JANUARY/FEBRUARY 2017

ENGINEERING INC.

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2017 Legislative Outlook
New Administration

RIPPLE EFFECT

ENHANCING EARTHQUAKE RESILIENCY ALONG THE CASCADIA SUBDUCTION ZONE

PLUS

Member Firm Drone Use Taking Flight

VHB Helping Those in Need

Stability & Risk: 2016 PLI Survey of Carriers

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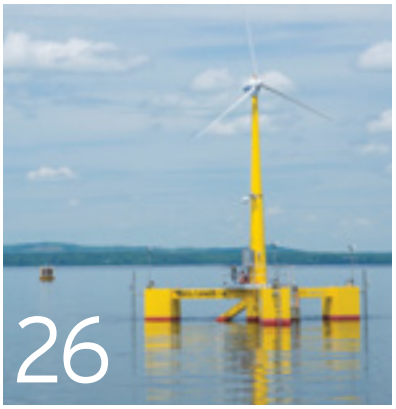
January/February 2017

"The issue isn't only public safety and people losing their lives or being injured; it's also about the long-term economy of the region. The reality is that widespread damage could impact the region for months or years."

Stacy Bartoletti | Degenkolb Engineers

TOM PAIVA PHOTOGRAPHY



FEATURES

DEPARTMENTS

COVER: C.J. BURTON

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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.

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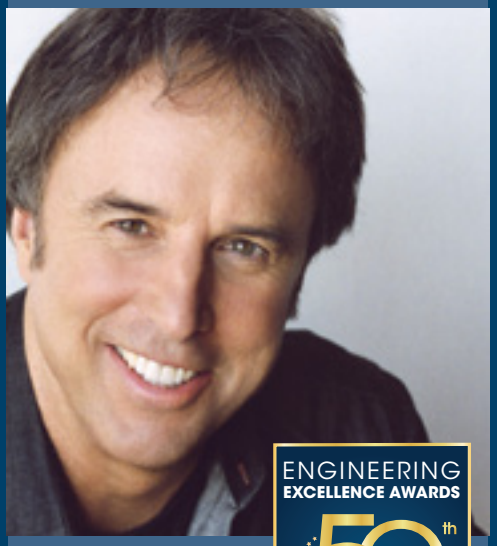


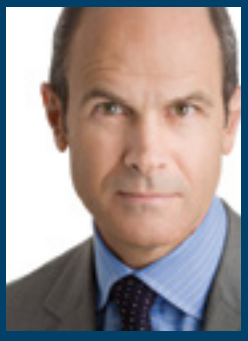
with Special Celebrity MC, **Kevin Nealon**

ENGINEERING EXCELLENCE AWARDS 50th ANNIVERSARY 1967 · 2017

Featured Speaker: "The New Political Landscape"

Nicolle Wallace, Political Analyst and Former White House Director of Communications

Featured Speaker: "U.S. Business/ Economic Forecast under the New Administration"



Geoff Colvin, Senior Editor, *FORTUNE*

Panel Presentation: "Industry Perspectives on the New Administration"

CEO Panel moderated by **Geoff Colvin**

Panel Presentation: "The New Administration and Congress – Opportunities for the Engineering Industry"

A panel of U.S. lawmakers moderated by **Amy Walter,** *Cook Political Report* and former Political Director for ABC News

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Trump Cabinet Nominees Show Promise for A/E Industry

Two of President-elect Donald Trump's nominees for Cabinet could be particularly beneficial for the Council's advocacy program.

Transportation Secretary designate Elaine Chao is a longtime friend of ACEC. She worked closely with us as Secretary of Labor under President George W. Bush to win critical reforms to the Fair Labor Standards Act that made it easier for firms to properly classify employees for overtime purposes and avoid costly lawsuits.

Chao addressed the 2005 ACEC Annual Convention in Washington, D.C. to personally thank the Council for its support in the FLSA reform campaign.

When Wall Street financier Steven Mnuchin was nominated for Treasury Secretary, he said he wanted tax reform to help generate increased infrastructure investment—a key Council priority.

