GAINING MOMENTUM

ISI is busy developing the next version of Envision, Nelson says, which will be submitted for public comment near the end of 2017, with implementation scheduled for 2018. Besides possible revisions to the system's credits and categories, there is still a need for a module that specifically focuses on construction, she says.

The current version looks at the entire lifecycle of a project from planning and design to operations and management—yet avoids the actual construction phase, which includes the sourcing of sustainable materials and adhering to all design specifics.

In the meantime, ISI will continue to spread the word on Envision. It's gaining momentum, Nelson says, especially among big-name firms. To date, 17 projects have earned awards—eight this year alone.

Psomas' Thornton is even more optimistic. "In the next five years, as far as infrastructure projects go, I believe Envision will be the accepted standard," he says.

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



"Envision brought a new framework and set of best practices, forcing us to look across socioeconomic and environmental issues in infrastructure projects."

KARI HEWITT, VHB

As a member of a joint venture, Atkins utilized BIM software to deliver a £220 million extension to an existing treatment plant in Liverpool, England on time and under budget.

nur Fall



# SO YOU THINK

Dewberry used BIM software in the development of a community outreach video to demonstrate the benefits of an innovative water banking system on the Potomac River.



# YOU KNOW BM?

#### **ENGINEERS SEEK TO NARROW THE GAP BETWEEN CURRENT USE AND UNTAPPED POTENTIAL OF BUILDING INFORMATION MODELING**

**BY GERRY DONOHUE** 



"We already had the ability to create a digital mirror of the physical world," says Terry Bennett, senior industry strategist at Autodesk. "The next frontier is using BIM to simulate, test 'what ifs' and validate long-term returns by creating structures that are immersed in the data through connected assets."



"There'll be augmented-reality headsets that will know where I'm standing and where a particular beam should go, or I'll be able to walk up to a wall and see what's in it."

BRAD HARDIN, BLACK & VEATCH

#### CAPABILITIES VERSUS USE

BIM, which has been available since the 1970s, was slow to catch on in the engineering industry, and its use has focused mainly on modeling rather than information.

"BIM has historically tended to be design-driven," says Brad Hardin, chief technology officer at Black & Veatch and the author of two books on BIM. "Designers would go in and begin modeling objects."

Even in the early 2000s, firms were put off by the high cost of the systems, the need for extensive training and the perception that the technology was little more than a 3D pencil.

"Just like when CAD came out in the 1980s, there was a time when people were wondering if BIM was ever going to stick," Bennett says.

Gradually, as the technology improved, the costs came down and firms started hiring a generation of engineers raised on video games, BIM and its inherent benefits won over even the most stubborn technophobes.

"It provides wonderful visualizations of the design intent," says Ian Howell, CEO of Newforma. "It also enforces coordination among the different design disciplines—ensuring in the computer model of a building, for example, that the structural steel, airconditioning ductwork and architectural elements don't clash."

#### More than 50 percent of projects are now done by design-build

#### Future designs can be improved based on 10 years of data on actual performance of a similar previous design

Howell says clients have provided a lot of impetus for increased BIM implementation. "Owners simply got sick of the delays, the adversarial relationships [and] the cost overruns from so many change orders," he adds. "BIM provides a single source of truth. Instead of information split up over hundreds or even thousands of separate drawings, BIM allows for consistency across all of the documentation."

It is remarkable, then, that BIM has become the de facto design and construction technology in the industry even though most firms don't use or are even aware of—some of its most powerful functions.

"There is a very large gap between the standard of capability that exists in the technology today and the standard of use in practice by most design firms," Bennett says.

As more and more firms realize the value and potential of the project information database behind the design, that gap will close quickly.

#### **CHOOSING THE RIGHT DESIGN**

Big data is unleashing many untapped design capabilities of BIM technology.

"We're using BIM and model analysis tools to do performance testing, pressure testing analysis and the computational fluid dynamics calculations that need to be done," says Hardin of Black & Veatch's water business.

BIM not only helps project teams ensure the design is right, but it can also help them determine whether it's the right design, Bennett says.

Paul Doherty of DigitGroup calls this process generative design. "Take a school project in Cleveland, for example," he says. "You input all of the design criteria—the demographics, the history, the weather, the zoning, the client's needs—into the system. Then you run all those variables through thousands of simulations, and then the system kicks out the three to five most perfect pathways to achieve your project goals."

Such a process would have been cost- and time-prohibitive not too long ago, but because of the proliferation of data, the development of analytical tools and the incredible power of today's computers, these exercises will quickly become commonplace.

"Analysis, simulation [and] optimization," says Andy Smith, director of product management at Bentley Systems. "There's going to be a lot more work for engineers in that area."

#### **PROMOTING COLLABORATION**

At the same time the design is being optimized, BIM can also turbocharge the project planning and procurement processes.

"We're in the midst of a big transition," says HDR Chief Technology Officer Raj Prasad. "We're moving from 2D to 3D to 4D (time) to 5D (cost), and now we're looking at 6D—helping clients manage O&M risk by linking the BIM model with component details."

As a platform for all participants to come together to share information, BIM helps create a better, more efficacious project.

"More than 50 percent of projects are now done by design-build. Owners prefer it because it requires collaboration between design and construction early in the project," Howell says. "Having the whole project team using BIM plays right into that improved collaboration."

Prasad says BIM's collaborative nature will be a driving force behind its future growth. "The silos in the industry are a hindrance.



It's still not very common for engineering firms and construction companies to share designs," he says. "BIM facilitates the process, capturing the knowledge of the owner, designer and builder, and putting it on the table right from the start."

Such collaboration is very attractive to the new generation of engineers.

"We are in an era of connections, social networks, mobile devices, big data and cloud computing. It's coming at us from every direction," Bennett says. As a result, collaboration in real time is customary for the engineers coming out of schools today. "They like to work together and solve problems as a group," he says.

#### **OPTIMIZING PERFORMANCE**

Long after the designer and builder have moved on to the next project, BIM keeps working. The project data allows the owner to optimize the building's performance, and it even provides information for improving future projects.

Office buildings, for example, already have numerous individual sensors to monitor all kinds of factors, such as energy consumption, temperature, sunlight and MEP performance. Linking those sensors to the BIM system allows for a coordinated approach.

The same situation is happening in our roads, highways, bridges and water systems, Bennett says. "Our infrastructure in the near future is going to wake up. You're going to see more and more sensors added to infrastructure components during design, rather than after the fact," he adds. "They're going to connect and start self-diagnosing, telling us what's wrong and how to fix it."

That data—plus countless other data points on how the system is performing, how it is being used and how it is aging—will then provide a treasure trove of information for future projects.

"We hope to feed the data back into similar designs that are underway for constant relearning," Bennett says. "We can improve future designs based on 10 years of data on actual performance of a similar previous design."

#### TOMORROW'S REALITY TODAY

Even as firms are increasingly appreciating the myriad capabilities of BIM, the next generation of advantages has already arrived.

"Virtual reality, augmented reality and altered reality aren't years away anymore; they're already here," Doherty says.

Augmented reality can be as simple as the Pokemon Go app that swept up the world at the beginning of the summer, or as complex as the 360-degree "otherworld" we enter when we put on virtual-reality goggles.

Applications that already coordinate with BIM programs allow project members to put on goggles and change the colors of everything they see, or even wear a glove that gives them the sensation of touching virtual surfaces.



"I don't see any limits in the technology. I think we've only scratched the surface of what's possible."

RAJ PRASAD, HDR



#### "Instead of information split up over hundreds or even thousands of separate drawings, BIM allows for consistency across all of the documentation."

IAN HOWELL, NEWFORMA

On project sites, there will be a new set of tools to use BIM in construction in a deeper way, Hardin says. "There'll be augmented-reality headsets that will know where I'm standing and where a particular beam should go, or I'll be able to walk up to a wall and see what's in it," he says.

#### NO LIMITS

Although firms are becoming more aware of its advantageous uses, BIM technology still has some challenges to overcome.

Prasad says one of the biggest hurdles remains the lack of interoperability among systems. "When you're on a big project with lots of participants, it's impossible that all of us will be on the same platform, but that's what we need to effectively share data," Prasad says.

Howell doesn't believe the industry will ever settle on one model. "I think we will continue to see a federation of specialized models—the difference being that in the future we will have a new generation of interoperable applications," he says. Hardin expects to see real-time collaboration among project participants in different locations. "I'm excited about the potential there by leveraging the cloud—when we flip a switch and have everybody on the team working in real time no matter where they are," he says. "It's going to come."

Smith says another challenge is keeping the human element in the process. While BIM has the capability to analyze all of the data and optimize the project, machines are still cold and heartless.

"How do you capture gut feeling in an algorithm?" he says. "How do you capture the human intellect and experience?"

Despite these challenges, almost everyone involved with BIM is unfailingly optimistic.

"I don't see any limits in the technology," Prasad says. "I think we've only scratched the surface of what's possible. It's mindboggling to think about what we could possibly do."

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

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#### **MULTI PROJECT**



PROJECT: **University Medical** Center of New Orleans

FIRM: AECOM





**PROJECT: Bexar County High Water Detection System** San Antonio, Texas

FIRM: **Kimley-Horn** and Associates

PROJECT: The Sny Island Levee Drainage District, Illinois

FIRM: Klingner & Associates

**PROJECT: Preparing Rhode** Island's Wastewater **Treatment Facilities** for Climate Change

FIRM: Woodard & Curran

-**MEMBER FIRMS HELPING LOCAL AND** FEDERAL AGENCIES **MAKE INFRASTRUCTURE** AND FACILITIES SAFER **DURING SEVERE** 

WEATHER EVENTS

**BY KYLE CLAPHAM** 

EATHERING



NOVEMBER / DECEMBER 2016 ENGINEERING INC.

