

# ENGINEERING INC.

[www.acec.org](http://www.acec.org)

AWARD-WINNING BUSINESS MAGAZINE • PUBLISHED BY AMERICAN COUNCIL OF ENGINEERING COMPANIES

>> **Amping Up  
the Energy Grid**

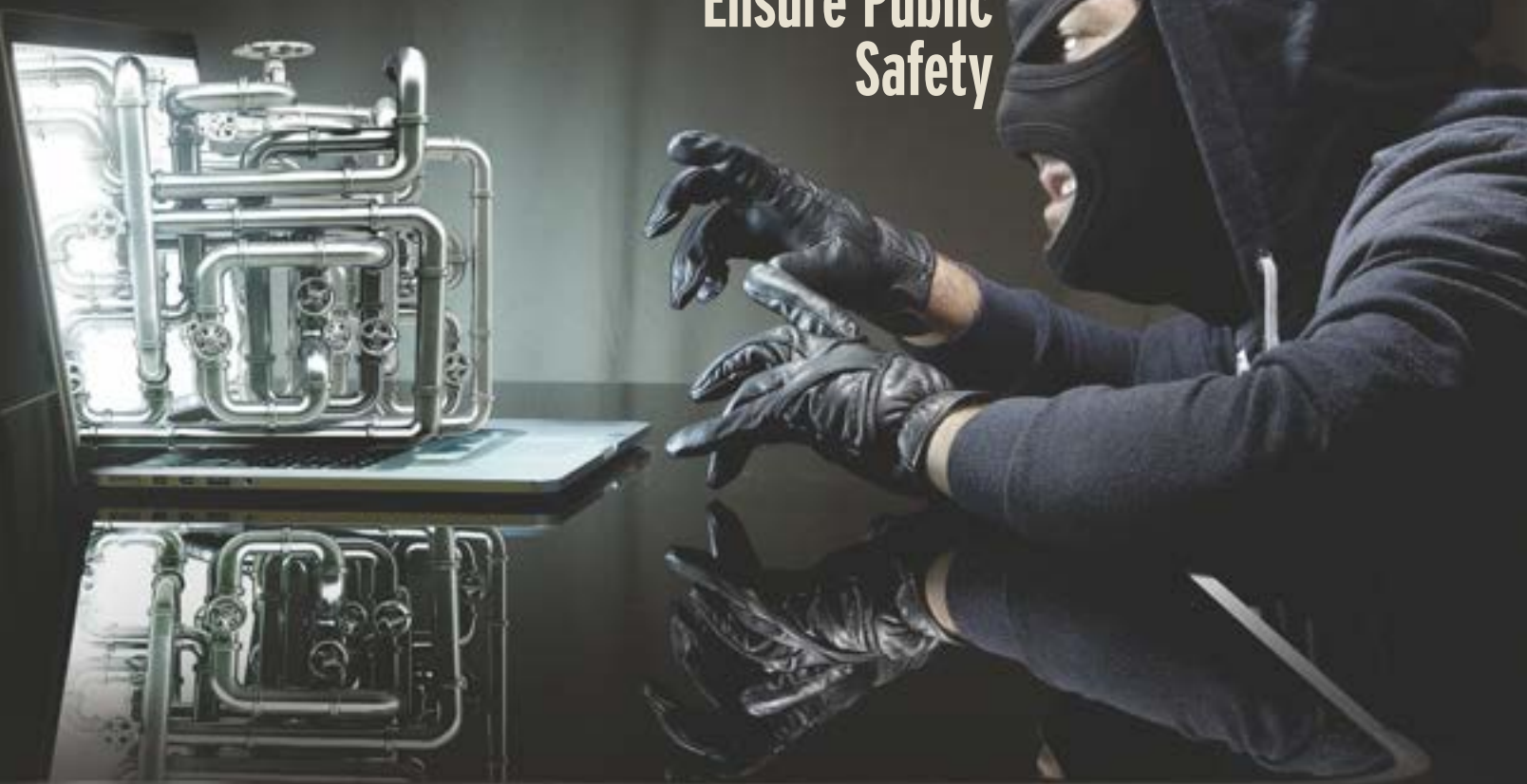
>> **Effective  
Strategies for  
Ownership  
Transition**

>> **Innovations in  
Public Security**

>> **T. Baker Smith  
Employee-inspired  
Charitable  
Efforts**

## CYBERDEFENSE

**Engineering  
Firms Must  
Protect Own  
Networks, and  
those that  
Ensure Public  
Safety**





# ACEC

LIFE/HEALTH TRUST

## Better by Design

*Engineers Deserve Better*

### Value-Added Healthcare Solutions That Make Your Healthcare Coverage Better by Design.

ACEC Life/Health Trust believes engineers deserve better. That's why we've introduced our *Better by Design* portfolio of value-added healthcare solutions. Offered at no additional cost to engineering firms enrolled in a Trust medical benefit plan, these integrated and complementary solutions work together to help your employees stay healthy, feel better, remain productive and enjoy a greater quality of life.



A comprehensive wellness program designed to improve your health and well-being



Personal healthcare advisors helping you understand and benefit from your Trust healthcare plan



24x7 phone access to physicians to keep you out of the doctor's office and on the go

For more information, call The Trust at (800) 841-6130 or email [BBD@ACECLifeHealthTrust.com](mailto:BBD@ACECLifeHealthTrust.com)





8

## Cover Feature

### ENGINEERING AND CYBERDEFENSE

Engineering firms must protect their own networks as well as those affecting the public.

8



14

## Features

### PASSING THE BATON

Why an effective ownership transition plan is more important than ever.

14

### LOOK BEYOND THE PREMIUM

Price is critical when considering professional liability, but so are service and relationships.

19

### TURNING UP THE POWER

Engineering innovation helping to modernize the energy grid.

24

### SECURE DEFENSE

Member Firms help agencies achieve public defense objectives.

29

### LIGHTING A SPARK

T. Baker Smith's charitable efforts ignite employee passion.

34

### NAVIGATING A CHALLENGING TERRAIN

2016-17 Executive Committee addresses industry's most pressing issues.

38

### 2016 FALL CONFERENCE PREVIEW

Hear from world-renowned speakers and top industry leaders at the ACEC Fall Conference in Colorado Springs, Colorado.

42

## Departments

### FROM ACEC TO YOU

Cybersecurity demand creates new industry challenges.

2

### GUEST COLUMN

Investing in the human side of business pays dividends.

44

### MEMBERS IN THE NEWS

L'Heureux to succeed Shoiry as WSP Global president and CEO; Fulmer named president and CEO of Urban Engineers; Inman named president and CEO of Primera Engineers.

49

### MARKET WATCH

Flint water crisis increasing water infrastructure awareness.

4

### MERGERS AND ACQUISITIONS

Planning to sell your firm? Plan to stick around.

46

### BUSINESS INSIGHTS

Solutions for the A/E industry.

52

### LEGISLATIVE ACTION

Transportation appropriations bills fund FAST Act; House committee urges USAID to engage engineering firms.

6

### GUEST COLUMN

How technology continues to advance the practice of engineering.

48

COVER PHOTO: C.J. BURTON



*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.

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

# From ACEC to You

## Campaign Season Takes Over; Industry Focus on Cybersecurity

As Congress now wraps up for its summer recess and the political parties prepare for the national conventions that will launch their presidential candidates, ACEC remains focused on both propelling its advocacy agenda—including FAA reauthorization—and supporting pro-business friends in tight House and Senate races.

An issue that has gained increased prominence nationwide and especially among our Member Firms is cybersecurity. Cyberattacks throughout world have forced all businesses including our own to dedicate significant investment in security measures. Cyberthreats have also prompted state and federal governments to seek stricter data security measures that will create new challenges for our industry.

ACEC recently weighed in with the Federal Energy Regulatory Commission on potential regulatory mandates that would impose uninsurable contract terms related to cybersecurity for firms working for energy clients.

*Engineering Inc.*'s cover feature takes an in-depth look at cybersecurity and how engineers are on the front line of this challenge (Page 8). Also included in this magazine is a report on how the Flint, Michigan, water crisis will impact future water infrastructure investment (Page 4); and why effective ownership transition planning has become increasingly important as more baby boomers near retirement (Page 14).

Looking ahead to our Fall Conference, October 19–22 in Colorado Springs, Colorado we will be welcomed by Colorado, Gov. John Hickenlooper and treated to an incredible business program of nationally noted speakers and business experts, and more than 30 advanced business sessions for CEOs, CIOs, CFOs, emerging leaders, and other industry professionals (Page 42). We encourage you to sign up if you haven't already.



Peter M. Strub  
ACEC Chairman



David A. Raymond  
ACEC President & CEO



## ENGINEERING<sup>INC.</sup>

THE OFFICIAL PUBLICATION OF THE  
AMERICAN COUNCIL OF ENGINEERING COMPANIES  
AMERICAN COUNCIL OF ENGINEERING COMPANIES

CHAIRMAN	Peter M. Strub
PRESIDENT & CEO	David A. Raymond
VICE PRESIDENT, OPERATIONS	Mary Ann Emely
VICE PRESIDENT, GOVERNMENT AFFAIRS	Steven Hall
VICE PRESIDENT, BUSINESS RESOURCES AND EDUCATION	Marie Ternieden
DIRECTOR, COMMUNICATIONS AND MEDIA	Alan D. Crockett
STAFF EDITOR	Andrea Keeney akeeney@acec.org 202-682-4347
SENIOR COMMUNICATIONS WRITER	Gerry Donohue

### ACEC PUBLIC RELATIONS AND EDITORIAL ADVISORY COMMITTEE

CHAIRMAN	James Blake
----------	-------------

### 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

*Engineering Inc.*, Volume 27, Number 4 (ISSN 1539-2694), is published bi-monthly by the American Council of Engineering Companies (ACEC), 1015 15th Street, NW, 8th Floor, Washington, D.C. 20005-2605. Periodicals postage paid at Washington, D.C., and at additional mailing offices. Annual subscriptions are \$24 for members (included in dues as a non-deductible amount); \$45 for U.S. non-members; \$65 for institutional subscriptions. Back issues are \$15.

POSTMASTER: Send address changes to *Engineering Inc.*, c/o ACEC, 1015 15th Street, NW, 8th Floor, Washington, D.C. 20005-2605.  
© 2016 American Council of Engineering Companies. All rights reserved. This publication may be copied, downloaded from the ACEC website, stored in electronic or hard-copy format, and disseminated to third parties for educational and information purposes. ACEC expressly disclaims any liability for damages of any kind in connection with such copying, downloading, storage, and/or dissemination. By copying, downloading, storing and/or disseminating this publication, the recipient of this publication expressly agrees to defend, indemnify, and hold ACEC, its officers, directors, employees, volunteers and agents harmless from and against any and all losses, damages, claims, causes of action and liabilities, including reasonable attorneys' fees and costs, arising out of or resulting from the recipient's use of this publication. Notwithstanding the above, no part of this publication may be altered, resold, licensed, or used for any other commercial purposes without the prior written permission of ACEC. Recipients may opt out of receiving the electronic version of this publication from ACEC by sending an e-mail with the subject line "Unsubscribe" to ACEC at [magazine@acec.org](mailto:magazine@acec.org).

*Engineering Inc.* subscribers: If you have a mailing address correction or need to add or remove an employee from the *Engineering Inc.* mailing list, please contact the ACEC Membership Department at [memberservice@acec.org](mailto:memberservice@acec.org) or call 202-347-7474 and ask for Member Records.

**ACEC**  
AMERICAN COUNCIL OF ENGINEERING COMPANIES  
[WWW.ACEC.ORG](http://WWW.ACEC.ORG)

# Complex challenges. Connected expertise.



Every day, we help clients meet the most pressing challenges of our time.

Our engineers, architects, designers, planners, scientists and management and construction services professionals work together on projects of all scales in over 150 countries. From some of the world's premier sports facilities to infrastructure, urban development and national security, our connected approach creates better outcomes for people, communities and the world.



# Flint Crisis Increasing Water Infrastructure Awareness, Not Opportunity

**T**he lead-poisoning tragedy in Flint, Michigan, has catapulted the wretched condition of the nation's water infrastructure into the public consciousness.

Federal, state and local government leaders nationwide have called for increased funding to address deteriorating water infrastructure. But will that funding materialize? And if so, how close will it come to the estimated \$385 billion needed to upgrade the nation's drinking water systems?

Lauren Evans, president of Pinyon Environmental, Inc., is not optimistic. "I would like to hope so, but we've seen it before where there's a big event and everyone talks about it, but then it disappears from the radar screen," she says. "News cycles tend to be

shorter than the time needed to have a conversation."

## Getting the Lead Out

Fitch Ratings, a global credit rating and research agency, has estimated the national fallout from the Flint crisis could exceed \$275 billion.

"The EPA currently regulates drinking water exposure to lead based on its Lead and Copper Rule," says the Fitch report. "The EPA is considering strengthening the rule sometime later this year or next. Fitch expects any proposed rule revisions will likely move the industry toward removing all lead service lines."

Fitch also notes that the current EPA estimate of \$385 billion for necessary upgrades in water infrastructure through

2030 includes funding only for partially replacing lead pipes. If municipalities and utilities are required to replace all of the estimated 6.1 million lead service lines nationwide—or just speed up their current replacement pace—some of them could face financial stress.

Engineering firms, however, will play a diminished role in the vast majority of that specific line replacement work.

"Most service lines are on private property and are generally the responsibility of the individual homeowners," says Mike Orth, executive vice president of Black & Veatch's Water Business. "The work will mostly be done by plumbers." Utilities and local governments may have to provide grants and no- or low-interest loans to homeowners who cannot afford to replace their lead lines, he adds.

Evans says a sliver of the work might fall to firms. "Some municipalities still have issues determining the makeup of their delivery lines," she says. "A lot of them might need help from engineering consultants in how to rebuild customer confidence in the water system."

A big concern for engineering firms operating in the water sector—and in these days of limited budgets at all levels—is whether the increased dollars for line replacements will come from money earmarked for other necessary water infrastructure projects.

Miles Jensen, water practice center leader at SEH, Inc., hopes water's unique status as a "human survival need" will drive municipalities to increase their overall investment in infrastructure improvements. "I expect to see more collaboration among local governments and Congress to invest in ensuring access to clean, safe water," he says.

Orth is not as optimistic. "Because of the public outcry, I would like to see some sort of leadership, but I expect that we'll continue to defer and defer."

ACEC is advocating for quick passage of the Water Resources Development Act of 2016, which authorizes more than \$12 billion for new

Corps of Engineers projects, assistance for communities affected by lead in drinking water and other critical water resource needs.

Four Member Firm leaders will address

water sector issues and opportunities as part of a special panel during the upcoming ACEC Fall Conference Oct. 19–22 in Colorado Springs, Colorado. (See page 42).

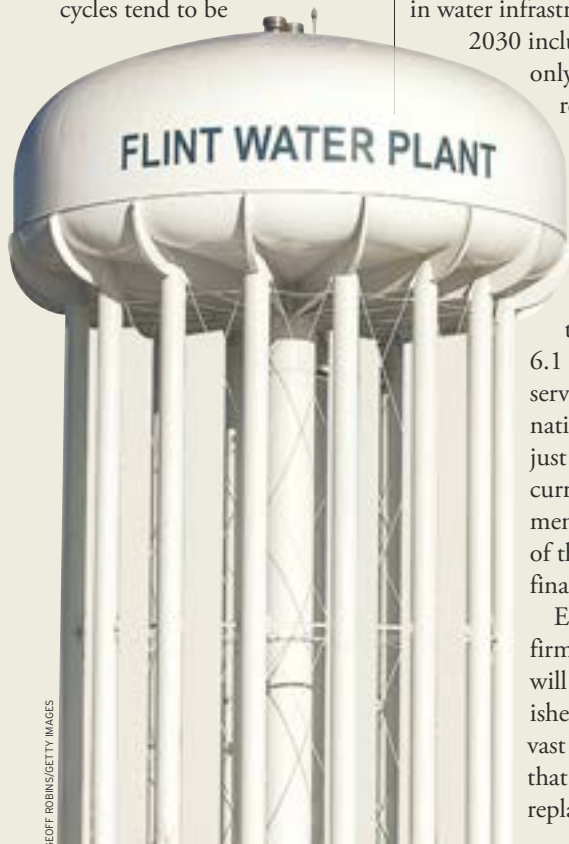
**\$275 billion potential fallout from Flint water crisis**

## Taking Water for Granted

Investment in water infrastructure does not depend solely on government funding. Water rates account for between 80 and 90 percent of the average water utility's revenue, according to Circle of Blue, a web portal focused on water issues. While water rates in the 30 largest U.S. cities climbed an average of 6 percent in 2015, most analysts agree that U.S. water rates remain a huge bargain.