The Council's recommendations for legislative and regulatory advancement were delivered to President-elect Trump and his transition team in December. These recommendations are highlighted in this issue of *Engineering Inc.* as part of the 2017 legislative outlook. *(See page 6)*

Taking our cue from a recent *60 Minutes* report, our cover story focuses on how engineers are leading efforts to improve disaster resiliency in the Pacific Northwest—as that region lies in the crosshairs of an earthquake zone more powerful than San Andreas. *(See page 14)*

Looking ahead to our Spring Convention in April, we are lining up top industry and political speakers and will celebrate the 50th anniversary of our Engineering Excellence Awards with guest host Kevin Nealon. Mark your calendars now for April 23-26! *(See page 3)*

Have a great New Year!

Peter M. Strub
ACEC Chairman

David A. Raymond
ACEC President & CEO

ENGINEERING INC.

THE OFFICIAL PUBLICATION OF THE AMERICAN COUNCIL OF ENGINEERING COMPANIES

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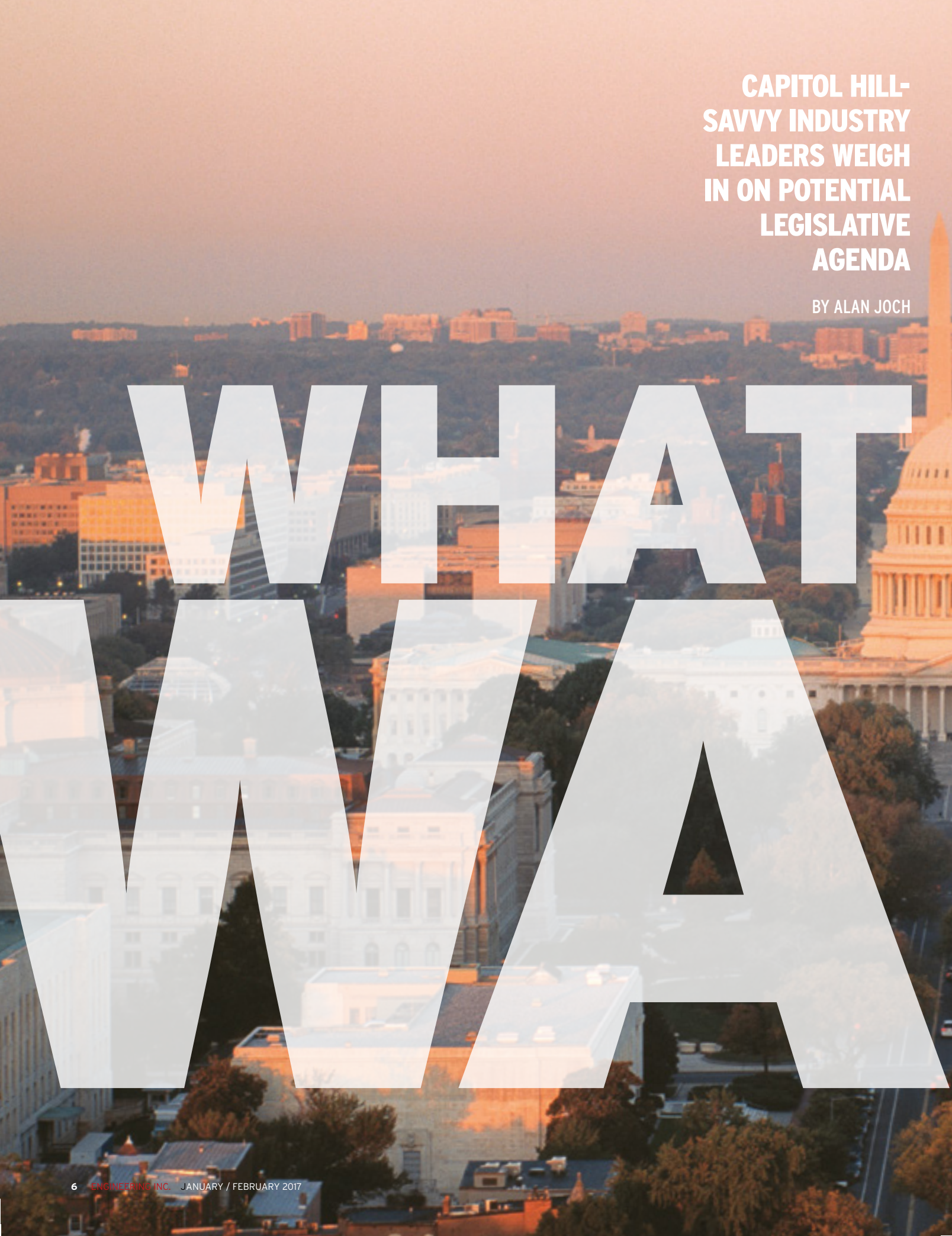