# 20102

The University Medical Center of New Orleans opened in fall 2015 and features a state-of-t patient drop-off area as well as new inpatie towers (right).

**PROJECT: UNIVERSITY MEDICAL CENTER OF NEW ORLEANS** NEW ORLEANS, LOUISIANA

#### FIRM: AECOM, COLUMBUS, OHIO

ater intrusion following Hurricane Katrina in 2005 effectively destroyed Charity Hospital, the only full-service medical

center in downtown New Orleans. Tasked with designing the replacement hospital, AECOM collaborated with local, state and federal agencies to determine the criteria that would achieve their operational objectives.

"There were a lot of potential funding sources, and each one of them had their own goals and ways they thought

the building should be put together," says John George, senior structural engineer at AECOM.

Potential operational objectives included the hospital acting as a community shelter

following another storm, which would have demanded a design based on FEMA storm shelter criteria. There was concern this approach would encourage locals to stay in the city during a storm event instead of evacuating, however, and that it would render the building a dark, windowless fortress.

"We tried to digest all of the various standards that could be applied and present them in such a way that they

> were all apples-to-apples," George says.

The team eventually agreed the hospital should operate uninterrupted for at least seven days in the aftermath of an extreme weather event. AECOM helped guide the owner (the state of Louisiana) through a comparison of the different building standards

and ultimately recommended a balance of design criteria that would accomplish the project's goals without adversely affecting the patient experience.

AECOM designed the facility to



days, and an 80,000 gallon tank can provide potable water over that same time period.

After three years of construction, the \$700 million, 424-bed replacement hospital opened in the fall of 2015. The project, which encompasses nearly 2 million square feet on a 38-acre site, won the ACEC/Ohio Grand Award, with the highest score in the history of the awards program; and at the national level, the project won the ACEC National Recognition Award.



John George



#### **PROJECT:** BEXAR COUNTY HIGH WATER DETECTION SYSTEM SAN ANTONIO, TEXAS

#### FIRM: KIMLEY-HORN AND ASSOCIATES SAN ANTONIO, TEXAS

lash flooding causes the most weather-related deaths in the U.S.—approximately 200 per year, according to the Centers for Disease Control and Prevention. In Texas,

76 percent of those deaths involve vehicles, which inspired Bexar County to pursue a high water detection system (HWDS) to help warn travelers of flooded roadways.

As part of this project, Kimley-Horn and Associates evaluated low-water crossings and prepared plans for the installation of sensors, or

HWDS units, to detect the water levels over roadways and trigger flashing beacons on signs located alongside the road in the event of dangerous flooding.

"Generally, local roads are constructed at grade, and many of them are in areas subject to flooding," says Nefi Garza, project manager at Kimley-Horn. "In the city of San Antonio, as well as Bexar County, we are installing flood sensors at low-water crossings to become aware of when these roads are inundated."

Kimley-Horn also developed a geographic information system (GIS) analysis of specific sites to help city and county staff sort and prioritize the low-water

> crossings. The GIS analysis included daily traffic counts, reported roadway closures and determined the distances to hospitals, schools and police and fire stations from each location.

HWDS sensors transmit data to a collection tower, where stakeholders including Bexar County, the city

of San Antonio, Texas DOT (TxDOT) and the San Antonio River Authority can access the information. Previously, these

#### **MULTI PROJECT**

agencies had difficulty coordinating with one another, so Kimley-Horn created a website that collects and displays the realtime data.

"The proposed website is a digital platform that presents sensor data from city, county and TxDOT," Garza says. "These agencies continue to control the sensor and its data, but the general public could now see this sensor data."

A key component of the website, currently in its beta release, allows city and county staff to manually insert warning points on roads that might not have HWDS units. Motorists will be able to sign up on the website and receive alerts via text or email when sensors flood at a location of interest.



Flash flooding prompted San Antonio to install gauges (above) at low-water crossings to help warn the traveling public of flooded roadways.

#### Detection System Alerts Motorists to Flooded Roadways



Nefi Garza

#### **MULTI PROJECT**

**PROJECT:** THE SNY ISLAND LEVEE DRAINAGE DISTRICT IN ADAMS, PIKE AND CALHOUN COUNTIES, ILLINOIS

#### FIRM: KLINGNER & ASSOCIATES QUINCY, ILLINOIS

ome of the most fertile and productive row-crop property in the U.S. lies adjacent to the Mississippi, Illinois and

Missouri rivers. More than 100 years ago, farmers began to build levees to protect the land from river flooding, but extreme weather events have magnified issues with interior flooding and drainage in these areas.



The Sny Island Levee Drainage District, located in Adams, Pike and Calhoun

counties in Illinois, experienced record rainfall in 2015; in fact, approximately 26.5 inches of rainfall between just May 1 and July 31 that year destroyed thousands of acres of typically high-production corn and soybeans, devastating the majority of property owners in the district. age District, studied the possibility of supplementing the area's existing pumping capacity to remove rainfall runoff in a more timely manner. The firm performed detailed hydrologic analyses and benefitto-cost calculations, and also assisted in the physical hydraulic modeling to determine the proper amount and location of additional pumping stations. "The value and

Klingner & Associates, the engineer of

record for the Sny Island Levee Drain-

"The value and productivity of the land has significantly increased," says Michael Klingner, president of Klingner & Associates. "As a result, what used to be acceptable pumping capacity and drainage in these districts has significantly changed along with the weather conditions."

Michael Klingner

Because a levee or drainage district constitutes a political subdivision of the respective state, the cost for an assessment falls on the landowners, railroads and any other utilities that would benefit from potential improvements. Klingner & Associates received nearly unanimous support for its evaluation of the Sny Island Levee Drainage District and its recommendations for upgrades.

"Using GIS, HEC-HMS software, agricultural flood-damage curves, and LiDAR (Light Detection And Ranging) data, we were able to contour different interior flood height inundations under various pumping and rainfall conditions throughout the district," Klingner says. "This is technology that really wasn't available in the 1950s and 1960s at the time of the original design—to actually see how much water was over these fields for an extended period of time." The firm plans to add about 600,000 gallons per minute (gpm) of pumping capacity to nearly 1.1 million gpm already in place, for a benefit-to-cost

ratio between \$2 and \$3, Klingner adds.



Klingner & Associates used cutting-edge software to ascertain interior flood heights so the firm could recommend additional pumping capacities for county pump stations (above).

#### Drainage District Aims to Improve Pumping Capacity

Floodwater breached a protective berm around the Warwick sewer plant in 2010, underscoring the need for surveys (below) to determine other hazards to **Rhode Island'** wastewater infrastructure.

# Wastewater Treatment Clim

**PROJECT:** PREPARING RHODE ISLAND'S WASTEWATER TREATMENT FACILITIES FOR CLIMATE CHANGE

#### FIRM: WOODARD & CURRAN PROVIDENCE, RHODE ISLAND

hode Island contains 19 major wastewater plants that treat approximately 120 million gallons of wastewater each

day, but many of the facilities and associated pump stations operate in freshwater or coastal floodplains, which puts them at risk for inundation and other natural hazards. Increasing storm intensities have already damaged some facilities.

Recognizing that any modifications would require

long-term planning, the Rhode Island Department of Environmental Management has collaborated with other state agencies to integrate these considerations into current and future wastewater

designs. As part of this project, Woodard & Curran evaluated the implications of climate change on the major wastewater infrastructure within the state.

"Pump stations and treatment facilities are constructed at the low points to take advantage of gravity, and quite often they are very close to coastal, riverine or local water bodies, and thus subject to flooding," says senior project manager Janice

> Greenwood, a principal at the firm.

Woodard & Curran assessed all 19 treatment plants to identify vulnerabilities to flooding, storm surge and other impacts related to severe weather and climate change. The analysis included a scientific investigation into the most likely consequences of continued

climate change and a preliminary look at how those alterations would affect wastewater facilities.

"Our goal was to identify some universal adaptation strategies and suggest where



they could be implemented at the various plants," Greenwood says.

A limited budget prevented Woodard & Curran from visiting each site, but ultimately the firm produced a report that presents potential strategies in five categories. Constructing walls or dikes near the plant or just certain facility components, for example, could help retain floodwaters. Relocating systems and equipment to higher ground would also be an effective approach, per the report.

Woodard & Curran reached out to utility managers, operators and other stakeholders to discuss the importance of incorporating this information into their planning efforts. The state has even worked with organizations to develop an online mapping application called STORMTOOLS that provides access to a suite of coastal planning data and tools.



Janice Greenwood



Chuck Harrington, Parsons chairman and CEO, addresses a group of graphic design students at Marshall Fundamental School in Pasadena, California, who are working on 3D printing projects.





# A BIG GIVE BACCIK

#### EMPLOYEES OF INDUSTRY GIANT PARSONS CONTRIBUTE IN INNUMERABLE WAYS TO COMMUNITIES THROUGHOUT THE NATION

**BY CALVIN HENNICK** 

ooking through the company's archives, Erin Kuhlman, vice president of corporate marketing and communications, came across a black-and-white picture—dating back to the 1940s or 1950s—of firm founder Ralph M. Parsons lying on a cot, donating blood.

Parsons died in 1974. But, as Kuhlman says, that spirit of giving back lives on.

"This ethic has been passed down from our founder to us today. It's definitely something that's valued by our management," she says. "But I also see it as grassroots."

Parsons takes a particular interest in organizations working on education or health care issues. But the Pasadena,

California-based firm is one of the world's largest engineering and construction companies, with offices in more than two dozen countries, so its philanthropic programs are highly decentralized, with different offices spearheading their own projects. Often, local offices will post updates on a "Parsons Gives Back" page on the company's internal social media site.