"Water rates are definitely too low when compared to other products," Jensen says. "We tend to take water for granted."

Orth says Black & Veatch found in its annual water industry survey that utilities are aware



GEORGE ROBINSON/GETTY IMAGES



BILL FUGLIANO/GETTY IMAGES

of the need to raise rates, but they are concerned about the viability of the strategy.

Evans shares how she advised one water board to raise its rates. "They wouldn't even go there, saying they didn't want to upset their users," she says. "That's so short-sighted."

In Colorado, where she currently chairs the Water Quality Control Commission, Evans recently testified in front of a state legislative committee. "A state survey projects that we will

need \$9 billion in infrastructure investment over the next 20 years," she says. "The total we've gotten through the State Revolving Fund over the past 26 years is only \$1.5 billion."

### Educating the Public

Given this reality, Jensen and others say the best investment in water infrastructure might be educating the public on the social utility of higher water rates.

"We need to promote that we have one of the best, safest water systems in the world, and that we all need to come together to keep it that way," Jensen says.

Orth agrees but says it will be a huge challenge. "Water infrastructure is often out of sight and therefore out of mind. It took a catastrophic situation to make the public aware of how fragile the environment and water we deliver really is," he says. "It's up to us to make sure it remains a priority."

Public education is a key component of the Lead and Copper Rule, which lays out its procedures and funding

to inform people about the dangers of lead poisoning in communities where problems have developed. The rule, however, does not make any provisions for unaffected communities, nor does it address water infrastructure on a state or national level.

"We need to lay the groundwork for people early and do a lot of outreach," Evans says. "[We need to] get their attention focused on the things that need to be done."

*Gerry Donohue is ACEC's senior communications writer. He can be reached at [gdonohue@acec.org](mailto:gdonohue@acec.org).*

# FIND YOUR NEXT

## ENGINEER on ACEC's Job Board ...

Since the ACEC Job Board's inception in August of 2005, over **3,437 member firms** have posted job openings and more than **29,000 job seekers** have posted resumes. Find your next new hire at:

[www.acec.org/jobs](http://www.acec.org/jobs)

Where today's engineering job seekers go to find their next jobs.

# Legislative Action

## Transportation Appropriations Bills Fund FAST Act, Boost Discretionary Grants

**T**he U.S. House and Senate have advanced annual funding bills for the Department of Transportation and the Department of Housing and Urban Development for F.Y. 2017 that would fund surface transportation programs under the FAST Act, and increase funding for other key infrastructure accounts.

The Senate bill provides \$43.3 billion for highways, nearly \$1 billion more than 2016, and \$12.3 billion for transit, an increase of \$580 million. The bill also boosts the popular Transportation Investment Generating Economic Recovery (TIGER) multimodal grants program by \$25 million, to \$525 million. The bill was

approved by a vote of 89–8.

The House version of the bill would also fund highway programs under the FAST Act, and it would increase transit capital investment grants by an additional \$160 million over the Senate bill. The House bill reduces TIGER grants by \$50 million.

Both House and Senate bills provide \$3.35 billion for the Airport Improvement Program and \$2.84 billion for FAA facilities and equipment, which is consistent with current funding. Both bills also provide roughly \$1.7 billion for federal rail programs.

The House bill was approved by the committee and is awaiting further action from the full House.



PHOTODISC/THINKSTOCK

### TRANSPORTATION BILLS BY THE NUMBERS

#### IN THE SENATE:

**\$43.3 billion** for highways



**\$12.3 billion** for transit



**\$525 million** for TIGER multimodal grants



#### IN THE HOUSE:

**\$160 million** more than Senate bill for transit



**\$50 million** less in TIGER multimodal grants



ICONS: DIGITALVISION/GETTY IMAGES

## House Committee Urges USAID to Engage U.S. Engineering Firms



NBC NEWS/REUTERS/GETTY IMAGES

Rep. Charlie Dent (R-Pa.)

**A**t the request of ACEC, Rep. Charlie Dent, R-Pa., inserted language as part of the 2017 State and Foreign Operations Appropriations bill that urges the U.S. Agency for International Development (USAID) to do more to engage U.S. engineering firms in development projects abroad.

This language is the latest step in a long-running effort by the Council to

promote reforms within the agency. ACEC's International Committee was successful in initiating an internal study within USAID that culminated in the development of the 2014 Construction Assessment.

The assessment, which documented USAID's investments of \$5.6 billion in roads, bridges, water, power, health care and other projects over a two-year period, brought to light problems in the

management of the program, including the lack of complete data on construction projects, the lack of design oversight on projects and the need for more engineering expertise within the agency.

ACEC's Member Organizations and the International Committee were effective in educating lawmakers on the issues surrounding the agency. The House is expected to vote on the measure later this year.

BLOOMBERG/GETTY IMAGES



## Senate Republicans Push for Action on Water

**A**CEC and industry allies persuaded 30 Senate Republicans to sign a letter to Senate leaders urging action on the Water Resources Development Act (WRDA) before Congress adjourns.

Authored by Sen. Jim Inhofe, R-Okla., the chairman of the Environment and Public Works Committee, the letter called for a floor vote on S. 2848, which authorizes more than \$12 billion for new Corps of Engineers projects, assistance for communities affected by lead in drinking water and other critical water

resource needs. The Senate bill includes a significant expansion of Qualifications-Based Selection (QBS) as well, requiring the use of QBS for certain projects funded through the Safe Drinking Water State Revolving Fund program. ACEC was successful in securing a similar mandate for wastewater projects in 2014.

Legislation has been approved by the House committee but awaits a floor vote. ACEC continues to press for action on this important legislation when Congress returns in the fall.

**\$12 BILLION**  
in funds for Corps of Engineers projects

## House Unveils Blueprint for Tax Reform; ACEC to Submit Comments

**H**ouse Ways and Means Committee chairman Kevin Brady, R-Texas, joined with House Republican leaders to release a broad outline of major tax-code changes that call for significant rate reductions and the elimination of most deductions. The plan, which envisions a shift toward consumption-based taxation by reducing taxes on investment and capital, could become the basis for tax reform legislation in 2017.

The blueprint calls for reducing 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. The plan would also eliminate the individual and corporate alternative minimum tax (AMT) and the estate tax and allow businesses to fully expense capital investments.

Although the R&D tax credit would be retained, most business deductions—including the Section 199 domestic production activities deduction—would be eliminated.

In addition, the deduction of interest expenses would be limited.

ACEC and many other business organizations have strongly advocated for parity in the top rates for corporations and pass-through businesses. The blueprint lowers the rates for C corporations and pass-through businesses by a similar amount, but it does not achieve true parity. The Council intends to raise this concern in its comments on the plan.

ACEC members are encouraged to contact ACEC Director of Tax and Regulatory Affairs Katharine Mottley at [kmottley@acec.org](mailto:kmottley@acec.org) or 202-682-4306 for more information.



Rep. Kevin Brady (R-Texas)

ISSUES ON THE MOVE	WHAT'S NEXT
Transportation funding bill	Final action likely in the fall
USAID reforms	Final action before the end of the year
WRDA	House, Senate floor action in the fall

## Legislation Introduced to Allow Private Investment in Public Buildings

**U.S.** Reps. Mike Kelly, R-Pa., and Earl Blumenauer, D-Ore., and Sens. Dean Heller, R-Nev., and Bill Nelson, D-Fla., have introduced ACEC-backed legislation to add public buildings to the list of facilities that qualify for private activity bonds (PABs), allowing state and local governments to generate up to \$5 billion to support public facility projects.

PABs are currently limited to public infrastructure projects, such as wastewater facilities and airports. H.R. 5361 would allow private investment funds to be used in the design and construction of schools,

courthouses, libraries and other public buildings.

ACEC has partnered with a large coalition of organizations to develop and support this legislation, which seeks to promote a public-private partnership (P3) approach in helping state and local governments to build new facilities. Over the past several years, P3s have been successful at bringing private investment into the transportation space, creating jobs and cost savings by using TIFIA or exempt-facility bonds.

The Council will advocate for its inclusion in the next tax package that moves through Congress.



### For More News

For weekly legislative news, visit ACEC's *Last Word* online at [www.acec.org](http://www.acec.org).





---

# ENGINEERING AND CYBER DEFENSE

As cybersecurity risks and dangers mount, engineering **firms must have a clear strategy** and strong protections both internally and for public safety

By Samuel Greengard

**I**t's no secret that digital technology is radically transforming society. Yet, it's also introducing unforeseen and remarkable risks. Over the last decade, hacking and cybercrime have evolved from an inconvenient nuisance to a persistent and ominous threat. Hardly a day goes by without news of a major breach somewhere in the world, often to the tune of millions of dollars or involving highly sensitive data and intellectual property. What's more, the control of energy systems, transportation networks and a growing swath of other types of infrastructure are increasingly at risk for cyberattacks and cyberterrorism. >>

C.J. BURTON



It's no small matter. ISACA, a global association representing IT professionals, and the RSA Conference recently surveyed cybersecurity managers and practitioners and found that 74 percent of enterprise security executives expect a cyberattack in 2016. Consulting firm PwC reports that security professionals have witnessed a 38 percent increase in cybersecurity incidents over the last year.

Robert Parisi, managing director and cyber product leader at insurance brokerage firm Marsh, believes there's a reason behind the uptick. "Today, breaches typically have a financial or political motive," Parisi says. "Attack surfaces are growing with the Internet of Things (IoT) and connected devices; cybercriminals are becoming far more sophisticated, and the potential damage and losses can be devastating."

Within the engineering field, cyber risks are nothing less than terrifying. Security experts are increasingly detecting malware in computers and industrial controls. In the future, this could lead to acts of terrorism or cyberwarfare that might include a release of radioactive material in an urban area or the derailment of a train carrying highly combustible or poisonous chemicals.

The safety of today's business and IT frameworks require a different way of thinking—and a far more sophisticated cybersecurity strategy. "Cybersecurity touches every market and every company," says Biff Lyons, executive vice president and manager of the Defense and Security Division at Parsons Corp. "There's a need to protect intellectual property as well as public infrastructure. Every project must involve strong cybersecurity from the start."

### Under Siege

High-profile cyberattacks and espionage have become the new norm in the digital age. The list of targets reads like a Who's Who of business and government, including Anthem, Inc.; eBay, Inc.; Home Depot, Inc.; JPMorgan Chase & Co.; Target Corp.; Sony Pictures Entertainment; and



**"As machines become more sophisticated and intelligent, and as they allow data to flow in and out, there is an increased risk of cyberthreats."**

JEFF PACK  
POWER ENGINEERS

the U.S. Office of Personnel Management. "The risks are large and growing," says Matt Devost, president and CEO of FusionX, a security division of consulting firm Accenture.

Yet, the dangers aren't limited to servers and personal data. Cyberattackers seeking to sabotage systems may take aim at industrial controls used at facilities, which could lead to a shutdown or failure in a high-rise building, transportation system, food processing facility, energy grid or gas pipeline.

It's also important to recognize that internal and external systems aren't necessarily discrete entities in a connected world. Cybercriminals who steal passwords from an engineering firm may dig into

classified files and eventually wind up with the information needed to break into a key piece of infrastructure. At that point, even the best security tools—firewalls, malware detection, endpoint security, end-to-end encryption, sandboxing and air-gapping (running critical infrastructure off a separate network)—are rendered useless.

Unfortunately, credential theft—usually accomplished through social engineering methods such as phishing and spear-phishing—has become rampant. Various industry studies show that about 70 percent of today's intrusions originate from stolen credentials.

Making matters worse, the nature of cybersecurity is changing. Only a few years ago, attacks were typically blatant and messy. It was entirely obvious that hackers had broken into a system and stolen data or caused damage. Today, cybercriminals often take a "slow" and "low" approach that involves stealthily lurking in systems and collecting data drip by drip over months

or years, until they are ready to unleash a major attack or shut down a piece of key infrastructure. Last December a piece of malware dubbed "BlackEnergy" reportedly caused a massive power failure and was said to have spread through Microsoft Office macros. The same month, the U.S. Department of Homeland Security reported that intruders had broken in to systems at the Bowman Avenue Dam in Rye Brook, N.Y. (not just once but six times) and had accessed and read files, including usernames and passwords.

In 2014, officials in South Korea blamed North Korean hackers for breaching the computer system at a nuclear power plant. The event occurred just days after the now infamous hacking of Sony Picture Entertainment's computer network, which may also have originated from hackers in North Korea. Other major infrastructure breaches have occurred all over the world. In 2001, a man hacked into a waste management system in Queensland, Australia, and released millions of gallons of raw sewage into local parks, rivers and even the grounds of a large hotel. Ten years ago, hackers broke into the main traffic control center in Los Angeles and reprogrammed traffic lights, causing massive congestion.

At the heart of the problem, says Jeff

Pack, senior project manager at POWER Engineers, a firm that specializes in control systems for power facilities and food processing factories, is the growing number of exposure points that result from connected devices and systems. These vulnerabilities often multiply across systems and companies.

"As machines become more sophisticated and intelligent, and as they allow data to flow in and out, there is an increased risk of cyberthreats," he says. "The problem today is that so many systems interconnect, and you cannot defend against everything. It's impossible to build an impenetrable castle. You can't lock down every device and system."

Further complicating things, most legacy infrastructure and industrial



**"There's a need to protect intellectual property as well as public infrastructure. Every project must involve strong cybersecurity from the start."**

BIFF LYONS  
PARSONS CORP.

# Demystifying Cybersecurity:

## A Practical Approach for Engineering Firms

**W**hile engineering firms have not yet suffered the well-publicized cybersecurity attacks targeting the retail and health care industries, they are not immune to the real threats posed by cybercriminals.

An engineering firm must protect its assets—including its employees, infrastructure, computers, software, services, client information, and project design information—as well as all of the transmitted or stored information in the firm's computing environment.

The following is a five-step practical approach for engineering firms to protect assets against a cyberattack:

### (1) Identify Critical Data

In the engineering industry, the definition of critical data may vary depending on the scope and nature of work being performed by the firm; however, identification of the critical data elements should be the first step in building a cybersecurity program. For engineering firms, “personally identifiable information,” or “PII,” client confidential information, and firm financial and pricing data are good examples of critical data.

### (2) Map Data Stores and Flows

After critical data has been identified, the firm must recognize where that data resides and how it flows through the organization—both within and outside of the organization. The chances are good that critical data flows through multiple storage locations that could be subject to cyberattacks.

### (3) Perform a Controls Risk Analysis

Controls that mitigate cyber risk fall into three categories—people, process, and technology. Most engineering firms tend to focus on the technology aspect—exploitable systems, weak passwords, and unsecured web portals, for example—but risk involving people and processes also merits attention. Employees who lack security awareness or a breakdown in a vendor

or sub-consultant management process could result in a cyberattack.

### (4) Rate the Maturity of Security Controls

The next step is to rate the effectiveness of controls against a security domain framework such as those available from the National Institute of Standards and Technology, the Securities and Exchange Commission, and other agencies. Frameworks typically cover 10 or 12 domains, or categories, such as third-party risk management, regulatory compliance and data protection. Each domain comprises multiple subcategories, all of which can present sources of risk.

### (5) Develop Short- and Long-Term Remediation Plans

The final step is to develop both short—and long-term plans to remediate deficient controls. Some deficiencies are easy to fix, perhaps requiring a literal flip of a network device's switch. More complex corrections require more time and resources to implement.



### Stay on the Agenda

Engineering executives and directors should continue to keep cybersecurity high on their agendas and provide their cybersecurity teams with the resources needed to protect both their digital assets and their most valuable assets—their people and customers. They also should monitor regulatory developments to keep the security efforts of their firms from falling behind and, as a result, falling short in the inevitable occurrence of a cyberattack.