WHAT WA

CAPITOL HILL-SAVVY INDUSTRY LEADERS WEIGH IN ON POTENTIAL LEGISLATIVE AGENDA

BY ALAN JOCH

NEW PRESIDENT, NEW CONGRESS, WE NEED

CAMERON DAVIDSON/GETTY IMAGES

ndustry leaders were encouraged when President-elect Donald Trump—who proposed $1 trillion for infrastructure during his campaign—reaffirmed in his victory speech his aim to make America's infrastructure "second to none" while putting millions of people to work and doubling the pace of economic growth.

ACEC President and CEO Dave Raymond sent a letter to Trump (*see right*) outlining critical infrastructure and regulatory issues. And *Engineering Inc.* polled executives engaged with ACEC's advocacy program to get their take on legislative issues and prospects for progress in the 115th Congress.

PROGRESS OR MORE POLARIZATION?

"We're hopeful of seeing progress on transportation and infrastructure, energy and national security—those are areas where Congress and the new administration should be able to work together to produce results," says Brian Tynan, director of government relations, AECOM. "These have been fairly bipartisan issues and ones not necessarily subject to the makeup of Congress and the administration. These are clearly all places that the incoming Trump Administration will look to advance its priorities with the Republican majority in Congress."

Similarly, Jack Hand, chairman of POWER Engineers, hopes a new administration can create a more collaborative atmosphere in Washington. "The new president will make a greater effort to work with Congress," he says. "President Obama over the last eight years really didn't engage enough with Congress, and that hurt."

But engineering executives are also realists. "While everyone agrees that infrastructure is of great importance to the economy as a whole, lawmakers must agree on how we can pay for the infrastructure investment that we really, really need," says Elizabeth Burkhart, executive vice president, Collins Engineers, Inc.

Political fights will likely begin immediately, as politicians start campaigning for the next election on Inauguration Day.

TRANSPORTATION FUNDING

Despite optimism about Trump's commitment to use increased infrastructure spending as a path to more U.S. jobs and private sector growth, engineering leaders still say long-term and sustainable transportation funding remains a top industry challenge.

"To avert a national water crisis, we need to increase federal funding and financing programs to local communities."

LISA GLATCH | CH2M

LETTER TO PRE

November 16, 2016

Dear President-Elect Trump:

On behalf of the oldest and largest business association of the nation's engineering industry, with more than 5,000 firms and 600,000 employees—I want to heartily congratulate you on your election as the nation's 45th president!

We are eager to support your agenda to invest in the nation's critical infrastructure, reform our tax code and reduce unnecessary regulatory burdens. Our members are knowledgeable in these areas, as they are directly engaged in construction projects that propel America's economy and enhance its quality of life.

We are pleased to provide your Transition Team with a summary of our recommendations, as outlined below.

• **Rebuilding America's Infrastructure:** As you have said many times, among America's most critical needs is the repair and modernization of its infrastructure. Because infrastructure investment has consistently generated broad, bipartisan support in Congress, this challenge represents a promising opportunity for the new administration in 2017.

Both private and public investment will be required. Our members have played important roles in the development and management of public-private partnerships (P3s) to leverage private finance for major infrastructure projects. We have supported government programs such as the Transportation Infrastructure Finance and Innovation Act (TIFIA), which could be expanded to generate more P3 projects nationwide. We also support tax-exempt tools such as Private Activity Bonds (PABs) for both transportation and water projects to unlock private investment for infrastructure projects.