"That's [usually] how we find out about it," Kuhlman says. "They'll post a picture of their team. Maybe they did a jog-a-thon or a walk, or a blood drive. Some offices have done back-to-school drives, or in the winter, maybe they'll do a coat drive. It can be very local and specific to their city."

Some Parsons campaigns focus on raising money for disaster relief or the United Way, but most programs emphasize the importance of employees working together to make a difference. "More and more, employees want to be involved themselves," Kuhlman says. "They don't just want to throw money at a problem—and that's what we want. We feel that employees need to be really involved in their communities."



"They don't just want to throw money at a problem-and that's what we want. We feel that employees need to be really involved in their communities."

ERIN KUHLMAN, PARSONS

#### **BIG SUNDAY**

Look for Parsons employees in California on a Sunday during the month of May, and you might find them preparing and serving breakfasts at a women's center in Sacramento, or painting walls and planting citrus trees at a Boys & Girls Club in Pasadena. Chances

are they're packing boxes of food at an Orange County food bank, removing invasive plants and trash from a nature preserve in El Segundo, or transforming a vacant lot into a working organic farm at an Encinitas elementary school.

These are just a few of the projects that Parsons employees have tackled through the Big Sunday program. The annual day of service expanded to Big Sunday Weekend, one of the largest annual community service events in the country. And last year, the program grew to A

Month of Big Sunday, which connects people with service opportunities every day in May.

"Parsons is trying to foster that feeling of working together to contribute to our communities," says Nikki Cotton, department manager for federal government accounting at the company's headquarters in Pasadena, and the liaison between Parsons and the Big Sunday organization.

Parsons employees in California have been participating in Big Sunday with their families since 2007. The program gives workers the chance to participate in activities related to engineering, as well as other activities that don't have an industry link, Cotton says. Many employees who participate relish the opportunity to connect with their colleagues outside of the office and to involve their children in community service, she adds.

"It gives employees the opportunity to do something outside of the day-to-day, and to bring their families into it as well," Cotton says. "A woman told me that the thing she loves about it is that it allows her middle-school daughter to see that the company works

to make a difference in the community."

#### YMCA CORPORATE CUP

For 32 years, employees in the company's Charlotte, North Carolina, office have walked, jogged and run across the finish line at the YMCA Corporate Cup race to help support local YMCA programming.

Dianne Allen, senior office services assistant at the branch, has been the Parsons team captain since 2002, organizing the company's

registration efforts. She first ran the race in 1988 and has participated every year since, moving up from the 5K to the halfmarathon distance several years ago.

"We have a friendly competition for bragging rights," Allen says. "You have some competitive people, you have some people jogging, and you have some walkers who are just out there for the exercise."

Parsons pays the registration fees for the runners; about 25 to 40 people (including employees' families) from the approximately 100-person Charlotte office sign up most years. In March, 51 people signed up to run, resulting in nearly \$1,400 going to the YMCA. Out of 31 teams in its division, Parsons ranked third for number of sign-ups.

> In addition to providing employees with a chance to help a local charity, the Corporate Cup race offers employees the opportunity to bond with their colleagues and improve their health, Allen says. She emails tips about training and hydrating, and some workers go out for evening runs with their colleagues after work in the lead-up to the race.

"We look forward to this event every year. People seem to enjoy it so much," Allen says. "You should see them when they cross the finish line—especially those that weren't runners before. It really instills a lot of confidence in them."

#### TOURNAMENT FOR LIFE

Debra Fiori, senior vice president for corporate talent management at Parsons, has relo-



**\$3.1 million** has been raised for the American Cancer Society by Parsons since 1976



cated three times in the past nine years. But every spring, except for one, she has found herself in the same place—at the Brookside Golf Course in Pasadena, teeing off in Parsons' annual Tournament For Life, which raises money for the American Cancer Society (ACS) of San Gabriel/Pomona Valley.

Fiori first heard about the tournament when she was working in the firm's Charlotte office and was excited by the prospect of raising money to fight cancer while also making connections with company executives and meeting other leaders in the industry. "I said, 'I'm going to figure out a way to get to that tournament,'" she recalls. "This was an event that was for a good cause but also allowed me an opportunity to meet people that I might work with every day via phone and email but haven't been able to interact with on a more personal level."

Parsons employees, as well as employees and managers at partner organizations, can pay individually to play in the tournament, or individuals or groups can pay to sponsor teams or holes. There's also a raffle, along with smaller fundraising moments such as a hole where players can pay a club pro to take their tee shot for them.

Since 1976, the event has raised more than \$3.1 million for ACS.

"Cancer impacts so many lives. It has impacted a lot of lives and families at Parsons, throughout the employee base and all the way up to senior leadership," Fiori says. "We've lost some leaders to cancer, and we've had employees who've been diagnosed with cancer every year. We believe it's a very important organization."

#### ParSTEM

Biff Lyons, executive vice president and manager of the Defense & Security Division at Parsons, believes students aren't the only ones who benefit when the company invests in education and internship programs. The company, the country and, ultimately, the entire world are all better off with a well-educated workforce that has a science, technology, engineering and math (STEM) background, he says.

"It benefits everybody who's involved. The students get a lot of value out of coming to work, earning some money over the summertime, and they learn a little bit, too. We as a company get a benefit of maybe meeting the next group of full-time employees that we'll hire when they gradu-

ate," Lyons says. "We firmly believe that we're part of a community, and everybody benefits from more progress in this area."

In addition to internships, Parsons sponsors scholarships and in-school programs in communities where the company's employees live and work through its ParSTEM program. In the Washington, D.C., area, for example, employees have been involved in a K-12 robotics program, and the company has funded scholarships at the University of Maryland. In Pasadena, employees work with K-12 students on engineering and science activities, help with mock interviews and resume workshops, and sponsor a 3D printing program.

The ParSTEM program is long-standing, but the company is constantly on the lookout for new ways to make an impact in math and science education, Lyons says. For example, the company's involvement in the robotics program is the result of two employees who wanted to volunteer and asked the company to help sponsor it.

"There's really a terrific culture here of folks coming forward and wanting to be involved," Lyons says. "We try to really create a culture of innovation here and to ensure that people know that getting into the community is something anybody can get involved in."

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



"Parsons is trying to foster that feeling of working together to contribute to our communities."

NIKKI COTTON, PARSONS

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early stages of their careers.

#### **ANNIE BLISSIT** Gresham, Smith & **Partners**

Alpharetta, Georgia Annie Blissit, 24, has contributed to master planning, collection system design, treatment facility design, permit compliance and water supply projects for many municipalities in metro Atlanta, Georgia nationally and internationally. She co-authored a chapter of a Water **Environment Federation** (WEF) publication and has presented at the Georgia Association of Water Professionals (GAWP) annual and fall conferences. Blissit is actively involved in GAWP, WEF and the American Society of Civil Engineers Georgia Section as the director of younger members.





#### STEPHANIE KUNKEL Johnson, Mirmiran & Thompson Sparks, Maryland

Stephanie Kunkel, 27, serves as lead designer and project engineer/manager on new construction and renovation projects in the government, commercial and educational industries. She is knowledgeable in energy-efficient and sustainable products and their applications, and attends global forums on diverse and innovative technologies to remain a leader in her field. While traveling throughout North America, Malaysia and (soon) India, Kunkel promotes leadership skills and professional development tactics for young engineers through the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

#### BRIDGET OSBORN HR Green, Inc. St. Paul, Minnesota

Bridget Osborn, 30, played a key role in designing two waterreuse irrigation systems along a narrow roadway reconstruction corridor in Woodbury, Minnesota. A new golf course irrigation system will not only reduce pollutant loading to a downstream impaired lake, but it will also reduce the strain on a quickly depleting local aquifer. Osborn is an advocate for alternative stormwater-use education and has presented this project at multiple conferences throughout the Midwest. She received the 2014 Minnesota Council's Emerging Leader Award for her commitment to encouraging the involvement of new and aspiring engineers.



#### DANA AL-QADI AECOM, Inc. Chicago, Illinois

Dana Al-Qadi, 26, applies her technical expertise and engineering skills to improve communities. She has worked on projects involving the design of potable water treatment plants, the modeling of hydraulic distribution systems and the development of feasibility studies. Recently, Al-Qadi was a lead researcher on a project to leverage financing for investment in urban green infrastructure. She has conducted field work in Kenya to address sanitation and access to clean water. Outside of work, she has served as a lead organizer of Project Pipeline, a day camp that exposes disadvantaged middle school students to design fields.



#### ACEC coalitions find improving economic conditions still filled with challenges

BY STACY COLLETT



COALITIONS

DYA

embership and overall participation in ACEC's six coalitions are at an all-time high, according to coalition leaders. Member Firms are looking to these alliances for information, resources, a common advocate for their needs and a sounding board to discuss issues that are relevant to their industry niche and their firm size.

Many coalition chairs say they are facing many familiar challenges that have concerned Member Firms for the last several years, such as an aging workforce and hiring problems. Still, others see opportunities with new technologies, processes

and regulations backed by improved economic conditions.

#### A RECOVERING ECONOMY

In part because of an improving real estate market, the Land Development Coalition (LDC) has enjoyed a surge in membership from its inception six years ago—to more than 100 firms today.

"The single-family home market is stabilizing, foreclosures have made their way through the pipeline in most areas, and capital sources are strong right now, so a lot of money is flowing into projects," says LDC Chair Mark Borushko."There's been a lot of pent-up demand for multifamily and single-family [housing] units, as well as some office, retail and lots of mixed-use spaces. That's creating opportunities for us."

Borushko believes LDC's most pressing responsibility is continuing to provide an advocacy and business platform to help Member Firms serve their clients more efficiently. To that end, LDC will host its first one-day seminar for LDC members at its February meeting in San Diego. The event will include a guest speaker, as well as roundtable discussions and working groups.