**About the authors:** *Raj Chaudhary is a principal with Crowe Horwath LLP—one of the largest public accounting, consulting, and technology firms in the U.S. He can be reached at [raj.chaudhary@crowehorwath.com](mailto:raj.chaudhary@crowehorwath.com); Amy Holmes is a CPA and can be reached at [amy.holmes@crowehorwath.com](mailto:amy.holmes@crowehorwath.com); Jon Zeiler is a CPA and partner and can be reached at [jon.zeiler@crowehorwath.com](mailto:jon.zeiler@crowehorwath.com).*

control systems were built without today's connectivity needs and robust security requirements in mind. In many cases, they rely on old versions of MS-DOS, and they lack robust authentication and other safeguards, including built-in data encryption—all of which make it much easier for intruders to compromise the

system and control functions.

“A huge challenge for engineering firms is upgrading or updating infrastructure systems, including SCADA (supervisory control and data acquisition) systems, that operate in legacy environments,” says Richard Donohoe, director of the Security Risk and Resilience Group at Black &

Veatch. “In many instances, it's impossible to apply a patch, and many have hardcoded passwords that everyone knows. They are a huge security risk.”

### Protection Schemes

Despite the seemingly daunting nature of cybersecurity, Parisi believes it is possible to

gain control of the environment. A starting point for formulating an effective strategy is to recognize that cybersecurity spans the organization, and that it's essential to prioritize both threats and protection.

"Today, there are a lot of stakeholders who are responsible for aspects of cyber risk. It's not just the CSO, CISO, CTO or CIO, it's also the CEO, president, project principals and managers, design engineers, construction administrators, resident inspectors, HR director and myriad employees," he says. "You really have to understand what represents the greatest risk and what data and systems are the most

critical," Parisi says. "At that point, you can begin to address cybersecurity in a more manageable and effective way."

Parisi and others know that most initiatives start with education and awareness. A key component is teaching everyone within an organization how to spot suspicious emails with dangerous links that may infect systems and lead to intrusions and theft. However, it's also critical to build in safeguards such as provisioning and

de-provisioning users and systems promptly, and using strong passwords and authentication. FusionX's Devost

**38%**  
**increase in**  
**cybersecurity**  
**incidents**  
**over the**  
**last year**

says one of the biggest problems revolves around the lack of two-factor authentication. Requiring a secondary form of authentication, usually through a smartphone, provides enormous benefits and can be a huge deterrent, he says.

A few basic principles centered

on a multilayered approach can go a long way toward better securing systems. Among other things, Devost says network architecture with enclaving is essential, especially when an organization is handling sensitive data. "It's critical to have HVAC and IoT devices on a separate and secure network," he says.

Air-gapping these networks is just a start. Along with strong authentication methods and tight governance, organizations should consider using intelligence-sharing services that deliver information about new methods and look at emerging analytics tools that spot inconsistencies and anomalies in the network. Devost says certain safeguards, such as one-way data transfers and end-to-end encryption of critical data, can also raise the bar on protection.

In the end, there are no easy answers, and there is no silver bullet. Although federal and state agencies are drafting stricter cybersecurity regulations for contractors [see ACEC Addresses Cybersecurity Liability Issues with FERC], the onus remains on engineering companies to build security into systems from the circuit board and server on up. "Cybersecurity has to be just as important as your other core values," says Parsons' Lyons.

This may mean turning to outside cybersecurity services to conduct an audit and examine components for potential malware. It may also mean thinking about security at a fundamental design and engineering level; but, more than anything else, it means thinking about cybersecurity as a fundamental underpinning for business and hardwiring it into every system, workflow and process by weighing risks and building protections accordingly. ■

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

## ACEC Addresses Cybersecurity Liability Issues with FERC

**A**mid growing cybersecurity risks, federal and state agencies are beginning to eye stricter regulations for contractors. Regulatory pressure to fill a "reliability gap" in infrastructure protection is increasing, not only in the wholesale electricity sector but also for retail-level regulated electricity, natural gas and water utilities.

In 2015, the U.S. Federal Energy Regulatory Commission (FERC) proposed a cybersecurity supply chain rule that would introduce a more comprehensive framework for protection in owner-operator procurements of engineering services. This included technical and practical issues such as software standards and data accessibility.

ACEC has raised concerns with FERC about regulatory actions that could impose uninsurable contract terms related to cybersecurity on firms working for energy clients.

In a letter sent to FERC, ACEC highlighted particular concerns regarding the potential use of model procurement language developed by the Department of Energy that "would impose unrealistic obligations, standards of care and potential liability on professional services related to the supply chain." The Council noted that such an approach could expand to other agencies and lead to fewer firms competing for work.

The FERC-proposed cybersecurity supply-chain rule was withdrawn. It has since been the subject of technical discussions that are ultimately expected to result in a new FERC proposal. ACEC will continue to engage with the agency on supply-chain risk management issues.

Meanwhile, the General Services Administration (GSA) is developing its own set of federal cybersecurity supply-chain requirements for procurement of government buildings and infrastructure, and National Institute of Standards and Technology (NIST) continues to improve its new risk-management framework for all public and private entities. Several states are adopting their own guidelines and regulations modeled on federal initiatives of FERC, the North American Electric Reliability Corporation, GSA and NIST.

Just how all of this will play out (and how insurance companies adapt and adjust through liability coverage) remains to be seen. It is clear, though, that a combination of tighter regulations and voluntary standards are likely forthcoming.





## Creating harmony and balance between people and the planet.

We are 28,000 smart, talented and driven people committed to exceptional and sustainable outcomes. We collaborate. We innovate. We deliver results.

### **We are Arcadis.**

Improving quality of life.



# PASSING THE

As baby boomers continue to retire, **ownership transition plans** are more important than ever

# B

By Stacy Collett

**T**hirty years ago, Jeff Asher joined KPFF Consulting Engineers in Agoura Hills, California, as a bright, promising structural engineer. From the get-go, Asher was nurtured, mentored and treated as a valued worker. Over the years, he acquired more responsibilities, became an integral part of the business and eventually acquired leadership and ownership responsibilities to grow the firm. >>

E+/GETTY IMAGES

# ATON

A close-up photograph of a hand holding a wooden mallet against a blue background. The word 'ATON' is overlaid in large white serif font. The hand is positioned in the center-right, with the mallet's head pointing towards the bottom right. The mallet has a light-colored wooden head and a darker wooden handle. The background is a solid, deep blue.



Today, Asher is chairman of the KPFF board. He takes pride in the contributions he made that helped grow an 85-person firm into 1,000 employees, but he knows that a new generation of talent must eventually take the helm. In 2011, he voluntarily stepped down from his position as president to make way for new leadership and began the process of divesting his ownership in the firm—all part of KPFF's ownership transition plan.

"I can't say that every day is perfect, but I'm finding the right way to be productive and constructive," Asher says. "What really matters is that we see that the firm continues to be successful."

### Why Now?

Many A/E firm leaders such as Asher are reaching that same pivotal professional moment. Baby boomers in particular are entering ages where transferring ownership of firms they helped grow is paramount. Industry experts believe, however, that a large percentage of midsize A/E firms have ownership profiles that don't effectively consider future ownership transition. Many firms are considered top-heavy with principals in their 50s and 60s who own a large majority of the firm's stock. There simply aren't enough 30- and 40-year-olds ready, willing or able to buy out these senior owners in a coordinated process that

won't result in a decade long (or more) sell down.

Getting buy-in on an ownership transition plan is not always easy. Greed, ego and fear often keep senior owners from relinquishing power, experts say. They may be unwilling to share client relationships, knowledge and other sources of power in a professional practice, which prevents younger people from assuming real ownership and leadership of the firm. If there is no transition plan in place, younger employees might not be ready to assume leadership roles when owners decide to retire, or they can't afford to buy shares in the firm at the prices set by owners.

A successful transition plan balances the interests of sellers, buyers and the business; but time is ticking, and the actions that owners take today will determine the fate of their firm. One of the major mistakes many firm leaders make is waiting too long, says Bill Mandel, a partner at law firm Fox Rothschild LLP and co-author of the book, *Essentials of Ownership Transition*. "It takes



**"Err on the side of making a plan sooner rather than later. There's always an excuse to not move forward, but that's destructive if you're interested in perpetuating the firm."**

JEFF ASHER  
KPFF CONSULTING  
ENGINEERS

time for people to be developed and mentored" into leaders, he says.

Considering today's aging owner population, Mandel says it's more important than ever for A/E firms to have an ownership-transition plan. "If the firm wants to succeed in the future rather than just closing the doors when the owners retire, they have to plan for continuity."

But there are other benefits to having a transition plan. It can help firms accommodate growth by promoting more leaders to manage people. It can also help attract and retain talented staff by offering up a piece of the pie. This new generation also helps the firm keep in touch with the marketplace, Mandel says. "Younger people understand what younger clients want."

Timing is also important when it comes to cash flow, which allows firms to afford an internal transition plan, says Matt Fultz, vice president of Matheson Financial Advisors. Fultz recommends that owners begin planning 10 years ahead of a transition. "Business is cyclical.

A number of firms sold or went through an ownership transition process prior to the last recession at values that were supported by pre-recession earnings, and when revenue and profits fell, those plans became unaffordable," he says. It takes three-to-five years of current level earnings, on average, to transition the ownership of the business. "That's why we like to have a longer runway," he says.

### The Method

Owners usually choose to transition either through a management buyout (MBO) plan, which allows for future growth from within the firm's ranks, or by merger or acquisition,



which relinquishes control to an outside buyer.

Owners looking for a quick and lucrative return may choose acquisition because the firm's value can be as much as 30 to 50 percent higher than its value in an MBO, Mandel says. "But the reality is not all firms are sellable." Firms may be more likely to develop an ownership transition program than they are to sell to an outside party. The founders may get less money by selling to the leadership candidates in an MBO. "If things work out well, the firm prospers, and they can realize value through compensation."

An MBO-based ownership transition plan begins with establishing a commitment by owners to facilitate a transition. "That's not just ownership transition but a leadership and management transition as well," Asher says. "Then there's the process of really forcing yourself to live that commitment on a regular and ongoing basis. We view it as a cultural value."

In the midst of the economic downturn, many internal transition plans stalled, Fultz says. Values were down, financing was generally unavailable and owners were unsure of the future direction of the business, which made Employee Stock Ownership Plans (ESOP) appealing. An ESOP is an employee benefit plan where shares are held in a trust that vests in the company for the benefit of the employee participants. Today, even with the slow recovery of the last two years, many young engineers have not regained their buy-in risk appetite, so many firms continue to offer ESOPs.

"You're seeing more firms considering an ESOP than before," Fultz says. "If that level of commitment isn't there, but the company wants to remain privately held and not sell to the third party, then an ESOP is an effective tool to do so. [However] it's not right for every firm."

For instance, if a company is not employee-focused, then there is a risk that the

value of an ESOP won't be realized, Fultz says. Firms are more likely to find ESOP success if they're "essentially running the business like an employee-focused firm, and it's part of your culture." An ESOP does not, however, help identify and groom future leaders, he adds. Fultz says some firms do add an ESOP as part of a combination of strategies.

#### Identifying Leaders

One of the first steps in any MBO transition plan is to identify the next generation of leaders. How do you discover those diamonds in the rough and then keep the pool of talent coming to continue the process?

Founders often have a good idea of their future leaders, but many use outside consultants to vet candidates. "It's done in a non-threatening way," usually by pointing out that "the firm is going to be doing some strategic planning and we want your views on the firm," Mandel says.

Surprisingly, most founders aren't afraid to pick someone who's been there a very short time if they're very impressed with that person. "I don't recommend rewarding

somebody with ownership just because they've been there for a very long time, especially if they're not owner material," Mandel says. "Reward them another way."

Vetted candidates usually receive a terms sheet that lays out exactly what they would receive as an owner. This paper usually includes their base compensation and explanation of the owners' bonus pool, which is typically based on firm profits and individual performance.

"I strongly recommend they also get a client development budget to go out and recruit potential clients," Mandel says. "It could be just \$2,500 a year, but they've got to use it." The bottom line: "The better you perform, the more you're going to get," he says.

## 30% to 50% higher A firm's value in an acquisition vs. a management buyout

Buy-in also has to be affordable for young leaders. "Most of these buyers aren't sitting on large amounts of cash, so they're going to rely on compensation they've earned through their employment with the company," Fultz says. "For instance, instead of just salary and bonus, it's salary, bonus and some distribution of firm profit."

#### Be Flexible

Over the years, plans should remain flexible to accommodate changes in business climate, economy and ownership makeup.

About 10 years ago, engineering firm Simpson Gumpertz & Heger recognized that a large portion of company shares would be coming up for sale as the firm's baby-boomer owners neared retirement. "At that time we had a share sell-down agreement that stretched over five years, but we extended that five years early to 10 years to spread that transfer out, so there wasn't an impractical concentration of shares coming on the market too soon," says CEO Glenn Bell, who has been with the firm for 40 years and the CEO for 22 years. Baby-boomer owners turn over 3 to 5 percent of ownership of the firm each year. "It's smooth, sellers and buyers can plan for it, and it makes the whole transition very practical."

When it comes to ownership transition plans. "Resistance is normal—it just takes a lot of work and a joint commitment to making it happen," Asher says. "Err on the side of making a plan sooner rather than later. There's always an excuse to not move forward, but that's destructive if you're interested in perpetuating the firm." ■

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



**"At that time we had a share sell-down agreement that stretched over five years, but we extended that five years early to 10 years to spread that transfer out...."**

GLENN BELL  
SIMPSON GUMPERTZ &  
HEGER

Insurance, Advice, Advocacy, Risk Management and  
Continuing Education for Design Professionals since 1988



**A network of Brokers Dedicated to  
the Insurance Needs of Design Professionals**

Our highly seasoned brokers and agents have the expertise and the market relationships to find the best solution for even the most difficult to place risks.

a/e ProNet brokers offer extensive expertise in delivering:

- Highly competitive quotes from top-tier insurance companies in the marketplace
- On-going risk management services like contract reviews and loss prevention seminars
- Claims monitoring and pre-claims assistance
- Review of your company's practice designed to identify and assess potential exposures

Visit [www.aepronet.org](http://www.aepronet.org) to download Insurance 101 for Design Professionals & get answers to your risk management questions.





# Look Beyond the . Premium

Price is important,  
but service and  
relationships  
have  
significant  
value, too

By Bob Woods

**T**he U.S. economy is continuing a moderate but steady growth, which is good news for ACEC Member Firms, according to results from the recent ACEC Professional Liability Insurance (PLI) Survey of Member Firms for fiscal year 2015. Positive financial indicators and strong market conditions signal that the country as a whole has largely recovered from the Great Recession, and corresponding revenues among Member Firms remain on an upward trajectory. >>

Indeed, two-thirds of survey respondents (66 percent) report that their revenues increased last year, reflecting a slight uptick from 2014 (63 percent) but a giant leap from the 35 percent growth reported in 2010. "It's exciting to see the extent to which the economy is returning to normalcy," says Kevin Collins, senior vice president for professional liability at Victor O. Schinnerer.

The upbeat environment bodes well for the state of PLI, Collins adds. "From the insurance cost standpoint, firms are seeing a flat-to-slight decrease in rates, as we would expect," he says. "Firms with the largest revenue volume have the lowest rates, and the rates increase as you get to the smaller firms." Regardless, virtually all respondents—99 percent—report carrying PLI, although 3 percent of



**"Firms should not focus solely on insurance premium for their policy, but total risk management."**

KEVIN COLLINS  
VICTOR O. SCHINNERER

those from the largest firms (\$100 million-plus in revenues) opted out of coverage last year.

The rate at which all firms changed PLI carriers rose just a point, to 14 percent from 13 percent last year, the survey reveals, with the highest rate (23 percent) reported by structural engineering firms. "The reasons cited, not surprisingly, were lower premium [72 percent] and better policy terms [28 percent]," says Chuck Kopplin, an industry consultant and member of the ACEC Risk Management Committee, which is responsible for conducting the survey. What

impresses Kopplin most is that—although it remains one of the reasons for making a switch—dissatisfaction with pre-claims assistance plummeted this year to 6 percent compared to 22 percent a year ago. That's

heartening evidence, he says, that pre-claims systems are getting better.

Nonetheless, the fixation on premium as the overwhelming reason to make a switch is vexing for PLI carriers. "That's the wrong way to think about it," Collins says. "Firms should not focus solely on insurance premium for their policy but total risk management."

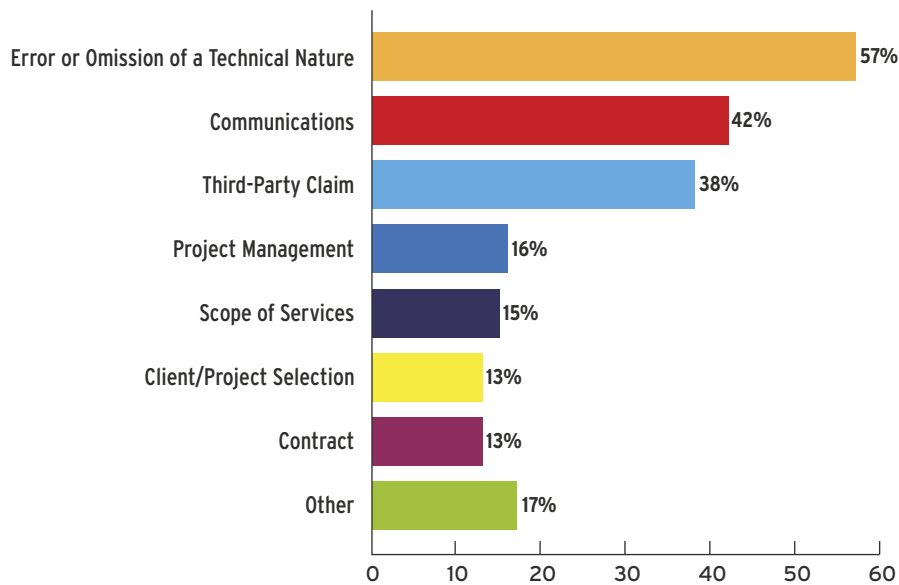
#### **Choosing the Right PLI Carrier**

Al Rabasca, director of industry relations for the design professional unit of XL Catlin, uses the term "insurance program" instead of "insurance policy" when discussing reasons why firms switch carriers. "While premium cost will always be a factor, there are many others of equal or perhaps greater importance to consider," he says. Those include expert claims service, loss prevention and education, agents specialized in A/E liability, and qualified defense counsel with experience in A/E cases.

John Rapp, managing director, design professionals, bond and specialty insurance



## Causes of Claims



Source: 2016 ACEC PLI Survey of Member Firms for F.Y. 2015

at Travelers, says, “Firms should consider the financial stability of the carrier. Many PLI carriers come and go, and you want

yours to be around when resolving claims. Keep in mind, it is not uncommon for claims to remain open for five years after

they are initially reported.”

When choosing a PLI carrier, Collins says firms should be proactive in defining total value and cost of PLI. “Engineering firms are astute around individual costs, such as continuing education and cost of time to go after new business versus insurance,” he says. “The issue is connectivity—seeing coverage holistically instead of as just individual components. Connect the dots on the total value a carrier offers.”

Costs related to claim limits continue to be an issue in PLI coverage, Kopplin notes. More firms are choosing policies with split limits, such as \$2 million per claim with a limit of \$3 million, he says. “That decision becomes important if you have a major claim that goes beyond that limit,” Kopplin says. “You risk having to run without insurance for the rest of that year, or trying to buy additional insurance, which isn’t going to be cheap.”

Broker Ken Estes, president of Professional Liability Agents Network (PLAN), says firms may change carriers due to a carrier’s inability or unwillingness to offer higher limits. Those limits might be one reason for changing carriers, says fellow broker Eric Moore, president of a/e ProNet and vice president of Moore Insurance Services in Hillsdale, Michigan. “Deductibles could be another—the type of deductible being offered, i.e. first-dollar defense coverage, or maybe an aggregate deductible would appeal to large firms with large deductibles,” he says.

Schinnerer’s Collins addresses the subject from the carrier’s perspective. “We’re seeing an increase in the average limits carried by firms, which reinforces our view—that project owners continue to push or re-evaluate, from their own risk-management perspective, limit requirements they need to have to contract with engineers,” he says. “A \$1 million limit used to allow most firms to compete on public work projects. We now see that rising between a \$2 million and \$5 million limit for an individual project.”

### Reasons for Turning Down Work

Even though the growing economy translates to increased opportunities for firms and flat-to-slight increases in PLI coverage, risk management remains constant. Still, the number of firms reporting that they “frequently” or “sometimes” turn down work rose only slightly from 41 percent last year to 42 percent. And though the three most



SAM KITTNER/NATIONAL GEOGRAPHIC/GETTY IMAGES





**The personal service of one.  
The combined resources  
of many.  
That's PLAN.**

PLAN is a non-profit organization made up of a select group of insurance agencies specializing in risk management and loss prevention programs for architects, engineers, surveyors and environmental consultants in the United States, Canada and Puerto Rico.

Working with a PLAN agent gives you direct access to a world of benefits. You'll see the differences right from the start.

## PLAN AGENCIES BY TERRITORY

### UNITED STATES

AL	Crow Friedman Group, A Risk Strategies Company
AK	USI Northwest/Kibble & Prentice
AZ	Stuckey Insurance
AR	BancorpSouth Insurance Services
CA	Dealey, Renton & Associates
CA, San Diego Area	Cavignac & Associates Insurance Brokers
CO	USI Colorado
CT	Camilleri & Clarke/Smith Brothers
DE	KT&D, Inc.
FL	Suncoast Insurance Associates/USI Florida
GA	Crow Friedman Group, A Risk Strategies Company
HI	Finance Insurance, Ltd.
ID	The Hartwell Corporation
IL North	Holmes Murphy & Associates (PCIA) Professional Concepts Insurance Agency
IL Central	Holmes Murphy & Associates
IL South	The Crane Agency
IN	Old National Insurance
IA	Holmes Murphy & Associates
KS	Holmes Murphy & Associates
KY	The Underwriters Group, Inc.
LA	Alexander & Sanders Insurance Agency
ME	Clark Insurance
MD/DC/Northern VA	CBIZ
MA	Poole Professional Ltd.
MI	(PCIA) Professional Concepts Insurance Agency
MN	H. Robert Anderson & Associates
MS	HUB International Gulf South
MO	The Crane Agency
MT	The Hartwell Corporation
NE	The Harry A. Koch Company
NV	American Insurance & Investment
NH	Poole Professional Ltd.
NJ North	Singer Nelson Charlmers, A Risk Strategies Company
NJ South	Wortley/Poole Professional Ltd.
NM	R. J. Dean & Associates
NY North	Poole Professional – NY Inc.
NY South	Singer Nelson Charlmers, A Risk Strategies Company
NC	BB&T Insurance Services
ND	TRJ Professional Group
OH	Oswald Companies
OK	McLaughlin Brunson Insurance Agency
OR	USI Northwest/Kibble & Prentice
PA East	Wortley/Poole Professional Ltd.
PA West	Oswald Companies
RI	Camilleri & Clarke/Smith Brothers
SC	BB&T Insurance Services
SD	TRJ Professional Group
TN	Crow Friedman Group, A Risk Strategies Company
TX North	McLaughlin Brunson Insurance Agency
TX South	USI Southwest
UT	American Insurance & Investment
VT	Benchmark Insurance
VA	Poole Professional Ltd.
WA	BB&T Insurance Services
WV	USI Northwest/Kibble & Prentice
WI	Oswald Companies
WY	Holmes Murphy & Associates
WY	USI Colorado
PUERTO RICO	Fulcro Insurance

### CANADA

AB	Quadrant Insurance Services
BC	Metrix Professional Insurance Brokers
MB	Oldfield Kirby Esau, Inc.
NB	HUB International Atlantic
NL	HUB International Atlantic
NT	Quadrant Insurance Services
NS	HUB International Atlantic
ON	Pro-Form Sinclair Professional
PE	HUB International Atlantic
QC	Claude Barry RC Professionnelle
SK	Quadrant Insurance Services
YT	Quadrant Insurance Services

For contact information, see the "Find a PLAN Agent" map at [www.plan.org](http://www.plan.org).

common reasons for opting out remain the same, according to the firms, the percentages changed this year. Contract language jumped to 63 percent from 52 percent; client history dropped to 48 percent from 52 percent; and project risk came down to 53 percent from 59 percent.

At ACEC Member Firm Neel-Schaffer, Vice President Mark Bailey says, “there is very little work turned down.” But when it happens? “The biggest reasons would be: Can we do the work for the negotiated fees? Is the client known, and are we able to work with them? And are we taking a substantial risk with the work?” he adds.

Gil Hantzsch, president and CEO of Member Firm MSA Professional Services, echoes that sentiment. “We turn down work when the risk-reward equation looks out of balance,” he says. One possible reason for letting an opportunity pass by could be a lack of history with the client or a less than positive history. The fee could be too low or maybe the contract terms can’t mitigate the firm’s risk, he says. Other significant factors: “The nature of the work is inherently risky, or we are not experienced in it,” he adds.

On the flip side, both those principals imagine instances where the potential risk is not great enough to actually turn down a project. “Desperation” is the first word that comes to Hantzsch’s mind. “The need to generate revenue when work is scarce causes people to spin the wheel of fortune,” he says. A positive relationship with the client is Bailey’s caveat. “Even if some terms of the contract are onerous, when we know a client, we’re more likely to not turn that work down,” he says.

### The Importance of Claims Handling

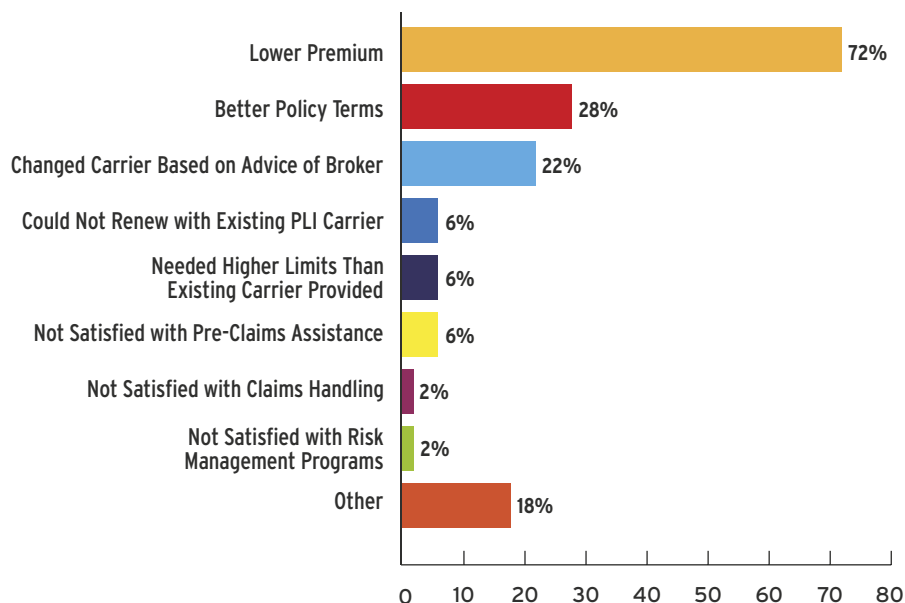
Relationships also play a role in firms’ decisions about whether to change PLI brokers, an incidence that rose to 7 percent in 2015 from 3 percent a year earlier. But for those who did make a change, it wasn’t because of dissatisfaction with their broker. In fact, only 32 percent cited that as a reason, which was a dramatic drop from a year earlier, when the number was 71 percent. Kopplin mentions a similarly stark year-to-year difference



**“We turn down work when the risk-reward equation looks out of balance.”**

GIL HANTZSCH  
MSA PROFESSIONAL  
SERVICES

## Reasons Firms Changed PLI Carriers



Source: 2016 ACEC PLI Survey of Member Firms for F.Y. 2015

as another reason to change brokers. “The new broker offering additional services more than doubled, from 14 percent to 32 percent,” he says. “Those figures tell me that brokers are doing a better job.”

Kevin Woolley, vice president at Marsh Sponsored Programs, a division of Marsh USA, offers a poignant example of this practice. “We had a firm that we lost last year come back this year because they missed the service and expertise we provided,” he says. “They left to save money, but this year they needed some services the new carrier didn’t provide.”

Claims handling is an integral factor in the PLI discussion. In this year’s survey, design firms reported a total of 451 claims, mostly by clients, made against them, an increase from 424 in 2014. Poor communications and third-party claims were two of the major causes (42 percent and 38 percent, respectively), while technical errors and omissions rose significantly to 57 percent from 50 percent. The explanation, Kopplin says, is a downside to firms’ increase in business. “Firms are busier, so they have less-experienced people

working on projects. When business was tight, they hung onto more senior people who made errors less often,” he says. Now, as firms hire new people, mistakes happen.

The survey reveals that of the 194 claims resolved last year, 95 percent occurred before trial, for a total of \$75,740,000 in awards and settlements. In spite of the numbers, claims handling is always key when considering a PLI carrier.

One of the most important aspects, Hantzsch says, is that they should provide firms with good legal representation that has experience in engineering and construction. “They should be clear and timely on how invoices will be processed and where we stand relative to our deductible,” he adds. “I recognize that it is our decision on how we spend our deductible, but the carriers’ claims people have far more experience in dealing with those issues than the typical engineering firm does.”

As the U.S. economy continues to chug along, ACEC Member Firms can expect to ride the tailwinds. And if the trend maintains this steady pace, firms, carriers and brokers will all remain upbeat and assured about the state of professional liability insurance. ■

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

# Turning Up the

Engineering firms are  
lighting up innovation to  
**modernize the energy grid**

By Alan Joch

**T**o see the future of energy, utility companies need look no further than Overland Park, Kansas. The engineering firm Black & Veatch created a microgrid to power its own headquarters and showcase modern power technologies. Each year, the microgrid generates about 1,300 megawatt hours (MWh) of power, or 12.5 percent of the headquarters' demand, from a combination of a geothermal well, rooftop solar photovoltaic panels and natural-gas-powered microturbines—all supported by a lithium-ion battery storage system and the company's proprietary energy management software. >>

# PC

CAMERON DAVIDSON/CORBIS DOCUMENTARY/GETTY IMAGES



An aerial, high-angle photograph of a city at night, likely New York City, showing a dense grid of skyscrapers and streets. The buildings are illuminated with various lights, and the streets below show traffic lights and lane markings. The word "DWR" is superimposed in a large, white, serif font across the upper portion of the image.

DWR



Together, these components add resilience to the company's energy supply and demonstrate how to successfully integrate renewable and traditional energy sources.

"For some years, we've believed that distributed power generation has the potential to fundamentally change the electric utility industry—and our business," says Ed Walsh, president of Black & Veatch's power business.

Black & Veatch isn't alone. Engineering firms throughout the nation are launching new business units to help utility companies design grid-modernization strategies and provide the custom engineering expertise to bring those plans to reality.

### The Need to Modernize

The nation's power grid has long been a catalyst for social change and economic development. The National Academy of Engineering singled out electrification as the greatest engineering achievement of the 20th century, ranking it ahead of the computer, automobile, internet and airplane.

Now, a variety of factors are coalescing to modernize the electric grid for 21st century demands. The power industry is shifting its mix of technologies. For example, U.S. coal production, which peaked in 2008, has steadily declined and last year was at its lowest level since 1986, according to the U.S. Energy Information Administration (EIA). At the same time, reliance on renewables, including solar and wind production, is growing. Renewable electricity generation could increase by 72 percent from 2013 to 2040, the EIA estimates. "This means that utilities have to think about the grid in new ways, which is one of the main drivers for grid transformation," says Wanda Reder, chief strategy officer at S&C Electric Company, which provides equipment and services for electric power systems.

The need to rethink the grid arises because power created by renewables flows to utility companies from a distributed



**"The Smart Grid can help utilities be more attentive to preventive maintenance, so they can get the full life out of all the infrastructure components."**

ED WALSH  
BLACK & VEATCH

mix of sources rather than being generated onsite, as with coal-fired power plants. Solar and wind power is also intermittent—it's created when weather conditions permit but cuts out at less favorable times.