"We're going to have some social time, as well, so we can learn about each other, collaborate and work on issues and topics that are relevant to our industry," says Borushko, who is also a vice president and general manager at David Evans and Associates, Inc.

#### **NEW TECHNOLOGIES**

Though new technologies can make the work easier for surveyors, it can also present a new set of challenges that could actually threaten their livelihood, says John Schneider, chair of the Council of Professional Surveyors (COPS).

Unmanned Aircraft Systems, or drone technology, has the potential to vastly reduce the time spent collecting accurate data, increase the amount of data collected and minimize the risk to surveying teams that are measuring on dangerous terrain. But the wide availability of drones and their relative ease-of-use allow other professions to poach work from surveyors.

Crews often collect data with geographic information systems that are not used for design and are stored in centralized systems, Schneider says. If the data is not tracked appropriately, it can be unknowingly used down the road in design, which could lead to issues of data accuracy.

"Our challenge is to communicate to the marketplace about when it's OK to use data collected by nonprofessionals, and what types of services should only be done by a licensed surveyor," Schneider says.

#### PROCESS AND REGULATION SHIFTS Anthony Bartolomeo, past chairman of the Design Professionals Coalition (DPC)—comprised of senior officials from the largest firms—noted some of the many shifts in process and practice that pose challenges for his Member Firms.

"Some of the most significant changes include the continued growth of the P3

More than half-

55 percentof the 2,194

surveyors nationwide are

between ages 51

and 76

market, innovative financing, and alternative delivery mechanisms," Bartolomeo says. "You can also include emergence of new technologies such as drones and virtual reality, and effectively navigating the challenges and opportunities with mergers and acquisitions."

He added that smart

firms must manage change to create opportunities. "P3s are helping to fill the void in public financing and create new markets for the industry, and new technologies—when properly applied—will make us more competitive in the global marketplace."

Although many firms complain that their work is being commoditized, several shifts in business processes and building regulations are actually reducing commoditization and encourages collaboration within the entire design team.

For mechanical and electrical engineers, the push for net-zero energy buildings which rely on exceptional energy conservation and on-site renewable generation to meet all of a building's heating, cooling and electricity needs—require firms to bring more creativity to projects.

"It takes a lot more engineering knowhow and less cookie-cutter type of solutions to design those types of buildings," says **Kevin L. Peterson, chair of the Council of American Mechanical and Electrical Engineers (CAMEE)**. At least 100 projects across the country have been designed and built for net-zero energy, Peterson says. California has mandated that all new residential buildings must be netzero energy by 2030, and CAMEE expects other states and the federal government to follow suit.

> The challenge will be educating the engineering community, so they are prepared to respond to the demands that come with it, Peterson says.

"There are a lot of engineers out there who are used to doing things a certain way," says Peterson, who is also president and CEO of P2S Engineering, Inc. They will need to adapt

through continuing education or mentoring, he adds. "I think we'll see some firms will adapt well to it, and other firms will dwindle by not adapting—or be relegated to doing very commoditized types of solutions."

In the structural engineering world, a transformation of a different kind is taking place. Building Information Modeling (BIM) has completely transformed the way designs are delivered to contractors.

"Probably 95 percent of our Member Firms are using BIM for almost all of their work now. I would say in the next couple of years, everything will be BIM," says **David W. Mykins, chair of** 



"There's been a lot of pent-up demand for multifamily and single-family [housing] units, as well as some office, retail and lots of mixed-use spaces. That's creating opportunities for us."

> MARK BORUSHKO, CHAIR OF THE LAND DEVELOPMENT COALITION DAVID EVANS AND ASSOCIATES, INC.



#### "Probably 95 percent of our Member Firms are using BIM for almost all of their work now. I would say in the next couple of years, everything will be BIM."

DAVID W. MYKINS, CHAIR OF THE COUNCIL OF AMERICAN STRUCTURAL ENGINEERS STROUD PENCE STRUCTURAL ENGINEERS

#### the Council of American Structural Engineers (CASE).

On the upside, BIM allows engineers to more easily predict the performance of projects before they are built, respond to design changes faster and optimize designs with analysis, simulation and visualization. But it also brings new contractual and liability issues for firms.

"Some new questions that are coming up are, 'What is the standard of care when you give somebody a BIM model to build a building?" says Mykins, who is also president of Stroud Pence Structural Engineers. "We all understand from decades of paper drawings what that standard of care is, but what's the requirement in that model for dimensional accuracy? What's the standard of care for coordination with other disciplines' models [such as] plumbing, mechanical and electrical?" he added. "That's a new phenomenon that has yet to be fully tested through our legal system. Those are the types of challenges that we're trying to help our Member Firms recognize and deal with upfront."

To that end, CASE provides tools, publications and training to help Member Firms. Within the last year, CASE has released updated contracts that address some of the new challenges with BIM. The coalition also holds several risk seminars throughout the year at ACEC meetings and conferences to help Member Firms become more aware of business risk and help mitigate it. Mykins points to another challenge with BIM. "With contractors also implementing BIM, it pulls some of the available workforce away from consulting engineers like us—and into a contractor's office to do similar work," Mykins says.

#### ATTRACTING TALENT

The overall industry has struggled to balance an aging workforce with a shortage of young talent, but maybe none more particularly among professional surveyors.

"Our group is a profession that is an aging group, and there are not a lot of young individuals entering the marketplace," says COPS Chair Schneider. "I'm not sure why that is, but it's beginning to show up in a lack of being able to find qualified staff."

A vice president at Vaughn & Melton, Schneider said the 10 to 12 professional surveyors on staff are in their 50s and 60s and nearing retirement. In fact, more than half (55 percent) of the 2,194 surveyors nationwide polled by the National Society of Professional Surveyors are between ages 51 and 76.

Attracting and keeping talent remains a challenge for many engineering firms, and particularly small firms, which may explain why the Small Firm Council membership has swelled from 139 Member Firms in 2012 to 172 firms in 2015.

At university career fairs, **Small Firm Council (SFC) Chair Tricia Huneke** often sees prospective structural engineers lining up at the booths of the largest, most well-known companies, and paying little attention to the smaller firms. "Small firms are having to be more creative in hiring, using recruiters—which small firms often don't do because they're expensive," says Huneke, who is also president and CEO of Ruby and Associates, Inc.

"You really have to be searching in the right places and working harder to gain relationships with universities and get some name recognition, so people know who you are and want to talk to you," she says. Human resources and recruiting issues will be discussed at the SFC's February meeting in San Diego.

As SFC chair, Huneke is also working to create a joint coalition business practice committee that will address the specific needs of small firms. "Large firms already have a lot of resources. Our companies might not even have an HR person, IT person or a full-time financial person. Everybody is wearing so many hats, so I'm hoping to develop a joint coalition that will provide best practice for these firms," Huneke says.

The diverse and enthusiastic groups that comprise ACEC's coalitions are driving the success of each specialty area. Member Firms come from across the country and present organizations of all sizes—from 10 to 20 professionals to several thousand employees. "Each brings different but real perspectives," Borushko says, "and together they will make their niche industries better and stronger."

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



"Small firms are having to be more creative in hiring, using recruiters-which small firms often don't do because they're expensive."

> TRICIA HUNEKE, CHAIR OF THE SMALL FIRM COUNCIL RUBY AND ASSOCIATES, INC.

## Balancing the Disruptive Distributed Energy Future

Traditional planning processes must incorporate analytics-based smart tools to help utilities manage business opportunities in the new energy landscape

#### By Dave O'Connor and Jacob Ohlhausen, Black & Veatch

t's no secret that the future of electric supply is more distributed than centralized, and the future is increasingly becoming the present. Distributed energy resources (DERs) are quickly merging into the mainstream market in the form of customer-sited solar photovoltaic (PV) installations, electric vehicle (EV) charging, and energy-efficiency measures such as window replacements. Other DERs appearing on the market include aggregated demand response, behind-themeter energy storage, and combined heat and power generation.

DERs promise energy that can be economical and help communities benefit from renewable energy (and meet their climate goals). However, conventional electric production and distribution planning processes do not fully consider the complex demands of DERs, and legacy distribution infrastructure is not designed for the two-way power flow needed to take advantage of some technologies. Electric utilities need to understand these disruptive impacts on the grid to keep their operations resilient, reliable, safe and profitable.

Black & Veatch's 2016 Strategic Directions: Electric Industry Report confirms the majority of industry respondents believe these technologies are viable business opportunities or will be within the next five years. To prepare for these disruptive technologies, the U.S. (and the world) is watching two major early

Without any changes in policy or ratestructure adjustments, more than **15 percent** of SMUD's transformers might need premature replacement adopting markets—California and Hawaii—for lessons learned. As utilities in these states manage the real-world, real-time effects of DERs, they are realizing that the critical information is not *how much solar* or *how many* electric vehicles but rather *where DERs* are located, *when* they impact the grid and *how* they impact it.

#### TRADITIONAL PLANNING SHORT-CIRCUITS DERS

Traditional planning processes used by most utilities for capital infrastructure additions and maintenance fail to capture the complexity of a DER-rich future. By enhancing the traditional planning process with analytics-based smart tools, DERs shift from a utility business risk to a business opportunity, and they can help utilities adapt and thrive in a new world of energy.

The traditional utility-investment planning process is optimized for large, central generating facilities that distribute power to their service areas. While this design is not completely representative of the emerging energy landscape, it will still form the backbone of utility planning practices. In traditional planning, the effects of DERs are typically layered on to existing hourly load forecasts according to their expected demand-reducing and energyconserving properties. This approach neglects two key aspects of DERs: subhourly activity and local system impacts. Furthermore, the traditional models used to predict DER adoption often lack information about when, where and to what degree DERs will affect the electric grid. These shortcomings could lead to inaccurate planning, nonoptimal investment choices and, ultimately, more expensive energy for the consumer.