Another factor is demand for more reliable power sources, as businesses and consumers grow dependent on electricity-hungry digital technology. This has helped spur the rise of the so-called Smart Grid, in which an array of sensors backed by automation software helps utilities isolate and circumvent problems in the grid to avoid brownouts and blackouts.

The electric power industry is investing \$20 billion a year in grid modernization,

including purchasing approximately 60 million digital meters over the last six years to support greater information gathering, according to the Edison Foundation, a research and education institution devoted to electric power. Sensors and other updates are helping the traditional power grid evolve to mirror the digital networks running in modern data centers, says Lisa Wood, the foundation's vice president. "A digital overlay on top of the traditional grid means information can flow along it, in addition to power."

Now, if the potential for a system overload or other problem in the grid emerges, utilities will be alerted and can take action to avoid a major disruption, she says.

Wood says a mix of industrial and IT

companies is helping create this digital grid, including General Electric, IBM, Itron, Oracle and Silver Spring Networks.

Other developments include evolving battery technology that addresses intermittent renewable energy and reliability goals with backup power reserves. Microgrids, such as the one created by Black & Veatch, combine these various production, storage and management components for ready supplies of reliable power, even during extreme events such as hurricanes.

### Investing in the Future

These industry changes offer significant business opportunities. Burns & McDonnell is one of several engineering firms evolving to meet the needs of grid-modernization projects. "We believe the opportunities in this market are immense, and we plan to grow and adapt to the changing needs of power-industry clients," says Lucas McIntosh, associate project manager and technology consultant at the company.

Many firms are creating special business units just to develop expertise in the latest energy innovations and help utility companies update their systems. "We now have consultants from both a technical and business orientation who are addressing these issues head-on to determine the best solutions," McIntosh says.

Black & Veatch is following suit. To meet new utility demands, it has steadily added engineering professionals with backgrounds in renewable energy, and Walsh says, "We expect that trend to continue."

The firm is seeing interest in system upgrades, especially by utility companies along the coasts. Eastern firms place high value on increasing the resiliency



The Yerba Buena energy storage system in California charges batteries when needs are low and sends reserve power to the grid when demand grows.

S&C Electric Company and Schneider Electric developed an advanced microgrid for Texas electric utility Oncor that utilizes nine different distributed generation sources, including two photovoltaic arrays.



of the power grid to prevent widespread outages like those in the aftermath of 2012's Hurricane Sandy. Western utilities are looking to address the challenges of absorbing larger volumes of renewable-generated power into their existing plants.

But modernization isn't confined only to the East and West coasts. Black & Veatch is working on projects in Texas that require a series of transmission lines and substations to transfer power created by wind turbines in far-flung rural areas to major cities in the state.

As engineering firms are helping upgrade capacity and transmission at utility companies, they're also on the hunt for related business opportunities, such as making facilities more efficient. "The Smart Grid can help utilities be more attentive to preventive maintenance, so they can get the full life out of all the infrastructure components," Walsh says.

Success requires more than just specifying new equipment. "Our clients need our expertise in integrating all the various pieces, so they can make the most out of their investments," Walsh explains.

Black & Veatch is also forging new relationships with other energy players, such as companies devoting extensive R&D to next-generation batteries for vehicles. Advanced battery technologies being developed for electric cars might eventually be used by the power industry. "Batteries could be a step

**\$20  
billion**

**The amount the electric power industry is investing per year in grid modernization**

change to store energy from renewables to use during peak demand," Walsh says.

The development and incorporation of new technologies such as battery storage and smart inverters are areas Burns & McDonnell is watching closely. These devices, still in pilot and R&D phases, hold the potential to address the highly variable flow of power coming from weather-dependent, renewable resources,

such as photovoltaic cells and wind turbines. Modern-grid proponents hope to design a new generation of energy storage systems and inverters that can reliably accommodate the generation characteristics of renewables and the growth in distributed generation capacity. "Both could be game changers," McIntosh says.



**"We believe the opportunities in this market are immense, and we plan to grow and adapt to the changing needs of power-industry clients."**

LUCAS MCINTOSH  
BURNS & MCDONNELL

#### **Engineers Are Essential**

Industry observers say engineering firms have a vital role to play in the modernization of the nation's power grid and related activities. Engineers can participate in a dramatic remix of electrical generation sources through a variety of project types, including

natural-gas pipelines, wind turbines and solar-panel installations. "Our industry has made major progress in terms of reducing carbon emissions, primarily by switching from coal to natural gas and renewables," Wood says. "As we will continue to do that, there will be an even greater focus on renewables in the years ahead."

Engineering assistance will be needed in other areas as well. "The marketplace needs assistance to bring these technologies together so they're dependable and they interoperate," Reder says. "That involvement is important in everything from analyzing and designing projects all the way through commissioning and the ongoing operations."

As a result, Reder says that some engineering competencies are evolving to encompass a system-wide perspective. "Success requires utilities to bring together an amalgamation of computers and software, power systems and communications resources systems," she says. "Individual customers and suppliers come with a piece of that puzzle, but not necessarily the whole thing. That's where the opportunity lies for independent engineering firms." ■

*Alan Joch is a business and technology writer based in Franconia, New Hampshire.*



BECAUSE SUSTAINABILITY IS A PRIORITY

# DRIVABILITY MATTERS



"When I bike to work or around town, I am getting exercise and reducing my impact on the environment. At work, I analyze the environmental impact of infrastructure, including roadways. Asphalt pavements are 100% recyclable and can be produced with energy-saving warm-mix technologies. That makes asphalt the sustainable choice, whether you are on two, four, or even 18 wheels. That matters."

-Lianna Miller | Engineer | Commuter



LEARN MORE AT  
[DRIVEASPHALT.ORG](http://DRIVEASPHALT.ORG)

## SUSTAINABILITY

It's just one of the ways asphalt delivers drivability.



SMOOTHNESS



NOISE



SAFETY



SUSTAINABILITY



CONSTRUCTION

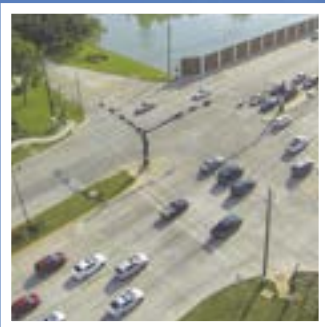
The Asphalt Pavement Alliance is a partnership of the Asphalt Institute, National Asphalt Pavement Association, and the State Asphalt Pavement Associations.

Member Firms  
help local  
and federal  
agencies  
achieve  
critical  
security  
and defense  
objectives >>

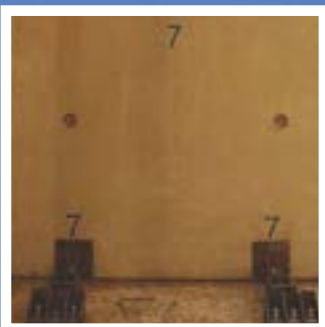
# SECURE DEFENSE



**PROJECT:** Counterterrorism  
Operations Training Facility  
**FIRM:** Mason & Hanger (a Day  
& Zimmerman Company)



**PROJECT:** Automated License  
Plate Recognition  
**FIRM:** Shrader Engineering



**PROJECT:** Testing and  
Analysis of Precast  
Concrete Wall Panels  
**FIRM:** Protection  
Engineering Consultants

By Bob Woods



# Training Facility Simulates Real-World Terrorism Conditions

**PROJECT:** Counterterrorism Operations Training Facility, Glynco, Georgia

**FIRM:** Mason & Hanger  
(a Day & Zimmermann Company),  
Lexington, Kentucky

In 2013, the U.S. Department of Homeland Security unveiled a revamped Federal Law Enforcement Training Center (FLETC) that includes a 35-plus-acre Counterterrorism Operations Training Facility, featuring realistic venues and a high-tech forensics lab. The sprawling, state-of-the-art campus comprises more than 30 buildings, each one meticulously designed to simulate real-world urban and suburban terrorism and other crime scenarios.

ACEC Member Firm Mason & Hanger, which specializes in national-security projects, designed the facility. “Our overall goal was to provide a facility for uber-realistic training right down to pans in the pizza parlor, hats hanging over the chairs in houses and a pawn shop filled with items,” says Stephen Scott, vice president at Mason & Hanger. “Every building can be used individually, or they can all be used together.”



Stephen Scott



Mike Spradling

When the Mason & Hanger team arrived on the proposed site in late 2009, FLETC project coordinators presented them with a complete layout of the buildings they wanted and introduced them to the various training units so they would understand what was needed in each venue. “FLETC is a sophisticated customer, and their prep work and understanding of the project requirements allowed us to get our concept drawings and ideas down right from the get-go,” Scott says.

“There was a much higher level of design collaboration than we normally have with our users and customers,” says Mason & Hanger project manager Mike Spradling. “We spent 12-hour days doing design reviews because there was so much information.”

Most of the construction materials were conventional, though the variety of training exercises called for particular needs, such as easy-to-clean paints for walls that would be splattered with chemicals and real (goat’s) blood, and environmental sound systems that would simulate gunshots, explosions and people screaming. Another challenge, Spradling says, “was designing the project to comply with various permits and environmental regulations, including stormwater runoff due to the size of the site.”

Mason & Hanger completed the design phase within a year, and the contractor finished construction in 2012. “We have a deep sense of pride in being able to contribute to such a unique facility,” Scott concludes, “especially knowing the type of training it provides.”

The Counterterrorism Operations Training Facility contains more than 30 buildings meticulously designed to simulate real-world scenarios.





# License Plate Readers Focus on Crime Prevention



Shrader Engineering designed Sugar Land's automated license plate recognition system to ensure that vehicles cannot enter or leave the city limits without passing by one of the plate detection cameras.

**PROJECT:** Automated License Plate Recognition, Sugar Land, Texas

**FIRM:** Shrader Engineering, Houston, Texas

**S**ugar Land, Texas, a tidy community of nearly 87,000 residents just west of Houston, is one of the 20 safest cities in the country, according to FBI data. ACEC Member Firm Shrader Engineering is helping to bolster that status. Last fall, Sugar Land's city council approved a \$1.6 million budget to implement an automated license plate recognition (ALPR) system, part of the city's broader Crime Prevention Project, that would include installing 27 cameras in locations mostly north of town. The city council chose Shrader to design the system.



Craig Shrader

"After being selected, we employed a product agnostic approach to analyzing and selecting the correct technology for the application," says firm President Craig Shrader. He assembled a team of specialized engineers to review a dozen ALPR camera manufacturers, as well as to study Sugar Land's traffic infrastructure and zoning ordinances to recommend optimal installation sites.

"We discovered a lot of variation in camera technology," Shrader says. They couldn't simply rely on manufacturers' data because much of it was not field-verified through an independent testing



agency. "We short-listed down to five camera technologies and then set them up for field tests at a designated, proof-of-concept intersection." Three camera technologies were ultimately selected and allowed to bid on the project.

Besides selecting the ALPR hardware and software technology, Shrader's team also developed the back-end technical requirements for capturing and storing the data. "We spent several months developing how the system should operate at the console level," Shrader says. Meanwhile, citizens and advocacy groups raised privacy concerns regarding the retention and use of the data. The city council ultimately agreed to retain the data for no more than 30 days.

Shrader assigned a technical team of engineers and IT specialists to advise the installation company during construction, and the system has been up and running for several months. Sugar Land officials are tracking statistics and will gauge the effectiveness of the ALPR program before moving on to additional phases, which Shrader anticipates being part of.

"They eventually want to have the city fully covered so that you can't get into or out of Sugar Land without having your license plate read," Shrader says.

# Embassy Walls Stand Up to Explosives



Protection Engineering Consultants assembled precast concrete wall panels (below) that were tested to show deflection gages and load cells (left).



## PROJECT: Testing and Analysis of Precast Concrete Wall Panels

**FIRM:** Protection Engineering Consultants, Austin, Texas

In 2010, the U.S. Department of State's Bureau of Diplomatic Security hired ACEC Member Firm Protection Engineering Consultants (PEC) to study and test the blast-load levels of concrete wall panels used in its embassies and office buildings. PEC, an expert in industry and government programs related to blast and ballistics research, was tasked with developing improved design criteria specifically for protection against terrorist attacks.



Charles Oswald

"The department has long-standing, conservative design criteria to resist blast loads used for all their buildings," says project manager Charles Oswald, a senior principal at PEC. "They'd like the capability to use less conservative criteria for blast design, including precast concrete panels. They also may start to use new types of panels, including insulated concrete."

PEC analyzed and tested both precast and insulated panels. Oswald's team of five engineers began by using two types of computer analyses: a simplified analysis that modeled a panel as a single

degree of freedom and a dynamic analysis that had several degrees of freedom. "We did both levels of analysis, but focused mostly on the single degree of freedom," he says.

Armed with the results, the team worked with a subcontractor in San Antonio to perform shock-tube tests on the panels, followed by full-scale blast testing at Tyndall Air Force Base in Panama City, Florida. Although terrorists have employed different types of explosives and delivery systems, PEC focused on the magnitude of an explosion. "We look at blast design in two steps," Oswald says. "One, we have methods to take any type of explosive and calculate the blast loads that are applied to a building. The second step is to design the building components to resist those particular blast loads."

PEC wrapped up the project last year and submitted its report and recommendations to the Department of State and the U.S. Army Corps of Engineers Protective Design Center. Ultimately, the government will assimilate the test data and modify its design approach for new and retrofitted buildings. "The final challenge is to have the report accepted and published as improved design criteria," Oswald says. ■

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



# Comprehensive FAR Compliance and Oversight Training for State DOTs and A/E Firms:

*A special 2-part program developed by the FHWA National Highway Institute*

*Mysteries of the FAR Revealed:  
Using the AASHTO  
Audit Guide*

**Agenda & Registration Info**

[aashto.acec.org/aashto-portland2016/](http://aashto.acec.org/aashto-portland2016/)



## COURSE PARTNERS







T. Baker Smith employees participate in a diverse array of philanthropic activities ranging from the Special Olympics Unified Relay Across America to clothes drives and charity golf events.





# *Lighting a* SPARK

T. Baker Smith's charitable mission  
**ignites the passions** of its employees

By Calvin Hennick

**F**rom the Make-A-Wish Foundation to Habitat for Humanity, from local food banks to animal shelters, Louisiana-based T. Baker Smith supports as many causes as its employees have passions.

"Giving back to our communities is ingrained in our DNA," says Kenneth Smith, president and chief executive officer of the civil engineering firm that bears his grandfather's name. "It's what we do. It's an expectation. One of my deep values and something I read years ago is, the more you're blessed in life, the more you have to pay in 'rent.' I've been extremely blessed, and I have a lot to pay back." >>



In preparation for T. Baker Smith's 100th anniversary in 2013, the firm assembled a task force of associates and asked them to streamline the enterprise's charitable efforts through the creation of a 501(c)(3) nonprofit organization. The result of those efforts is an entity called Social Purpose and Responsibility Krewe, or the SPARK Foundation, which gives T. Baker Smith a centralized way to raise and disburse funds, and organize myriad employee-driven charitable endeavors.

Smith says it was important to him that SPARK gives employees the chance to raise money and volunteer for causes nearest to their hearts. Smith himself is an education advocate—a focus reflected in his multiple trips to Nicaragua to help build schools and houses, and in SPARK's ongoing support of four Louisiana elementary schools. But, Smith says, he realized that employee participation would be limited if SPARK revolved solely around his interests.

"I love to find out what other people's passions are," Smith says. "Whether it's Wounded Warriors, whether it's Habitat for Humanity, we let people chase their passions. With Relay For Life, we have a group of people where you couldn't stop them if you wanted to. That's the beauty of it, allowing them to be engaged."

### Multiplying the Impact

"We're not a group where you just come and say, 'We want money for something,'" says Craig Carlos, chairman of the SPARK Foundation and a senior project manager at T. Baker Smith's headquarters in Houma, Louisiana. "If employees are approved to move forward with a project, they are the spearhead, and they have to organize and find the ways to generate the funds. I say, 'If you feel that passion, you need to take the lead role.'"

For example, one employee suggested that the firm conduct a toy drive for Toys for Tots. The employee organized the event and promoted it by hanging posters around the office, and the firm's workers embraced the drive. "Every year [since], we've been donating thousands of dollars in toys and money to Toys for Tots," Carlos says.

While employees take the lead in these efforts, SPARK helps out by fronting



**"One of my deep values and something I read years ago is, the more you're blessed in life, the more you have to pay in 'rent.' I've been extremely blessed, and I have a lot to pay back."**

KENNETH SMITH  
T. BAKER SMITH

money for fundraising events such as luncheons, and matching employee donations and fundraising efforts on a dollar-for-dollar basis. So employees who bring in items for a charity auction or raffle instantly double their donating power through the SPARK match. Carlos says workers bring various household items or fishing equipment into the office to sell or raffle. At one fundraiser, he purchased three pounds of peeled pecans for \$20 (for a total impact of \$40 after the SPARK match—not bad for a box of nuts).

The SPARK program also assists employees working to help charities on an individual level. For example, one worker builds doghouses for an animal shelter, and SPARK supplies him with paint. Additionally, the firm gives employees the option of taking PTO—which stands for

"purpose time off"—to volunteer without using their vacation days. "If you want to go build a house with Habitat for Humanity,

you file a request," says Carlos. "You get paid while you're doing that, and then you write a small summary of what you've done and take photographs so that we can share it with associates in other offices."

One beneficiary of the SPARK program is Pointe-Aux-Chenes Elementary School, a Montegut, Louisiana, school that T. Baker Smith has "adopted." The company sends employees to the school to read to students, provides financial support and hosts field trips at the company's headquarters. The firm also buys prizes for the school to give out to students during an annual "Character Counts" program.

"It really brings it together that it takes a whole community to



T. Baker Smith Associates Erica Guise, Cory Taquino, Aimee Toups and Cindy Spence celebrate Red Nose Day during the Pointe-Aux-Chenes field trip.



raise our children,” says Cindy Chauvin, the school’s principal. “It takes us all working together collaboratively to help them have success.”

To date, the organization has donated more than \$52,000 to charities across Louisiana and Texas. In some cases, Smith explains, two external foundations also match donations, helping to further multiply the impact of employee fundraising. “If a group of associates does a fundraiser and raises \$300, the firm will match their \$300, so then we’ve got \$600,” Smith says. “If we give that \$600 to the Bayou Community Foundation, that turns into \$1,200. And then another foundation matches it, and all of a sudden that \$300 has become \$2,400. It’s truly a synergy.”

### Creating Culture

Carlos says that encouraging employees to be active in the firm’s charitable endeavors spurs social connections among workers, especially in the company’s satellite offices. “I find that the smaller offices have a lot of camaraderie,” he says. “It becomes a competition thing.”

Perhaps one of the best examples of this phenomenon is a pie-in-the-face fundraiser for Relay For Life at the company’s 15-person Thibodaux, Louisiana-branch, which raised \$850 for the cancer charity. “Everybody in the office got a cup,” says Dustin Rabalais, a project manager at the branch. “Whoever had the most money in their cup got a pie in the face. And then we raffled off tickets to see who would get to put the pie in the person’s face.”

Employees quickly funneled money into each other’s cups in order to ensure that their colleagues—and not themselves—would be among the three people to end up with their faces covered in pie. Rabalais said he even conducted “behind-the-



Dustin Rabalais, Randy Landy, Annette Huber, Gabe Huber, Ryan Leboeuf, Kenny Smith and Keith Verdin of T. Baker Smith volunteered to help clean up Bayou Lafourche for the Barataria-Terrebonne National Estuary Program.

scenes” deals with his colleagues to buy protection for himself by putting money only into certain other co-workers’ cups, but the plan backfired.

“You better believe I got one in my face,” Rabalais says, recalling the chocolate cream pie. “I should have picked the vanilla.”

These machinations are all in service of a greater good, of course. Rabalais says that people are more likely to open their wallets when they’re engaged and having fun. But, he says, these types of events also help to form bonds among employees and create a positive company culture.

“It gets our mind off work while we’re at work,” Rabalais says. “It brings everyone together.”



**“I find that the smaller offices have a lot of camaraderie. It becomes a competition thing.”**

CRAIG CARLOS  
T. BAKER SMITH

### A Personal Connection

Lorre Autin, Smith’s executive assistant and a 31-year veteran of the firm, has been involved with SPARK since its inception, helping out with accounting and secretarial tasks. But over the course of the past year, her connection to the organization has become more personal. Her husband died last April, only seven weeks after being diagnosed with brain cancer. In his obituary, Autin asked that friends send donations to the SPARK Foundation in lieu of flowers.

“My husband was a very generous person, to the point of giving away cars or large things like that,” Autin says. “Most of the time, he did it without me even knowing. When I thought about how can I honor his memory, that’s a way for me to be able to do it—to give back to somebody else.”

Autin hasn’t yet been able to bring herself to part with many of her husband’s belongings, but she has begun to donate clothes and cookware to SPARK’s garage sales that raise money for health care-related charities. In this way, Autin’s husband continues to help people even now that he is gone, and his impact is doubled by SPARK’s donation matching.

“SPARK has really touched my life,” Autin says. “It’s something that I’m very happy to be a part of. Challenging? Yes. Did I know anything about a nonprofit when it started? Absolutely not. But to be able to do this, to know that we’re helping so many people on such a scale—from St. Jude Hospital to Pointe-Aux-Chenes School—is just tremendous.

“For me personally, my core says to do what I’m supposed to do and give to people,” Autin adds. “My core tells me to do that. When I can do it on company time and know that I’m making a difference in somebody’s life, it is the most rewarding thing.” ■

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

# CHALLENGING

**Talent shortage**, retiring baby boomers among industry's most pressing issues

By Stacy Collett

**M**ost engineering firms are experiencing a little breathing room as the economy continues its upward trend. Billings for private, nonresidential construction broke into growth territory last spring, according to the U.S. Census Bureau and MAPI Foundation. Public construction spending rose 3 percent in 2015, with another 3 percent growth expected in 2016, and 1 percent in 2017. The oil and gas sector, however, continues to suffer, especially in the Deep South and the Dakotas. What's more, looming unknowns such as the upcoming presidential election and a contentious regulatory environment temper the industry's enthusiasm.

Members of the 2016-2017 ACEC Executive Committee weighed in on the industry's

top challenges from concerns about the economy, to the effect of retiring baby boomers to the need for increased cybersecurity.

"The industry has progressed

steadily, just as the economy, from the dark days of the recession," says Chairman **Peter M. Strub**, principal and senior vice president at TranSystems Corp. in Greenville, South Carolina. "We are maintaining progress in times of uncertainty, but have challenges ahead."

#### **Talent Shortage**

Industry data shows that engineering firms are looking to significantly increase staff but are struggling with a shallow pool of talent. Results from the first-quarter 2016 ACEC *Engineering Business Index (EBI)* show that more than eight in 10



**Peter M. Strub**  
Chairman



PORTRA IMAGES/GETTY IMAGES



# TERRAIN

engineering firm leaders (81 percent) plan to increase their staffing this year, with nearly 30 percent of respondents projecting a staff increase of 6 to 10 percent. Adding to the dilemma, mid-level engineers with seven to 15 years of experience “just don’t exist anymore,” says Vice Chair **John R. Nelson**, CFO of Wright-Pierce in Topsham, Maine. “We need to come up with a way around that by growing and grooming younger talent.”



**John R. Nelson**  
Treasurer

Complicating matters further, some universities are turning away prospective engineering majors due to small class capacity. ACEC/Maine, for instance, launched an engineering workforce summit in September 2015 with the University of Maine. “The intent is to educate legislators and trustees of the university of the need to invest more in U. Maine’s engineering facilities and staff,” Nelson says.

**Abbie Goodman**, who is executive director of ACEC/Massachusetts in Boston

and NAECE president, suggests that firms need to cultivate interest in engineering at the middle school level. “We need to be doing more to get kids to choose STEM-



**Abbie Goodman**  
NAECE President

related careers, but particularly to focus on infrastructure and the natural and built environments—not thinking they’re going to invent the next iPhone or great video game,” she says. Member Firms should have access to brochures and media presentations that resonate with tweens and teens, she adds. They should also encourage young engineers to visit schools to show these students how they can make a difference.



Cultivating leaders for ownership transition also poses a challenge. Many midsize engineering firms have principals nearing retirement age, yet who own a large majority of the firm's stock. There simply aren't enough younger professionals ready, willing or able to buy out senior owners and avoid a lengthy sell-down. But



**Thomas E. Mosure**  
Vice Chair

many leaders say an internal transition plan is important to ensure a firm's perpetuity. "Our philosophy is, who better to understand your culture and what you're doing than

the people who are sitting here—and you hired them," says Vice Chair **Thomas E. Mosure**, president and board chairman at MS Consultants in Columbus, Ohio.

Firms face similar challenges with handing over long-standing client relationships to the next generation. "Many baby boomers are set to retire in three-to-five years, and those relationships are going to be gone," says Strub.

"We need to be nurturing those new relationships and doing it in concert with current leaders and younger engineers."

Younger engineers will be challenged to step outside their comfort zones to become relationship builders, says Vice Chair **Lee Cammack**, president and CEO of J-U-B Engineers, Kaysville, Utah.

"Some folks who may have been more content to be in the back room will have to be out front a little bit more," Cammack says. He points to author Daniel Pink's book, *To Sell is Human*, which finds that ambiverts—people who are in the "modulated middle" between introvert and extrovert—make the best salespeople.



**Lee Cammack**  
Vice Chair

## 82% of employers struggle to fill engineering jobs

"A lot of our engineers are ambiverts, and they can be very effective at that if given the right opportunities," he says.

There's also a need for more diversity in hiring and around the executive table, Goodman says. She recently attended a leadership presentation where four women DOT state secretaries spoke about the next generation of engineers. "They still have people who are used to doing things the way they've always been done," she says. "A diverse workforce can bring fresh perspective to problems."

### Eroding QBS Laws

Qualifications-Based Selection (QBS) has largely been preserved at the federal level, but many states with the requirement have ignored it or made numerous attempts to do away with it, industry leaders say.

"I think that is one of the pillars of good engineering—not having to bid and reduce price and reduce quality," says Vice Chair **Philip L. Houser**, principal at Alfred Benesch & Co. in Chicago, Illinois. "It doesn't save money. It can cost more in the long run, and it saves lives. The engineering industry must lead the effort to explain why it's important."

In Massachusetts, firms have seen a

big push over the last year to bypass its QBS law. A few state universities started the practice. "Now, our largest state agency, which maintains all the state



**Philip L. Houser**  
Vice Chair

buildings, is competitively procuring design services through house doctor contract holders," says Vice Chair **Joel P. Goodmanson**, executive vice president of Architectural Engineers in Boston.



**Joel P. Goodmanson**  
Vice Chair

It's clear that it doesn't comply with the spirit of the law, let alone the letter of the law, he adds. Firms are forced to either staff jobs with junior engineers or forgo more innovative approaches to energy conservation and green technology.

Lack of funding shouldn't spur a lack of innovation, says Senior Vice Chair **Gregg W. Spagnolo**, partner at North Arrow, Inc. in Washington, D.C. "I see

a pretty significant threat in what I'm calling contentedness," he says. "Firms have to figure out how to create new ways of solving old problems" with their own funds.



**Gregg W. Spagnolo**  
Senior Vice Chair

Clients are not research institutions looking to invest in innovation, Spagnolo says. "They're willing to pay for that innovation once you do it," he adds. "It's a Catch-22, but firms that don't innovate go down the death spiral—the commodity curve."

### Technology, Information Security and Cyberthreats

As technology rapidly evolves, the engineering industry will be challenged to safeguard its own data and systems, as well as its clients' data. For starters, recent high-profile breaches at the federal level are prompting government agencies to incorporate security requirements in engineering contracts.

Many firms now share project files through remote file access and file-sharing

systems, such as Box.com and Project-Wise, Strub says. And that is impacting other areas of business. "We're starting to see some very interesting insurance requirements in our contracts regarding protecting the client," he says. Contracts state that if malware originates in the engineering firm's systems and is transferred to and infects the clients' systems, the engineering firm is liable. "Can we get the insurance? And what's it going to cost our firms?" he adds.

Some contracts simply require firms to protect the clients' information as if it were their own, Houser says. "But how well do we guard our own? That's worrisome from a liability and cost perspective," he says.



Technology advances that make engineering work easier are also prompting companies to look at the scope and costs of their IT operations. Three years ago, Goodmonson's firm began using 3D laser technology that scans the inside of a room before it is drywalled, so clients have a record of what's behind each wall. Today, it's a requirement on every project. "We think this will speed things up and be a huge benefit in documenting existing conditions," he says. It has also created mountains of data that the firm must process and safely store.

Technology has become a double-edged sword for many firms that are working faster and getting jobs done more quickly—their fees decrease because engineering services are traditionally based on man-hours. "We need to be compensated

for the value that we bring, not necessarily the hours that we generate," says Chairman-Elect **Sergio "Satch"**

**Pecori**, president and CEO at Hanson Professional Services in Springfield, Illinois.



**Sergio Pecori**  
Chairman-Elect

### Growing Assumption of Risk

As part of the industry game change to innovative project delivery, design-build and public-private partnerships, engineering firms are being pressured to assume a greater risk. These new bidding structures raise challenges over how much exposure to take on and how to measure and analyze potential ramifications.

"Many contractors you deal with even in the simplest form of design-build are not willing to remunerate you for your risk to put in a bid," Mosure says. A bid for a \$2 million piece of a \$10 million contract could cost a firm \$200,000 in proposal prep, with no money upfront and no guarantees of getting the job, he adds. "When you get into P3s, if you miss a schedule, you're liable for construction contractors' and developers' delays and damages," he says.

Cammack suggests that a growing litigious society also creates greater risk for firms. "People are operating under such tight margins that they don't have the resources to try to solve problems. So they chose to fight through litigation," he says. "That's led to indemnification and defense clauses that are worse than they have been in the past."

The costs associated with indemnification and duty-to-define requirements have created legislative battles among contract stakeholders in California,



**Mary Erchul**  
Vice Chair

says Vice Chair **Mary Erchul**, project manager at Ghirardelli Associates in Irvine, California. "Somebody has to pay, and we're not really good as an industry in saying 'not us,'" she says. "We're at the end of the food chain as engineers, and all of us are paying for a lot of duty-to-define obligations when we have no negligence or liability."

### Economic, Regulatory Issues

Erchul also sees no end to new and more complex regulatory issues. "Every day we're becoming more and more about paperwork, regulations and what we can't do versus what we can do. It stops projects, innovation and us from moving forward to make sure people have the things they need to live," she says.

Acknowledging the affect the economy has on the industry, Pecori was guardedly optimistic that current U.S. economic trends will continue. "We feel good about the economy,

but we remain cautious about where it's going, and the challenges that lie ahead."

ACEC's goal is to unite the industry by sharing ideas

and best practices on a national level with the goal of helping resolve these challenges, Spagnolo says. "It's amazing how all these competitors can come together and collaborate, and be really productive," he adds."

Reflecting on the industry challenges that lie ahead, ACEC President and CEO **David A. Raymond** says the views of ACEC Executive Committee members are illustrative of the Council views at large, and that serious efforts are underway at both the national and state level.

"While the issues that can stymie growth or success for our industry are challenging, the opportunities that we have are tremendous, and the Council provides a strong advocacy and education tool for making progress," he says. ■



**David A. Raymond**  
President and CEO

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

# ACEC

AMERICAN COUNCIL OF ENGINEERING COMPANIES



**JOHN W. HICKENLOOPER**



*Colorado Governor*

**STUART ROTHENBERG**



*Top Political Analyst  
and Election Forecaster*

**RICH KARLGAARD**



*Forbes Publisher and  
Expert on Business Innovation*

**WHERE OVER 1,000  
A/E INDUSTRY LEADERS  
WILL MEET THIS FALL!**

## THE BROADMOOR

- The BROADMOOR is the longest consecutive winner of the Forbes Five Star and AAA Five Diamond awards for excellence.
- Situated at the gateway to the Rocky Mountains in Colorado Springs, the resort encompasses 3,000 acres, including three championship golf courses, 26 boutiques and 19 restaurants and lounges.