#### ANALYTICS AMPS UP PLANNING PROFICIENCY

By using the power of cloud computing and big data, utilities can make smarter investment choices by accurately predicting where DERs will likely be adopted, understanding the impacts on their distribution system and isolating necessary equipment upgrades. Black & Veatch, a global engineering, construction and consulting company, recently developed this capability in the form of SmartDG<sup>™</sup>—an analytics-based DER planning tool powered by Black & Veatch's ASSET360<sup>™</sup> analytics platform. The two core functionalities of SmartDG<sup>™</sup> are to comprehensively and accurately assess the technical potential of rooftop solar across a community and assign a time-variant probability of adoption for solar and other DERs for each customer.

The first step of Black & Veatch's approach uses aerial image analysis and light detection and ranging (LiDAR) data to identify the technical potential of rooftop and parking lot solar in a utility's service area. This geographic information system (GIS) approach models the total amount of solar that could technically be deployed, taking into account rooftop pitch, orientation and shading effects. Technical potentials are then associated with individual customer accounts and filtered to eliminate sites that are not cost-effective.

Consumers almost always adopt solar to cut energy costs, but savings is not the only driving factor of adoption. Consumers are

#### **GUEST**COLUMN



#### "It's this kind of detailed insight that makes this approach so valuable as we face such significant growth in distributed energy resources."

OBADIAH BARTHOLOMY SACRAMENTO (CALIFORNIA) MUNICIPAL UTILITIES DISTRICT

influenced by the "network effect," where favorable experiences of neighbors, friends or colleagues encourage adoption. The outcome of the "network effect" is that solar installations are not randomly distributed among economically viable sites, but they are instead clustered around customer demographics. Information on individual customer behavior can come from the utility or from customerdata companies such as Nielsen, Experian, Acxiom and others. This customer grouping places solar installations in natural clusters, mimicking actual observed behavior.

Predicting the adoption of EVs uses a similar approach, wherein market research data is used instead of aerial LiDAR data. EVs are important to utilities, as more than three-quarters of respondents to Black & Veatch's electric industry report survey said they were "interested" or "very interested" in EVs as a new revenue stream. Our DER approach can also be used to gauge participation in utility programs such as demand response and, to a lesser degree, energy-efficiency programs. (Certain amounts of energy efficiency occur as older, less-efficient products are replaced—this happens more or less uniformly across customer groups. Other energyefficiency steps are more likely to cluster by demographic group, such as window replacements, similar to solar deployment.)

The collection and integration of adoption forecasts for several

DER technologies provide a more realistic representation of the challenges the electric grid will face, along with how the utility must adapt to operate it. Figure 1 shows integrated adoption forecasts in SmartDG<sup>™</sup> for a given area. A customer's physical location is overlaid by dots with varying color and size. The colors represent different DERs, and the size corresponds to the magnitude of load shifting for each DER. The utility uses this information to locate areas of high- and low-DER penetration to inform their planning, policy, ratemaking and operational activities.

The resulting customer-level adoption probabilities empower the utility to estimate the impacts of DERs on its electric distribution system. Customer-level load profiles are aggregated to transformer "nodes" along each feeder, and that data is overlaid onto the utility's existing distribution system model. Power flow simulations result in calculations of volts, amps, real power and apparent power at key equipment locations. By prioritizing the most severe under- or over-voltage violations and transformer overloads, the utility can make focused system upgrade investments in order to preserve customer choice through enabling a more robust, flexible grid and increased system reliability.

Beyond distribution-system impacts, this improved DER planning process can integrate with other tools for comprehensive util-

#### FIGURE 1: INTEGRATED ADOPTION FORECASTS IN SMARTDG™. A CUSTOMER'S PHYSICAL LOCATION IS OVERLAID BY DOTS WITH VARYING COLOR AND SIZE. THE COLORS REPRESENT DIFFERENT DISTRIBUTED ENERGY RESOURCES (DERS), AND THE SIZE CORRESPONDS TO THE MAGNITUDE OF LOAD SHIFTING FOR EACH DER.





#### FIGURE 2: SACRAMENTO (CALIFORNIA) MUNICIPAL UTILITIES DISTRICT ENERGY LOAD FOR A TYPICAL SUMMER DAY (SOLID LINE) AND THE NET LOAD WITH HIGH ADOPTION OF DISTRIBUTED ENERGY RESOURCES (DERS) (DOTTED LINE).

ity-system planning. Utilities will generate a complete and accurate picture of system performance and investment priorities when they consider DER impacts on bulk-system power production and treat DERs as dispatchable loads in those simulations when appropriate. It is likely that public utilities commissions and intervening parties for rate cases and integrated resource plans will begin to require this level of accuracy and comprehensive system view.

#### INNOVATIVE DER SOLUTIONS IN CALIFORNIA

The first detailed, integrated look at how the various components of DERs interact with the distribution grid was undertaken for the Sacramento (California) Municipal Utilities District (SMUD) by Black & Veatch with support from Navigant, Nexant, ICF, Landis & Gyr, and others. SMUD is a community-owned, not-for-profit electric utility serving 1.4 million people in Sacramento County, and it is an industry leader in solar capacity, renewable energy and reliability. The purpose of the work was to understand the interplay among DERs, the distribution grid, the bulk power market and various business metrics. Using this methodology, Black & Veatch provided DER location, magnitude and temporal information to a distribution power flow model for analysis.

Results showed voltage violations and transformer overloadings are the primary impacts of note from deep DER deployment, strongly correlated with EV load and moderately correlated with PV load. In particular, without any changes in policy or ratestructure adjustments, *more than 15 percent of SMUD's transformers might need premature replacement*. The overloads arise primarily from the current rate structure, which encourages EV owners to charge overnight. This approach currently works well to reduce system peak demand, but it causes problems when larger numbers of EVs are clustered on a transformer and charge at the same time—as will be the case when adoption increases. To illustrate this, Figure 2 compares the SMUD load for a typical summer day (solid line) and the net load without DERs (dotted line). Note the significant jump in net load at midnight; it is this jump that would cause transformer stress.

The SMUD study was instructive rather than definitive. SMUD will examine the relative and qualitative interactions among general and EV-specific rate structures, as well as capital plans, behavior incentives and many other factors moving forward.

"It's this kind of detailed insight that makes this approach so valuable as we face such significant growth in distributed energy resources," says Obadiah Bartholomy, SMUD's lead analyst on the project. "We will definitely be using this type of analysis to shape our thinking and develop plans that best leverage these DER investments as we move forward."

#### CONCLUSION

As communities seek to benefit from DERs, utilities must prepare for their disruption by understanding where, when and how DERs impact the evolving grid. Black & Veatch's methods in DER planning incorporate a comprehensive approach to the total technical potential of customer-sited solar and predicting the adoption potentials for several DER technologies, especially customer-sited solar, with consideration for local system impacts and subhourly loads that are not traditionally examined. By accounting for these previously underestimated and overlooked effects, utilities can become well positioned to provide economical energy and maintain high reliability while meeting renewable energy goals.

**Dave O'Connor** is a Black & Veatch Grid Edge Solution Lead based out of California, and **Jacob Ohlhausen** is a Black & Veatch Solutions Consultant based out of Kansas. Blind adventurer Eric Weihenmayer delivered an inspiring speech to Conference attendees on how to convert struggles and challenges into life-changing achievement.

# More than 900 attend Fall Conference in Colorado

he 6,035-foot altitude of Colorado Springs was the perfect backdrop for the 2016 ACEC Fall Conference, which featured top political and business speakers as well as targeted business management programs to help attendees heighten bottom-line results.

"I enjoyed the Conference tremendously," said L. Thomas Bayne, principal at Western Geotechnical, Bakersfield, California. "The seminars I attended were very useful to my business, and the location was just excellent."

"It was a wonderful Conference with great presentations and a superb facility," said Oge Udegbunam, principal at Tyme Engineering,

Livonia, Michigan. "Definitely one of the best ACEC Conferences I've attended."

#### ACEC BOARD HEARS OF NEW CONTRACTING-OUT STUDY, THREATS TO LICENSURE

When all costs are included, contracting out to private firms provides demonstrable savings over DOT in-house operations, according to a recent New York University study released to the ACEC Board.

Dan Purvine, president of A/E Clarity, presented the study's methodology and findings. While salaries in the private sector are generally higher than in the public sector, the study showed that, when fully loaded with fringe benefits and overhead costs, the public sector is substantially more expensive—even when profit is factored into the equation.

ACEC/Arizona Counsel Doug Folk briefed the Board on threats to professional licensure in various states and recommended that Member Organizations

Colorado Gov. John Hickenlooper welcomed Conference attendees.





strengthen their legal defenses. Folk said a recent Federal Trade Commission challenge and ultimate win against a North Carolina dental board represents a growing national opposition that claims such licensing boards are barriers to competition.

He said the engineering industry should be especially concerned because many engineer licensing boards contain mandates for practitioners to abide by Qualifications-Based Selection (QBS) on state and local public projects.

The Board also officially welcomed leaders from ACEC's newest Member Organization, ACEC/Rhode Island: President John Shevlin of Pare Corp. in Lincoln; National Director Ken DeCosta of Pare Corp; and Executive Director Marcel Valois of Pare Corp.

#### **M&A BEST PRACTICES**

Major players in mergers and acquisitions (pictured below) gave Fall Conference attendees a graduate course in M&A with some key takeaways:

- You're acquiring people not companies, so make sure they're the right people.
- You're acquiring client relationships, so make sure they are strong.
- Clearly understand your motivations for acquiring or selling.
- Ensure the leadership on both sides of the deal is fully committed to making it a success.
- Be fully transparent. There are no secrets after the deal is done.