## ACTIVITIES & TOURS

- “Rocky Mountain High” Local Color Night
- Golf Tournament
- Craft Beer Tasting
- Pike’s Peak Cog Railway
- Garden of the Gods/Foothills Jeep Tour
- U.S. Olympic Training Center Tour
- Zipline Adventure
- Seven Bridges Trail Hike

# REGISTER NOW!

➡➡ [www.acec.org](http://www.acec.org)



# 2016 FALL CONFERENCE

OCTOBER 19-22 • THE BROADMOOR • COLORADO SPRINGS

**ERIK WEIHENMAYER**



*Renowned Adventurer  
and Motivational Speaker*



## #ACECFALL2016

## HIGHLIGHTS

### ***The M&A Shakeup***

- **Bob Gomes**  
President & CEO, Stantec
- **John Jastrem**  
CEO, Arcadis North America
- **Nick Masucci**  
Chairman, Louis Berger

### ***Water - The New Gold Rush***

- **Anthony Bouchard**  
President, North America, CDM Smith
- **Virginia Grebbien**  
President, Environment & Infrastructure, Parsons
- **Dr. Mike MacPhee**  
President, Water Division, Arcadis
- **Peter Nicol**  
President, Global Water Business Group, CH2M

### ***Smart Cities and Disruptive Technologies***

- **Gordon Feller**  
Co-founder, Meeting of the Minds

***And more than 30 other Advanced Business Sessions for CEOs, CIOs, CFOs, Emerging Leaders, and other Industry Professionals.***

## Investing in the Human Side of Business Pays Dividends



Shelley Row

**I**t came as a surprise to all of us. The CEO of this midsize engineering technology company instinctively knew his senior leaders were losing time, productivity and money because of ineffective communication and collaboration. It was the amount of loss that was the biggest surprise. After a year of working together, the senior staff reported productivity losses that ranged from 15 percent to 50 percent.

As you read part of their story, consider your own organization. How much productivity and money do you leave on the table because your staff doesn't work well together, annoyances escalate and communication suffers?

### Who

Company X is a midsize technology manufacturing company. With more than 100 people on staff and located in multiple cities, the leadership team must work together effectively to bridge communication gaps among engineering, manufacturing, sales and service.

### The Problem

Company X's leadership team is filled with diverse personalities and communication styles. The struggle to communicate derailed relationships and stifled potential. When the pressure was high, discussions often triggered emotional reactions that soured staff relationships. Meetings were duplicated as a result of ineffective communication. Some people opted out of discussions to avoid anxiety. Consequently, decision-making, productivity and innovation suffered. This is where Company X took a unique approach.

"We had individual personalities, management-style differences and misconceptions about one another," according to a company leader.

Engineering organizations readily invest in process improvements, but they rarely invest in people. In this case, the CEO invested in his staff, and it paid off with one of the company's highest-grossing years.

### Process

Structurally, the company held four in-person workshops with senior team members over a one-year period. Videoconferences and monthly personal coaching sessions were provided as well.

Team members received email reminders every few weeks to emphasize implementation. In total, each person allotted approximately 30 hours to personal improvement during the year. In less than one week per year, collaboration and decision-making improved dramatically.

The process implemented wasn't rocket science, but it was neuroscience. Each module in the process included education about how the brain impacts personal behavior. For example, staff members identified 14 behavioral outcomes that, if enhanced within the company, would lead to higher productivity and increased revenue. Individual self-awareness was enhanced through the Business DNA Behavior self-assessment tool. The results enabled staff to recognize personal tendencies and understand colleagues' style preferences by tying them to the wiring in their brains.

As a case in point, reactivity under pressure was a behavioral struggle for many people. Once triggered by a situation or person, the internal churn reduced productivity because everyone struggled to recover from the aggravation. Using neuroscience, staff members learned their brain's biological process in order to recognize and manage triggering situations.

### Results

In the end, participants reported noticeable changes in themselves and others. They identified five areas of benefit: time-savings, improved communication, enhanced decision-making, teamwork and reduced reactivity.

Some staff reactions include:

"Personal relationships are so much better that we're able to just get complex work done a lot faster..."

"(The first draft of the budget) has come together in a matter of weeks where normally it takes a couple of months..."

"I would say that we have reduced the amount of time that it takes to make good decisions, so I think our agility and flexibility has improved this year."

Company X reaped quantifiable benefits and noticeable productivity gains by addressing the human side of business. It earned back the investment many times over, and the staff developed skills that will pay dividends for years to come.

Indeed, the hardest part was the initial decision to invest in staff development. How much time, productivity and money could you save by investing in your people? ■

---

*Shelley Row is a professional engineer, author, speaker and consultant on leadership decision-making. She is a frequent presenter of business education seminars for ACEC. Go to [www.shelleyrow.com](http://www.shelleyrow.com) for more information.*



HERO IMAGES/GETTY IMAGES

## Four Key Success Factors

Staff members identified these factors that made their work particularly successful:

- 1. Forward-thinking leader.** The CEO recognized that significant efficiency gains were possible when people worked better together and individually. He made the decision to invest in his staff. Plus, he actively participated in every meeting and ensured that others did too.
- 2. Team approach.** By participating together, the team learned more about one another. They now share a common language that enables them to converse more effectively. If someone says, “That’s a trigger for me,” others know how to manage it.
- 3. Neuroscience.** Talk of behaviors can be off-putting for analytical staff. Neuroscience grounded the program in fact. Participants developed a basic understanding of how the brain influences behaviors. That knowledge made behavior change more accessible individually and collectively.
- 4. Duration and reminders.** The brain rarely creates new behaviors with just one exposure to an idea. Simple reminders maintained the focus on constructive behaviors, and the 12-month duration provided time to embed new behaviors through practice.



## Planning to sell your firm? Plan to stick around.

As our industry's baby-boomer owners and principals continue to make their way toward retirement, we expect to see substantial merger and acquisition ("M&A") activity in the engineering industry in the coming years.

A number of factors are creating an environment ripe for industry deal-making, such as firm owners' desire to retire and capture the value of the equity they've built into their firm. Ultimately, internal ownership transition has proven difficult for many firms. In many cases, employees lack the desire

or the capital (often both) to facilitate an internal transition. At the same time, buyer demand remains strong as industry firms seek to expand.

With the possibility of a merger or acquisition on the horizon, firm owners should consider their individual goals and time frames with respect to retirement. The owners and key principals are expected to remain with the acquiring firm in nearly every industry deal. As a professional service industry, the greatest assets of engineering firms are their people—and the knowledge

and relationships they have cultivated. In a merger or acquisition, this is what the buyer is paying for.

To ensure that a deal is a good investment, buyers typically want to find ways to keep both shareholders and employees fully engaged in the new firm and actively driving growth. Oftentimes they will use a combination of "sticks" and "carrots" as part of the transaction purchase agreements and employment agreements for individual employees.

Sellers should expect they will be subject to noncompete and

nonsolicitation clauses, which are designed to prevent sellers from leaving a firm and then competing with the acquirer, inducing employees to leave or soliciting business from former clients.

These are the most common sticks, or deterrents, that sellers will see; and, in some cases, they may have to forfeit some or the entire purchase price if they violate any provisions. Moreover, sellers may be required to work for the acquiring firm (often for three years) to receive the full value of the transaction, and a portion of the purchase price is often

deferred at the time of closing for this reason.

On the other hand, a buyer will dangle carrots to keep employees around. They may include a "stay" bonus for employees who remain with the acquiring firm (often for three years or more). They also may include stock awards, performance incentives, promotions or other methods designed to keep the buyer and seller "rowing in the same direction" after a deal is closed. Depending on the deal negotiated, these may be paid by the buyer, the seller or some combination of the two.

Before any deal can be



reached, an owner seeking to sell a firm must start planning early with an end goal in mind. Here's why:

- Once an owner decides to market a firm, it often takes 12 months or more until a deal is closed. Firms looking to get the full value of a transaction should spend six to 12 months "getting their house in order" ahead of pursuing a sale.

- In addition, an owner is often expected to continue working for three years after a deal. If you're a firm owner and want to be on the golf course by the time you're 65, you should start planning by age 60 or sooner.

## Recent ACEC Deal-Makers MAY 2016

ACEC member **NV5** (Hollywood, Fla.) acquired **Dade Moeller & Associates** (Richland, Wash.), an environmental health and safety firm.

ACEC member **Olsson Associates** (Lincoln, Neb.) acquired **Lutjen** (North Kansas City, Mo.), a firm with a strong presence in private land development projects within the Kansas City metro area.

**FES Group** (Wixom, Mich.) merged with ACEC member **KJWW Engineering Consultants** (Rock Island, Ill.). FES Group is a 25-person consulting firm that provides engineering design for complex building types.

**Minick Engineering** (Tucker, Ga.), a mechanical, electrical and plumbing engineering firm, joined ACEC member **Salas**

**O'Brien** (San Jose, Calif.).

**JENSEN HUGHES** (Baltimore) acquired ACEC member **Stevenson & Associates** (Woburn, Mass.), a provider of seismic and other risk-and-hazard engineering consulting services.

**S.S. Dannaway Associates** (Honolulu), a fire-protection engineering and building-code consulting firm, joined ACEC member **Coffman Engineers** (Seattle).

ACEC member **Taylor Engineering** (Spokane, Wash.) merged with fellow ACEC member **Parametrix** (Seattle), an engineering, planning and environmental services firm. Taylor Engineering specializes in civil engineering design, land surveying, landscape architecture and land planning.

ACEC member **SCJ Alliance** (Lacey, Wash.) acquired **Jeffrey B. Glander** (Olympia, Wash.), a landscape design and architecture firm.

## APRIL 2016

ACEC member **Barton & Loguidice** (Liverpool, N.Y.) acquired **David Clouser & Associates** (New Paltz, N.Y.), a provider of land planning, engineering and land surveying services.

ACEC member **Building & Earth** (Birmingham, Ala.) acquired geotechnical engineering and testing firm **Christian Testing Laboratories** (Montgomery, Ala.).

**ATC Group Services** (Lafayette, La.), an environmental consulting and industrial hygiene firm,

■ To view the most up-to-date and "live" versions of the M&A heat maps and to see the buyers and sellers in each state, go to [www.morrisseygoodale.com](http://www.morrisseygoodale.com).

■ Watch the M&A Takeaway video that accompanies this article, presented by Mick Morrissey, at [www.morrisseygoodale.com/ACECMergers/JulyAugust2016](http://www.morrisseygoodale.com/ACECMergers/JulyAugust2016).



acquired ACEC member **Sage Environmental Consulting** (Austin, Texas).

Sage provides environmental engineering and technical consulting services.

ACEC member **Jacobs Engineering** (Pasadena, Calif.) acquired **The Van Dyke Technology Group** (Columbia, Md.), a 180-person cybersecurity firm specializing in identity and access management, threat mitigation and other cybersecurity solutions for enterprise networks and cloud-based IT environments.

ACEC member **Karins and Associates** (Newark, Del.) acquired **Momenee, Inc.**, (Bryn Mawr, Pa.), a civil engineering and surveying firm specializing in land development and water resources engineering.

**North Rim Exploration** (Saskatoon, Saskatchewan,

Canada) joined ACEC member **RESPEC** (Rapid City, S.D.), an engineering consulting and IT solutions firm specializing in the energy, mining, water, natural resources and information technology markets. North Rim provides geoscience and engineering services to the mineral industry.

ACEC member **Wendel** (Williamsville, N.Y.), a nationally recognized design and construction firm, acquired **Evolve Architecture** (Richmond, Va.). ■

*Neil Churman is principal consultant of Morrissey Goodale LLC—a strategy, M&A and human capital solutions firm serving the A/E/C industry. Churman, who is based in the firm's Houston, Texas office, can be reached at [nchurman@morrisseygoodale.com](mailto:nchurman@morrisseygoodale.com).*

## How Technology Continues to Advance the Practice of Engineering

**T**he slide rule—a hand-held calculator—was invented almost 400 years ago, and it became the symbol of the engineering profession. On the Apollo 11 mission to the moon, astronauts used a sliderule. In 1971, Intel introduced its 4004 processor, which led to the first hand-held electronic calculator. Today, engineers carry around smartphones that have more computing power than a room-sized supercomputer of the 1980s.

Advances in technology have changed the tools used to practice engineering, and they will continue to do so at an ever-increasing pace. Computer-aided design (CAD), for example, brought changes to the way engineering designs were put on paper. In its infancy, CAD simply replaced the drafting table and T-square. It evolved from representing a line between two points to a description of what the line represents, such as a W16x36 steel beam.

### BIM

A major development has been Building Information Modeling (BIM), a 3D representation of a project containing spatial relationships and objects that can be either generic or product specific. BIM has expanded by adding 4D time and 5D costs. Contractors and their subcontractors can take the model and add information specific to their trade. BIM has reduced the duplication of efforts by the project team and preserves a lot of information that, in the past, was lost after the project was handed off by the design team.

Laser scanning is a 3D measurement technology that can collect high-density spatial images, creating a point cloud of more than 100 million points per scan. Stitching scans together creates an image that can be used as documentation of existing conditions for inspecting a project or for designing project modifications. The data often can be collected quicker and safer than other techniques.

### Robots

A common way to inspect sewers is with a CCTV camera tethered to a cable. It can also be done with a robot that is a self-operating crawler. The crawler performs multisensor inspection including sonar, laser and HD CCTV. The sonar records the location of sediment and provides data to determine the quantity of sediment. The laser provides information that is used to assess pipe corrosion.

### Drones

Drones—also called Unmanned Aircraft System (UAS) by the FAA, which covers both the aircraft and its payload—are a rapidly developing technology. In June the FAA, which governs national airspace, issued the long-awaited operational rule for the routine commercial use of small UAS that weigh 55 pounds or less. The new regulations

take effect in late August and open a path for integrating UAS into national airspace.

Some of the provisions of the rule include:

- The aircraft must remain within Visual Line of Sight (VLOS) of the pilot or a visual observer in communication with the pilot.
- Daylight-only operation.
- Flight altitude limited to 400 feet above ground level.
- Flight operations may not be conducted over nonparticipating people.
- The operator must be at least 16 years old and hold a remote pilot airmen certificate with a small UAS rating.
- A procedure for requesting an exemption that could include night operations and flights beyond VLOS.

“Although there is a lot of excitement about the use of drones, people need to understand what it takes to implement their use,” says Christian Stallings, research development manager and a certified photogrammetrist with McKim & Creed. It can take up to six months to become fully compliant and cost more than \$40,000 over the first year to use technology that is still evolving. Because of this, subcontracting of drone services might be more cost-effective.

### The Future

The FAA may create a new class of drones called Micro UAS that weigh 4.4 pounds or less. It is hoped they will not have any restrictions when operating over nonparticipating individuals, which will open many additional uses for drones.

Other advances in technology are going to be driven more by software than by hardware. For example, software is being developed to allow the drones to fly autonomously and sense and avoid obstacles, preventing crashes. Virtual reality will see greater use during design and construction, allowing clients and the building team to view a detailed image of the project.

Additional algorithms will be incorporated in software to verify input and results. This self-checking will help manage the risks associated with the software's use; however, it will be a long time before technology replaces an experienced set of eyes examining the results. But if you like technology, it is a great time to be an engineer. ■



Glen R. Mangold



Charles W. Kopplin

*Glen R. Mangold, CPCU, is managing director of the Architects/Engineers program for Markel Corporation, a provider of professional liability insurance. He has more than 25 years' of experience in the insurance industry. He can be reached at gmangold@MarkelCorp.com. Charles W. Kopplin, P.E., FACEC, has more than 40 years' of experience as a consulting engineer, including 14 years as the risk manager for an ENR Top 500 Design Firm. He can be reached at cw.kopplin@gmail.com.*



## On The Move

**WSP Global, Inc.** announced that CFO **Alexandre L'Heureux** will succeed **Pierre Shoiry** as president and CEO, upon the appointment of a new CFO. Shoiry transitions to vice chairman to oversee acquisition activities and strategic opportunities. **Paul Dollin** continues as COO.

**Kenneth R. Fulmer** succeeded **Edward M. D'Alba** as president and CEO of Philadelphia-based **Urban Engineers**. D'Alba served as CEO for 26 years and will remain on the firm's board. Fulmer is based in the firm's headquarters.

**Erin M. Inman** is the new president and CEO of Chicago-based **Primera Engineers**, after purchasing the company from co-founders **Michael F. DeSantiago** and **Pedro Cevallos-Candau**. Inman joined the firm in 2003 and most recently served as senior vice president and utilities division manager.

**Ernest Portfors** has been named chairman of Morristown, N.J.-based **Louis Berger**, following the retirement announcement of outgoing chairman **Nicholas Masucci**. Portfors is based in

Vancouver, British Columbia, Canada.

Canadian-based **Stantec** named **Alan Krause** executive vice president after the firm acquired Broomfield, Colo.-based **MWH Global, Inc.**, where Krause served as MWH chairman and CEO. Krause continues as president of MWH's global operations and is based in Broomfield, Colo.

**Al Hannum** has been appointed CEO of the environmental consulting business at Los Angeles-based **AECOM**. Hannum joined the firm in 2014 as environment consulting business line senior vice president and deputy chief executive. He is based in Philadelphia. **Bill Smith** joined **AECOM Capital**, the investment and development arm of AECOM, as executive vice president of design and construction. Smith formerly served as president of the MGM MIRAGE Design Group in Las Vegas and is based in the firm's Century City office in Los Angeles.

**Russell Zapalac** has joined Richardson, Texas-based **Halff Associates, Inc.**, as executive vice president and chief strategy officer. He formerly served as chief planning

and project officer for the Texas DOT. He is based in the firm's headquarters.

Oakbrook Terrace, Ill.-based **Professional Service Industries, Inc.**, (PSI) promoted **David Sabol** to executive vice president. Sabol will oversee firm operations in eight states and is based in PSI's North Tonawanda, N.Y., office.

**Thomas G. McNeice** has been promoted to president of Boston-based **CDM Smith's** construction unit, which operates as **CDM Constructors, Inc.** He is based in the firm's headquarters.

As part of a long-planned transition, Chicago-based **Collins Engineers, Inc.**, founder **Thomas J. Collins** will assume the new role of executive chairman. **Daniel G. Cecchi**, who has been with Collins since 1982, will be promoted from executive vice president to president. Additional appointments include: **Elizabeth C. Burkhart**, executive vice president; **Thomas M. Collins**, executive vice president; **Charles Conrad**, senior vice president—division manager southeast; **Glenn Gerschke**, senior vice



Alexandre L'Heureux



Kenneth R. Fulmer



Erin M. Inman



Ernest Portfors



Alan Krause



Al Hannum



Bill Smith



Russell Zapalac



David Sabol



Thomas G. McNeice



Thomas J. Collins



Daniel G. Cecchi

# Members in the News

president—division manager west; **Terence Browne**, vice president—safety; **Manus Cowley**, vice president—IT; **James Hamelka**, vice president—regional manager; **Katherine C. Heringhaus**, vice president—marketing communications; **Jeremy Koonce**, vice president—asset management; **Kathleen Louder**, vice president—pursuit management; and **Mark Mutziger**, vice president—regional manager.

Pasadena, Calif.-based **Parsons** announced the following appointments: **William Crosbie** rejoined the firm as senior vice president and business development director for its transport division, which provides services in rail transit, ports and harbors, and aviation. He is based in Vienna, Va. **Jon C. Moretta** joined the firm as senior vice president of business development for the North America West Division of its industrial business unit. He is based in Houston. **Harjinder S. Dhaliwal** was named senior vice president, international rail transit and systems, and is based in Parsons' Abu Dhabi office. **Charles Manning** joined the firm as senior vice president and infra-

structure leader for New York and New Jersey and is based in New York City. **Marianne Meins**, vice president, was appointed manager of the federal cyber intelligence and operations sector and is based in Parsons' Centreville, Va., office.

**Maj. Gen. John Peabody** has been appointed senior vice president and director of federal programs of Iselin, N.J.-based **Mott MacDonald**. Peabody retired from the U.S. Army Corps of Engineers in 2015 after 10 years. He is based in the Arlington, Va. office.

Dearborn, Mich.-based **Ghafari Associates** announced the following appointments: **Sanford Ring** joined the firm as executive vice president and general counsel. He recently served as senior vice president and general counsel at Hino Motors Manufacturing U.S.A., Inc. **Catherine Noyes** joined the firm as chief marketing officer. She formerly served as vice president and director of corporate marketing at the SSOE Group. Both are based in the firm's headquarters.

**Sandra K. Basehore** and **Gerald W.**

**Longenecker** have been promoted to executive vice president—environmental services and executive vice president—engineering services, respectively, at Harrisburg, Pa.-based **Skelly and Loy, Inc.** Each will oversee personnel and project management, client satisfaction and business development for their designated service areas companywide. Both are based at the firm's headquarters.

**Michael J. Walsh** was promoted to senior vice president of Fairfax, Va.-based **Dewberry**. Walsh manages the resilience solutions group and has extensive knowledge of project and program management in water resources. He is based at the firm's headquarters.

**Mary Clayton** has joined Nashville, Tenn.-based **Gresham, Smith and Partners** as a senior vice president in the firm's recently established Charlotte, N.C., office, where she will expand the firm's transportation market. Clayton previously served as a vice president and area manager for Parsons Brinckerhoff's Charlotte and South Carolina offices.



William Crosbie



Jon C. Moretta



Harjinder S. Dhaliwal



Charles Manning



Marianne Meins



John Peabody



Sanford Ring



Catherine Noyes



Sandra K. Basehore



Gerald W. Longenecker



Michael J. Walsh



Mary Clayton

## Welcome New Member Firms

### ACEC/California

**Acosta Engineering Solutions, P.C.**, San Francisco  
**APSI Construction Management**, Irvine

### ACEC/Colorado

**Davis Engineering Service, Inc.**, Alamosa  
**Entech Engineers, Inc.**, Colorado Springs  
**HG Consult, Inc.**, Highlands Ranch  
**Iconergy**, Denver  
**LS Gallegos & Associates, Inc.**, Centennial  
**NewFields**, Lone Tree  
**Studio 8.18 Engineering**, Denver

### ACEC/Delaware

**Telgian Engineering & Consulting**, division of Telgian Corp., Wilmington

### ACEC/Florida

**A2 Group, Inc.**, Miami  
**AIM Engineering & Surveying, Inc.**, Lehigh Acres  
**Bailey Engineering Consultants**, Cooper City  
**Barkley Consulting Engineers**, Tallahassee  
**Bodo & Associates**, Gainesville  
**Bolton, Perez & Associates**, Miami  
**C. Calvert Montgomery & Associates, Inc.**, Stuart  
**CAPTEC Engineering, Inc.**, Stuart  
**Civil Works, Inc.**, Doral  
**Corven Engineering Inc.**, Tallahassee  
**CPH Engineers, Inc.**, Sanford  
**Culpepper & Terpening, Inc.**, Fort Pierce  
**Dave Schmitt Engineering, Inc.**, Orlando  
**E Sciences, Inc.**, Orlando  
**Geotechnical & Environmental Consultants, Inc.**, Orlando

**Gerald M. Ward**, Riviera Beach

**GFA International, Inc.**, Delray Beach  
**Globaltech, Inc.**, Boca Raton  
**Hammond & Associates, Inc.**, Plantation

**Higgins Engineering, Inc.**, West Palm Beach  
**ICON Consultant Group**, Tampa

**JBS Engineering Technical Services, Inc.**, Oviedo  
**Keith and Schnars, P.A.**, Fort Lauderdale

**Kisinger Campo & Associates Corp.**, Tampa  
**Lea+Elliot, Inc.**, Miami  
**Lombardo, Foley, and Kolarik, Inc.**, Palmetto

**MC Squared, Inc.**, Tampa  
**Metric Engineering, Inc.**, Miami

**Michael W. Springstead Engineering, LLC**, Weirsdale  
**New Millennium Engineering, Inc.**, Miami

**Norman F. Bray, Inc.**, Hollywood  
**Nutting Engineers of Florida, Inc.**, Boynton Beach

**RADISE International**, Riviera Beach  
**Test Lab, Inc.**, Tampa  
**WBQ Design & Engineering, Inc.**, Orlando

### ACEC/Georgia

**Materials Managers & Engineers, Inc.**, Atlanta

### ACEC/Illinois

**Henneman Engineering, Inc.**, Champaign  
**Osborne Engineering, Inc.**, Wilmette

### ACEC/Indiana

**Metric Environmental, LLC**, Indianapolis

### ACEC/Louisiana

**Coastal Engineering Solutions, LLC**, Baton Rouge

### ACEC/Maine

**Doucet Survey, Inc.**, Kennebunk

### ACEC/Michigan

**GFA Inc.**, Traverse City  
**Great Lakes Geomatics, LLC**, Warren

### ACEC/Minnesota

**Loucks Associates**, Maple Grove

### ACEC/Mississippi

**ACE Consulting and Design, LLC**, Ridgeland

### ACEC/Missouri

**Lee Engineering and Associates, LLC**, Springfield

### ACEC/New Mexico

**CEI, Inc.**, Albuquerque

### ACEC/New York

**CB&I**, New York

### ACEC/North Carolina

**Genesis Engineering and Environmental Consultants, PLLC**, Wake Forest  
**Shielb PLLC**, Charlotte  
**Urban Design Partners**, Charlotte

### ACEC/Oregon

**Emerio Design, LLC**, Beaverton  
**Valar Consulting Engineering**, Clackamas

### ACEC/Texas

**G Sylva, LLC**, Austin  
**LRE Water, LLC**, Round Rock  
**Petroleum Exploration Co., Ltd.**, Breckenridge

### ACEC/Wisconsin

**Civil Engineering Professionals, LLC**, Madison

## Calendar of Events

### JULY

- 26** Grid Stability, Reliability and Resiliency: Technical, Economic and Political Reality (online class)
- 27** Hit the Mark—Implementing a Strategic Business Development Program in Your Firm (online class)
- 28** The Intentional Entrepreneur: Maximize Your Leadership Impact (online class)

### AUGUST

- 2** Take Control of Your Time: Strategies and Solutions to Boost Productivity (online class)
- 4** Latest Trends in Ownership Transition Planning, Valuations and M&A Transactions (online class)
- 4-5** 2016 CASE Risk Management Seminar: Managing Risk for High Stakes Success (Chicago)
- 11** Earn a Seat at the Table: A Guide for Emerging Leaders (online class)
- 16** Sustainability: The Advantage of Envision Verification (online class)
- 23** More Than a Suntan and a Souvenir: 8 Ways to Make Conferences a Revenue Builder (online class)
- 31** Project Partnering: Principles, Techniques and Benefits (online class)

### SEPTEMBER

- 1** Project Partnering: Principles, Techniques and Benefits (online class)
- 12-13** Finance Forum 2016 (Nashville, Tenn.)
- 12-13** Information Technology Forum 2016 (Nashville, Tenn.)
- 12-13** Human Resources Forum 2016 (Nashville, Tenn.)

To sign up for ACEC online seminars, go to [www.acec.org/education](http://www.acec.org/education).

Additional information on all ACEC activities is available at [www.acec.org](http://www.acec.org).



# Business Insights: Solutions for the A/E Industry

## EJCDC Releases New State-of-the-Art Design-Build Contracts

Design-build is becoming increasingly common in public work. Approximately 40 percent of all nonresidential construction in the United States and 53 percent of all nonresidential projects over \$10 million use design-build delivery, according to a Reed Construction Data/RSMeans report.

To meet this growing market, the Engineers Joint Contract Documents Committee (EJCDC)—which ACEC co-sponsors with NSPE and ASCE—has released its 2016 Design-Build (“D-Series”) Documents. The new series is a

**53%**  
of non-res  
projects over  
\$10 million  
use  
design-build

significant modernization, revision and expansion of EJCDC’s 2009 D-Series and is now the state of the art in design-build contract documents.

The new D-Series features the first standard-form documents for procuring design-build services, including new template-style guides to prepare requests for qualifications, requests for proposals and price proposal forms.

It also includes the industry’s first standard-form owner/design-builder agreement for “progressive” design-build, or when the project’s scope has very little definition and the owner and design-builder collaborate on defining the project scope—after which the parties agree on a price for final design and construction.

Also in EJCDC’s D-Series is a guide to the preparation of design-build supplementary conditions, application for payment form, change-order form and work-change directive form specific to design-build. EJCDC D-700—standard general conditions of the contract between owner and design-builder—has been extensively updated, revised and modernized as well.

The EJCDC 2016 Design-Build Documents can be purchased for immediate download in Microsoft Word at [www.acec.org/publications/books-and-contracts](http://www.acec.org/publications/books-and-contracts).

## Learning the Business of Structural Engineering, August 4–5, 2016, Chicago

The Council of American Structural Engineers (CASE) will host the industry’s only convocation dedicated solely to improving structural engineering firm business practices and risk management strategies.

*Managing Risk for High Stakes Success*, to be held August 4–5, 2016, in Chicago, features a day and a half of intensive training and collaboration with industry leaders and project managers from firms of all sizes on risk management and loss prevention on structural engineering projects.

Topics to be discussed include how to structure contracts, reducing liability so as not to trigger professional negligence, internal tools essential to a successful risk management

program and methods for properly communicating project phases to non-technical people. The seminar will kick off with a dinner speaker focusing on a “then and now” featuring the World Trade Center.



CASE represents more than 165 structural engineering firms dedicated to helping structural engineers understand and improve their business practices through enhanced management practices, shared best practices, reduced professional liability exposure, improved quality and increased profitability.

Registration for the 2016 CASE *Risk Management Seminar: Managing Risk for High Stakes Success* is now open at [bit.do/CASE-ManagingRisk](http://bit.do/CASE-ManagingRisk).

## ACEC HR, IT and Finance Forums Sept. 12–13, 2016, Nashville

Offering two days of peer-to-peer information sharing, problem solving and networking, ACEC forum workshops help members make sense of current concerns and emerging trends impacting today’s A/E workplace. Forums for HR, IT and Finance include firm leaders who will discuss common problems, benchmark processes, share experiences and network with their peers in an informal roundtable format, all of which continues post-forum via active online communities.

The next in-person forum meetings will be held Sept. 12–13, 2016, at the Hilton Nashville Downtown. Visit the following links for more information and to register:

- HR Forum: [bit.do/ACEC-HRForum-2016](http://bit.do/ACEC-HRForum-2016)
- IT Forum: [bit.do/ACEC-ITForum-2016](http://bit.do/ACEC-ITForum-2016)
- Finance Forum: [bit.do/ACEC-FinanForum-2016](http://bit.do/ACEC-FinanForum-2016) ■

### FOR MORE BUSINESS INSIGHTS

- Better Business Planning
- Factoring Executive Compensation
- Cyberattacks and Data Security
- High-Impact Proposal Writing

Go to: [www.acec.org/education/webinars/](http://www.acec.org/education/webinars/)

ACEC’s Business Resources and Education Department provides comprehensive and online-accessible business management education. Visit ACEC’s online educational events calendar at [www.acec.org/calendar/index.cfm](http://www.acec.org/calendar/index.cfm) or bookstore at [www.acec.org/bookstore](http://www.acec.org/bookstore), or call 202-347-7474, ext. 324, for further information.

# ACEC

## Business Insurance Trust

*Engineered for Peace of Mind ...*

## IS YOUR INSURANCE DESIGNED FOR YOUR ENGINEERING OR SURVEYING FIRM?

### BUSINESS INSURANCE CREATED FOR ACEC MEMBERS

When it comes to insurance, one type doesn't fit all. That's why The ACEC Business Insurance Trust teamed with the insurance professionals at Marsh Sponsored Programs, a division of Marsh USA Inc., to create plans tailored specifically for the needs of our members.

#### 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 COVERAGE

## 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](http://acecbit.com)**.

Marsh Sponsored Programs, a division of  
Marsh USA Inc. In CA,  
dba Marsh Risk & Insurance Services  
CA Ins. Lic. #0437153  
77308 Copyright 2016 Marsh LLC. All rights reserved.

## 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 distributed in 49 states and in D.C. William Penn 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](http://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.

Insurance coverage provided by or through UnitedHealthcare Insurance Company, UnitedHealthcare Insurance Company of Illinois or their affiliates.

MT1013057 03/16 ©2016 United HealthCare Services, Inc. 15-0989