(Left to right) Former Arcadis North America CEO John Jastrem, Stantec President/CEO Bob Gomes, and Pennoni President/CEO Anthony Bartolomeo addressed Mergers and Acquisitions.



#### DECENTRALIZED WATER MARKET MAKES TRANSFORMATIONAL CHANGE DIFFICULT

Addressing challenges to water infrastructure, a panel of Member Firm leaders noted the extreme fragmentation of the nation's water management.

The panelists—Anthony Bouchard, CDM Smith North America president; Virginia Grebbien, Parsons chief of staff; Mike MacPhee, Carolla Engineers chief strategic advisor; and CH2M Water Business Group President Peter Nicol underscored that while many of the problems facing the water sector have technological solutions (potable reuse, desalination and resiliency/sustainability), "overcoming political objections remains the biggest challenge."

As many as 50,000 separate water agencies operate across the country, making solutions local and wholesale change difficult and slow.



Water scarcity and challenges of water delivery were discussed by (left to right) Virginia Grebbien of Parsons (moderator), Anthony Bouchard of CDM Smith, Mike MacPhee of Carolla Engineers, and Peter Nichol of CH2M.

#### ROTHENBERG ON ELECTION; FORBES KARLGAARD HIGHLIGHTS BUSINESS MEGATRENDS

Election forecaster Stuart Rothenberg handicapped the national election (and like most others turned out to be wrong on the outcome).

*Forbes* Publisher Rich Karlgaard said business success increasingly depends on a company's ability to recognize and react to megatrends that are transforming the marketplace.

"Digital technology is transforming everything we do in industry and manufacturing, including everything from movies to agriculture to national defense. "The business that thrives in the future will be a business that quickly adapts to rapid change."

#### WEIHENMAYER: "NO BARRIERS LIFE"

Adventurer Erik Weihenmayer—blind since 13—delivered an inspiring message to Conference attendees on how to convert personal struggles and challenges into grand achievements.



Hundreds of Fall Conference attendees enjoyed exhibits from more than 40 vendors.

In 2001 he became the only blind climber to reach the summit of Mt. Everest, and subsequently he has scaled the highest mountains on all seven continents.

"Obstacles and fear too often conspire to paralyze and stop us from reaching our goals, but there's always a way forward," he said. "You just have to find it."

#### SMART CITIES AND DISRUPTIVE TECHNOLOGIES

Current government structures aren't yet up to the task of rapidly implementing "smart" systems, according to a panel of: Meeting of the Minds Co-Founder Gordon Feller; Black & Veatch Smart Integrated Infrastructure V.P. Scott Stallard; PricewaterhouseCoopers U.S. Sustainability Advisory Leader Clinton Moloney; and Verizon Smart Communities V.P. Mrinalini Ingram.

For smart technology to become mainstream, they said public agencies, utilities and private industry will have to jettison parochial attitudes and cooperate on a broader scale.

> John Heiberger of Kimley-Horn provided an outdoor demonstration of drone applications and limitations.





John Nishimura (second from left) of Fukunaga & Associates, Honolulu, received the ACEC Coalitions Distinguished Service Award. Also pictured from the left: ACEC President Dave Raymond, Committee of Fellows Chairman June Nakamura, and ACEC Chairman Peter Strub.

#### ACEC/PAC SUPPORT SOARS

ACEC/PAC continues to break records in 2016, having generated over \$860,000 toward its \$1 million goal with two months left.

More than 1,000 tickets were sold for the annual ACEC/PAC Fall Sweepstakes raffle—a record for the fall drawing. Jeff Volk, Moore Engineering, West Fargo, N.D., won the \$10,000 grand prize.

#### **2016 ACEC AWARDS**

- 2016 College of Fellow Inductees were: Kyle Anderson, Felsburg Holt & Ullevig, Omaha, Neb.; Thomas Blackburn, Blackburn Consulting, Auburn, Calif.; Mary Erchul, Ghirardelli Associates, Irvine, Calif.; Sergio Girau, Linfield, Hunter & Junius, Inc., Metairie, La.; Joel Goodmonson, Architectural Engineers, Inc., Boston, Mass.; Herbert (Bert) Parker, GARVER, North Little Rock, Ark.; Gregg Spagnolo, North Arrow, Inc., Washington, D.C.; Charles Craddock, Clark Dietz, Inc., Champaign, Ill. and Charles Huddleston, The Schemmer Associates, Inc., Omaha, Neb.
- 2016 Young Professional of the Year awards were presented to five Member Firm employees who have made significant contributions to the industry early in their careers: Dana Al-Qadi, AECOM, Chicago; Annie Blissit, Gresham, Smith & Partners, Alpharetta, Ga.; Stephanie Kunkel, Johnson, Mirmiran & Thompson, Sparks, Md.; Adam Leonard, formerly with Fitzemeyer & Tocci, Woburn, Mass.; and Bridget Osborn, HR Green, St. Paul, Minn., who was also chosen by National Engineers Week to represent ACEC in its annual "New Faces of Engineering" promotion.
- 2016 ACEC Scholarship Winners were: Jeremy Ensz, \$10,000 ACEC Scholar of the Year Scholarship; Kristen Copeland, \$5,000 ACEC Life/Health Trust Scholarship; Jeffrey Bloss, \$2,500 Council of American Structural Engineers (CASE) Scholarship; Lauren Grimley, \$2,500 A/E ProNet Scholarship; and Aryn Cowley, \$2,000 Small Firm Council (SFC) Scholarship.

- 2016 Community Service Awardees—recognized for their extraordinary contributions to their communities-were Ben Chen, Chen Moore Associates, Fort Lauderdale, Fla.; Lauren Evans, Pinyon Environmental, Lakewood, Colo.; Robert Pence, Freese and Nichols, Fort Worth, Texas; and Charles Phillips, KCI Technologies, Sparks, Md.
- The Mississippi Department of Transportation received the 2016 Quality-Based Selection Award, given annually to organizations and individuals who promote and make exemplary use of QBS at the federal, state and local levels.
- The Coalitions Distinguished Service Award was given to Jon Nishimura, Fukunaga & Associates, Honolulu.
- Gannett Fleming Chairman/CEO Bill Stout received the 2016 ACEC Chairmen Emeritus Award for his "outstanding service and support to the Council."

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NOVEMBER / DECEMBER 2016 ENGINEERING INC. 45

## Mid-Year Review of 2016 M&As

#### BY MICK MORRISSEY

he range and diversity of consolidations created through mergers and acquisitions in the U.S. engineering industry is vast. These informative infographics present all of the relevant trends and statistics on how the industry has changed through M&A through the first half of 2016.

#### RECENT ACEC DEAL-MAKERS OCTOBER 2016

ACEC member **T.Y. Lin International** (San Francisco) acquired a majority stake in **IDEAM S.A.** (Madrid), a structural engineering firm specializing in the design and construction of major infrastructure projects. The deal increases T.Y. Lin's presence in the European, Middle Eastern and Latin American markets.

ACEC member **ATC Group Services, LLC** (Lafayette, La.), a full-service environmental consulting and industrial hygiene firm, acquired **Environmental Compliance Services** (Agawam, Mass.), a multiregional environmental consulting, site remediation and regulatory services provider. The acquisition expands ATC's national footprint and increases the firm's staff to more than 1,900 employees.

#### **SEPTEMBER 2016**

ACEC member **DLR Group** (Minneapolis) joined with **Westlake Reed Leskosky** (Cleveland), creating a global design leader providing architecture, engineering, interior, planning, building optimization and specialty consulting services.

ACEC member **Kimley-Horn** (Raleigh, N.C.) joined with **Walker Engineering** (Las Vegas), a 15-person firm serving the commercial, industrial, retail and military markets.

ACEC member **POWER Engineers, Inc.'s** (Hailey, Idaho) wholly owned subsidiary, **POWER Testing and Energization**, expanded its testing and compliance capabilities by acquiring **G2 Electrical Testing and Consulting, LLC** (Rockwall, Texas).

ACEC member **OBG** (**O'Brien & Gere**) (Syracuse, N.Y.) acquired **PENTA Engineering** (Charlotte, N.C.), a full-service engineering firm serving the industrial sector in the Southeast and Midwest.

ACEC member **NV5** (Hollywood, Fla.), provider of professional and technical engineering and consulting solutions, acquired **Weir Environmental, LLC** (New Orleans), an emergency remediation and environmental assessment firm.

Hanson Professional Services, Inc. (Springfield, Ill.), an ACEC member and national engineering, planning and allied



services consulting firm, acquired **Naismith Engineering**, **Inc.** (Corpus Christi, Texas). Naismith is a full-service engineering, environmental and surveying firm.

#### AUGUST 2016

Mechanical engineering firm **Rice Group**, **Inc.** (Lynnwood, Wash.), merged with ACEC member **Harris Group**, **Inc.** (Seattle), a multidiscipline architectural, engineering and project management consulting firm.

ACEC member **Baxter & Woodman** (Crystal Lake, Ill.) merged with ACEC member **Matthews Consulting, Inc.** (West Palm Beach, Fla.), expanding Baxter & Woodman's capabilities in Florida.

Global design leader and ACEC member **Stantec** (Edmonton, Canada) acquired **Edwards & Zuck** (New York), a provider of MEP design services across diverse market sectors.

ACEC member **Terracon** (Olathe, Kan.) acquired ACEC member **Mayes Testing Engineers**, **Inc.** (Lynnwood, Wash.),



one of the largest providers of construction QA services in the Pacific Northwest. Terracon is retaining all 115 Mayes employees.

In a separate transaction, Terracon also acquired ACEC member **ROC Geotechnical Consulting Engineers, PLLC** (Rochester, N.Y.), a firm that offers subsurface exploration as well as geotechnical engineering design and field inspection services.

ACEC member Jansen Strawn Consulting Engineers (Denver) joined international design firm Ware Malcomb (Irvine, Calif.). Jansen Strawn provides engineering services to commercial and residential real estate development markets.

ACEC member **WSP | Parsons Brinckerhoff** (New York) acquired all substantial assets of **CRC Engineering, P.C.** (New York), expanding their cogeneration plant development and central utility design and installation capabilities in the Northeast.

**S.W. Cole Explorations, LLC**, a subsidiary of ACEC member **S.W. Cole Engineering, Inc.** (Bangor, Maine), acquired the assets of drilling firm **Great Works Test Boring, Inc.** (Berwick, Maine). The deal adds three drilling rigs to S.W. Cole's arsenal, significantly expanding the firm's exploratory drilling capabilities.

#### **JULY 2016**

ACEC member LJA Engineering (Houston) acquired ACEC member Coym, Rehmet, and Gutierrez Engineering, L.P. (Corpus Christi, Texas), an engineering and surveying firm that serves the land development market.

ACEC member **Ross & Baruzzini, Inc.** (St. Louis), acquired **Mitchell Planning Associates** (Northbrook, Ill.), a provider of medical equipment planning, procurement, installation and relocation services. Ross & Baruzzini is an international design and consulting firm.

Consulting engineering and aerial photogrammetric mapping firm, **KBM**, **Inc.** (Grand Forks, N.D.), joined forces with ACEC member **Widseth Smith Nolting (WSN)** (Crookston, Minn.). WSN is a 190-person engineering, architecture, land surveying and environmental services firm.

**Mick Morrissey** is managing principal of Morrissey Goodale, LLC, a strategy, M&A and human capital solutions firm serving the A/E/C industry. Morrissey can be reached at mmorrissey@morrisseygoodale.com.



# NOISE IS ONE PASSENGER TOO MANY DRIVABILITY MATTERS







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-Guy Frank | Tactical Driving Instructor | Dad

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## On the Move

Netherlands-based Arcadis appointed Mary Ann Hopkins as executive to lead the firm's North America and Latin America regions, as well as global leadership of the company's water and environment business lines. She succeeds Zack Smith, who retired from his position at the end of 2015. Hopkins, who previously served as group president of federal business for the Parsons Corp., is based in Washington, D.C.

George Nash has joined Tampa, Florida-based Atkins as CEO of its North America region. He most recently served as group president of energy, infrastructure and industrial construction at AECOM. Prior to AECOM, Nash was with URS Corp., where he served in a variety of senior leadership positions.

Walnut Creek, California-based Brown and Caldwell announced the following executive appointments: Chief Operating Officer Rich D'Amato has been promoted to president, succeeding Jim Miller, who

has been appointed vice chairman of Brown and Caldwell after 12 years in his post. D'Amato and Miller are both based in the firm's Denver, Colorado, office. Cindy Paulson, a senior executive with the firm since 1987, has been promoted to chief technical officer-a newly created position at the firm. She is based at the firm's headquarters.

Lexington, Kentucky-based GRW has appointed Brad Montgomery as its new president, succeeding Ron Gilkerson, who stepped down on Oct. 1, 2016, but who will remain as chairman. Gilkerson joined the firm in 1982 and was appointed president in 1991. Montgomery also currently serves as president of ACEC/Kentucky.

Jiri Maly was appointed president of Louis Berger Services, Inc. Maly, who is based in the firm's Washington, D.C. office, most recently served as managing director of global infrastructure finance at CIBC.

Bradley F. Post has joined Genesis CEI Services as an executive vice president. Post brings 40 years of construction administration engineering experience to the position. He is based in Tampa, Florida.

San Diego-based Kleinfelder announced the following appointments: John A. Murphy has been named executive vice president and CFO. He formerly served as president and CEO for the Europe, Middle East, India and Africa (EMEIA) division of WSP | Parsons Brinckerhoff. Patrick Schaffner has been named senior vice president and director of human resources of the firm. He formerly served as senior vice president, director global mobility for WSP | Parsons Brinckerhoff. Both are based at the company's headquarters.

Phyllis Brunner joined Portland, Mainebased Woodard & Curran as the president of consulting. She will focus on market and business systems to support strategic efforts to expand nationally around water and environmental issues. Brunner is returning



Mary Ann Hopkins

Jiri Maly



George Nash



**Rich D'Amato** 



John A. Murphy



Jim Miller



**Patrick Schaffner** 



**Cindy Paulson** 



**Phyllis Brunner** 



**Brad Montgomery** 



Sarabjit Singh



**Bradley F. Post** 





to Woodard & Curran after nearly 16 years at Brown and Caldwell where she worked as the west regional manager and a senior consultant.

Australia-based Cardno has appointed Sarabjit Singh president of the firm's government & infrastructure (G&I) division in its Americas region. Singh brings more than 25 years of experience managing complex infrastructure and federal business portfolios to the firm. He will be based in Arlington, Virginia.

Thomas L. Roell has been appointed interim president of Parsons' federal business unit (BU). In addition to this role, Roell will maintain his position as vice chairman, chief risk advisor. He is based in Parsons' Pasadena, California, headquarters.

WSP | Parsons Brinckerhoff announced the following appointments: Richard Driggs has been named president of the firm's program management sector and will expand the sector across all company markets in the U.S. and Latin America. Driggs formerly served as president and CEO of Heery International and is based in Atlanta, Georgia. Pamela Townsend has been appointed a senior vice president and Southeast region business manager for the transportation and infrastructure sector of the firm. Townsend previously

served as a senior vice president of Dewberry and is based in the Raleigh, North Carolina, office. Drew Galloway has been appointed a vice president, transit and rail planning director. Galloway, who previously served as deputy chief of planning for Amtrak, will be based in the firm's Newark, N.J., office.

Mary Cay O'Malley has joined Iselin, New Jersey-based Mott MacDonald as a senior vice president and project delivery leader. O'Malley, who previously served as vice president of engineering design services at Parsons Corp., is based in Mott MacDonald's Cleveland office.

DAR Holdings USA, a group of globally recognized full-service infrastructure consulting firms, which includes San Francisco, California-based T.Y. Lin International, appointed Jennifer Lee general counsel and a member of the executive management team. Lee, who previously directed corporate legal operations for URS (acquired by AECOM in 2014), is based in San Francisco.

**HNTB Corp.** announced the following executive promotions: Kevin Hoeflich, a senior vice president, was promoted to toll services chairman. He is based in the firm's Lake Mary, Florida, office. Sanja Zlatanic, a senior vice president, was

named chair of the firm's national tunnel practice. Based in the firm's New York City office, she will direct tunneling and underground projects and lead HNTB's global marketing and business development initiatives. Phil Brake, a senior vice president, is the New England district leader responsible for operations in Massachusetts, Connecticut, New Hampshire, Vermont, Rhode Island and Maine. He is based in the Chelmsford, Massachusetts, office. Gary Bua, a vice president based in the firm's Boston office, becomes office leader for Massachusetts, which includes the firm's locations in Boston and Chelmsford. Robert Driscoll, an associate vice president, was promoted to delivery officer for HNTB's Northeast division, which serves more than 30 clients across 10 states. He is based in the Portland, Maine, office.

Don Sepulveda was named vice president, rail and transit practice lead in the West Region for Moon Township, Pennsylvania-based Michael Baker International. Operating out of the firm's Los Angeles office, Sepulveda will also serve as senior project manager on select strategic rail projects. He formerly served as the executive officer of regional rail for the Los Angeles County Metropolitan Transportation Authority.



Thomas L. Roell



**Richard Driggs** 



Sanja Zlatanic



Gary Bua

Pamela Townsend







**Robert Driscoll** 



Jennifer Lee



Don Sepulveda





**Kevin Hoeflich** 

Phil Brake

#### **MEMBERSINTHENEWS**

#### CALENDAROFEVENTS

#### **Welcome New Member Firms**

#### ACEC/Alabama

CDG Engineers & Associates, Inc., Albertville Gonzalez-Strength & Associates, Inc., Hoover

ACEC/Arizona RLF Consulting, LLC, Tempe

ACEC/California

Accel Biotech, Inc., Los Gatos BC Engineering Group, Inc., Santa Rosa **Civil Design and** Drafting, Inc., Moorpark Civil Sense, Inc., Poway **Cornerstone Facilities** Consulting, Los Angeles **Encompass Consultant** Group, Inc., Camarillo EPC Consultants Inc., San Francisco Hawkins & Associates Engineering, Inc., Modesto

#### Hilbers, Inc., Yuba City Saiful Bouquet Structural Engineers, Inc., Pasadena Sunpin Holdings LLC, Los Angeles Ted Jacob Engineering Group Oakland

**Tobolski Watkins Engineering, Inc.**, San Diego

#### ACEC/Colorado

EDM International, Inc., Fort Collins Rule Engineering, LLC, Lakewood Vivid Engineering Group, Inc., Colorado Springs

#### ACEC/Idaho

J4 Engineering Group, LLC, Boise

ACEC/Illinois J.A. Watts, Inc., Chicago

ACEC/Indiana Journey Engineering, LLC, Indianapolis

#### ACEC/Metro Washington ADTEK Engineers, Inc., Fairfax

ACEC/Ohio

**2LMN, Inc.**, Lancaster

ACEC/South Carolina CEMS Engineering, Inc., Summerville

ACEC/Tennessee Harrah and Associates, Franklin

#### ACEC/Texas

Maverick Engineering, Midland MJ Thomas Engineering, LLC, Fort Worth

#### ACEC/Virginia

LRW McKinney, LLC, Ashland Lu + Smith Engineers, Glen Allen

#### ACEC/West Virginia

**Greenbrier Engineering Co.**, White Sulphur Springs

ACEC/Wisconsin JNI Engineering, LLC, McFarland

#### **Rhode Island Joins ACEC**

The ACEC Board of Directors voted unanimously to accept the Rhode Island Consulting Engineers (RICE) as the Council's 52nd Member Organization, ACEC/Rhode Island. Rhode Island had been the only state without an ACEC chapter.

"We're very excited to be joining ACEC," said RICE President John Shevlin of Pare Corp. in Lincoln, Rhode Island. "This move was enthusiastically supported by the entire Rhode Island engineering industry, and we look forward to being a part of an organization as important as ACEC."

The Rhode Island delegation, which included Shevlin and newly named Executive Director Marcel Valois, were formally welcomed at the ACEC board meeting at the Fall Conference in Colorado Springs, Colorado.

Valois is a former senior economic development advisor at the Rhode Island Commerce Corp. after being appointed by Gov. Lincoln D. Chafee to lead that agency in 2013.



John Shevlin



Marcel Valois

#### NOVEMBER

29 Mapping the Clients Mind: Building Client Loyalty and Avoiding Surprises (online class)

#### DECEMBER

- 1 So What if You Stamp or Sign it? The Meaning of Using Your Professional Seal (online class)
- 7 5 Contrarian Steps to Winning the Shortlist Interview (online class)
- 8 Email Marketing Crash Course: 25 Best Practices, Tips and Tweaks to Supercharge Your Firm's Email Efforts (online class)
- 13 You are Your Stories: The Who, What, When, How and Why of Storytelling (online class)
- 14 When Perfectionism Becomes Procrastination-Overcoming One of the 'Noble' Excuses for Putting Things Off (online class)

#### **JANUARY 2017**

- 10 From Project Manager to Business Leader (online class)
- 12 The Intentional Entrepreneur: Maximize Your Leadership Impact, Build Your Reputation with Intention (online class)
- 17 Oh What a Feeling-From Bland to Brand (online class)
- 18 New Lease Accounting Rules-How Will They Impact Your Firm? (online class)
- 19 Building a Social Responsibility Program That Improves Your Bottom Line (online class)
- 24 Secrets to Successfully Communicating Technical Topics (online class)
- 25 Broad Form Indemnification (online class)
- 31 Strategic Leadership and Management: Achieving Sustainable Growth and Profitability for Your Company (online class)

To sign up for ACEC online seminars, go to **www.acec.org/education.** 

Additional information on all ACEC activities is available at www.acec.org.

# **P3 Opportunities and Risks for Engineers**

#### NEW 2ND EDITION! P3/PUBLIC-PRIVATE PARTNERSHIPS: OPPORTUNITIES AND RISKS FOR CONSULTING ENGINEERS

With economic prosperity directly tied to physical infrastructure capability—and financing for public projects a growing challenge for governments—a significant rise in public-private partnerships (P3) has taken place, bringing together private financing and technical expertise to help deliver projects.

Consulting engineers need to fully understand the business impacts of P3 in order to reap the rewards of these growing opportunities.

ACEC's new second edition of the best-seller, *P3/Public-Private Partnerships and Design-Build: Opportunities and Risks for Consulting Engineers*, presents emerging information and real-life expertise on P3 project delivery—including all-new chapters on design-build (D-B).

Written and edited by David J. Hatem and Patricia B. Gary with 14 contributors, *P3/Public-Private Partnerships and Design Build* presents essential recommendations to consulting engineers about operating in P3 and D-B approaches with consideration of the inherent rewards, challenges and risk exposures. For more information: http://www.acec.org/publications/ books-and-contracts

#### NEW CASE DOCUMENTS SPOTLIGHT SITE VISITS

The Council of American Structural Engineers (CASE) has released its updated Site Visit Package, featuring *CASE Guideline* 962-E: Self-Study Guide for the Performance of Site Visits During Construction and CASE Tool 10-1: Site Visit Cards.

Site visits are crucial in the construction phase of any project because they help clarify and interpret the design for the contractor. *CASE Guideline 962-E* details how to identify construction errors, defects and design oversights that might otherwise go undetected. *CASE Tool 10-1* provides sample cards for construction site visits.

These cards provide a brief list of tasks to perform during each inspection, such as how to prepare and what to observe while on-site. The package includes cards for several types of structural construction, plus a general guide for all site visits. For more information: http://www.acec.org/publications/ books-and-contracts

#### **REGISTERED CONTINUING EDUCATION PROGRAM**

For engineers, surveyors and design professionals, the Registered Continuing Education Program (RCEP) provides a one-stop online shop for all educational activities. The program includes easily accessible record-keeping for continuing education, uniform and reliable transcripts for state licensing boards, up-to-date continuing education and licensure requirements by jurisdiction, and a master calendar of more than 135 registered education providers.

More than 74,000 design professionals use RCEP online to manage their continuing education. Originally developed in 2008 by NCEES and ACEC, RCEP is now administered by ACEC with the support of the American Society of Civil Engineers. As a special feature, state licensing board authorities can audit RCEP subscribers directly from the RCEP system. The board member simply logs into the RCEP system, selects the licensee's A/E/C discipline, and enters the individual's license number. A listing of education activities for a specified calendar period will be displayed.

RCEP is a powerful resource for firms to manage and track their staffs' continuing education programs. Firms can create customized reports to track continuing education credits earned toward renewing licenses, identify



**REGISTERED CONTINUING EDUCATION PROGRAM** 

specific courses and seminars for staff improvement, and use RCEP to recognize and award merit increases to employees for their continuing education achievements. Unique to RCEP is the provider network and master calendar.

For more information on RCEP, visit **www.rcep.net** or contact La'Creshea Makonnen at 202-682-4338. ■

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#### **COVERAGES AVAILABLE:**

- ✓ Business Owners Package
- ✓ Workers' Compensation
- 🗸 Commercial Auto
- 🗸 Umbrella Liability
- ✓ Professional Liability
- Management Liability
- ✓ Personal Auto and Home
- 🗸 Key Person Life
- 🗸 Key Person Lump Sum Disability

# THE RIGHT

#### THE RIGHT PRICE

We've used our negotiating power to secure quality insurance coverage at highly competitive rates.

Find out more. Request a quote today by calling **1.800.338.1391**. Or visit **acecbit.com**.

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#### **ENGINEERING INNOVATIVE SOLUTIONS SINCE 1983.**

Coverages may differ by state. All coverages are individually underwritten. For a complete description of coverage terms and conditions, refer to the insurance policy. In the event of a loss, the terms of the policy issued will determine the coverage provided. This program is underwritten by Hartford Fire Insurance Company, CA Lic. # 5152, One Hartford Plaza, Hartford, CT 06155, and its property and casualty insurance company affiliates. Key Person Insurance products are administered by Mercer H&B Executive Benefits, a service of Mercer Health & Benefits Administration LLC. Lump Sum Disability Coverage is offered by Lloyd's of London. Underwritten and administered by Hanleigh, a Lloyd's Cover Holder. Legal & General America life insurance products are underwritten and issued by Banner Life Insurance Company, Urbana, MD and William Penn Life Insurance Company of New York, Garden City, NY. Banner products are available exclusively in New York; Banner does not solicit business there. The ACEC Business Insurance Trust (BIT) has authorized Marsh Sponsored Programs to make engineer's Professional Liability Insurance (PLI) available to Member Firms. Neither ACEC nor The BIT endorses any one Professional Liability provider. It is the objective of Marsh Sponsored Programs to offer a choice of providers of PLI coverage. The selection of underwriters may change from time to time.

## A Proven Formula You + ACEC Life/Health Trust

For 50 years, the ACEC Life/Health Trust has offered health benefit plans to firms like yours based on the simple idea that health care coverage for engineers should be designed by engineers. Here's why ACEC members — and their employees — renew with the Trust 93% of the time.

**1. Strength in numbers:** Based on a large-group plan portfolio, the Trust features over 120 plan designs for **all group sizes** — whether for two employees or more than 100.

**2. Confidence in coverage:** By participating in the Trust, you offer employees **essential coverage** consistent with the Affordable Care Act (ACA). And UnitedHealthcare's vast provider network offers **local access to 99%** of the U.S. population.

**3. Proven satisfaction:** Currently, more than 1,400 ACEC member firms like yours participate in the Trust, and they **renew 93%** of the time.

**4. Product and price flexibility:** Through the Trust, you receive both **product and price flexibility** to fit your firm's needs.

**5. Simple setup and dedicated service:** Moving from your current health plan is **surprisingly easy**. Rely on the Trust's dedicated account service team with more than 20 years of **combined engineering industry and health care coverage experience**.



#### **The ACEC Life/Health Trust**

has been serving ACEC members for over 50 years. Since 2007, the Trust has been insured and serviced by UnitedHealthcare. UnitedHealthcare offers medical, dental, vision, life and disability insurance to Trust participants.

Call **1-877-279-6544** to learn more now. Or visit **uhctogether.com/acec24** and download "The Bottom Line on Group Health Plans."



Insured and serviced by:



The American Council of Engineering Companies (ACEC), the ACEC Life/Health Insurance Trust and UnitedHealthcare Insurance Company are three separate legal operating entities and, as such, the organizations are governed and function independently. UnitedHealthcare's services are provided with the authorization of the ACEC Life/Health Trust. Questions related to health benefits offered through the ACEC Life/Health Trust should be directed to 1-800-573-0415. Must be UnitedHealthcare insurance license products; and HMO products do not apply. ACEC membership qualification is determined by the association.

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