While private financing is an important component of a successful infrastructure effort, the need for additional public funding for core programs is also vital. In particular,

SIDENT-ELECT DONALD J. TRUMP

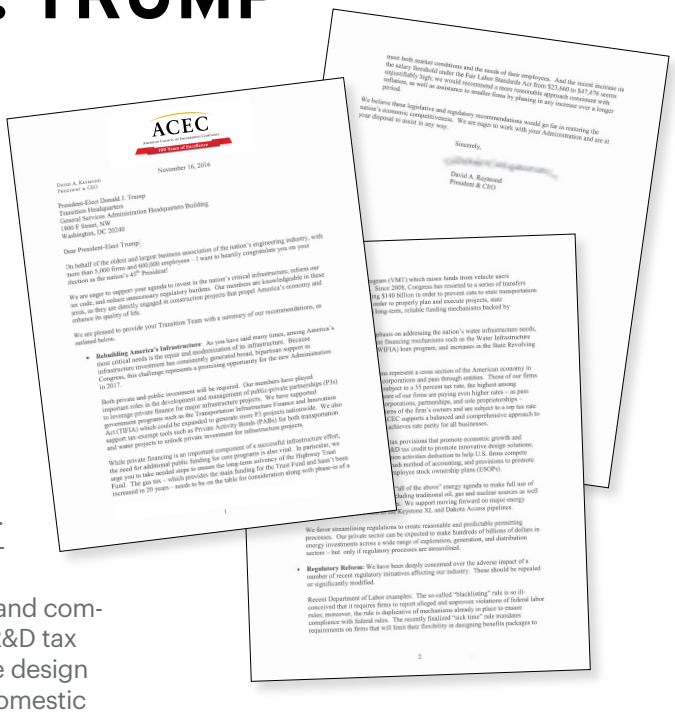
"We believe these legislative and regulatory recommendations would go far in restoring the nation's economic competitiveness."

DAVE RAYMOND | ACEC

we urge you to take needed steps to ensure the long-term solvency of the Highway Trust Fund. The gas tax—which provides the main funding for the Trust Fund and hasn't been increased in 20 years—needs to be on the table for consideration along with phase-in of a Vehicle-Miles-Travelled program (VMT), which raises funds from vehicle users regardless of energy source. Since 2008, Congress has resorted to a series of transfers from the General Fund totaling $140 billion in order to prevent cuts to state transportation programs. As you know, in order to properly plan and execute projects, state transportation agencies need long-term, reliable funding mechanisms backed by dedicated revenues.

We also support a similar emphasis on addressing the nation's water infrastructure needs, both through innovative private financing mechanisms such as the Water Infrastructure Finance and Innovation Act (WIFIA) loan program and increases in the State Revolving Fund (SRF) programs.

• **Tax Reform:** Our Member Firms represent a cross section of the American economy in terms of their tax structures as corporations and pass-through entities. Those of our firms that are corporations are today subject to a 35 percent tax rate, the highest among industrialized nations. Many more of our firms are paying even higher rates—as pass-through entities—including S corporations, partnerships and sole proprietorships—which pay their taxes on the returns of the firm's owners and are subject to a top tax rate that can exceed 39.6 percent. ACEC supports a balanced and comprehensive approach to tax reform that lowers rates and achieves rate parity for all businesses.


ACEC

November 16, 2016

President-Elect Donald J. Trump
Transition Headquarters
General Services Administration Headquarters Building
1800 F Street, NW
Washington, DC 20240

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must both market conditions and the needs of their employees. And the recent increase in the salary threshold under the Fair Labor Standards Act from $23,660 to $47,476 seems unjustifiably high; we would recommend a more reasonable approach consistent with inflation, as well as assistance to smaller firms by phasing in any increase over a longer period.

We believe these legislative and regulatory recommendations would go far in restoring the nation's economic competitiveness. We are eager to work with your Administration and are at your disposal to assist in any way.

Sincerely,

David A. Raymond
President & CEO

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ax provisions that promote economic growth and D tax credit to promote innovative design solutions; tion activities deduction to help U.S. firms compete sh method of accounting; and provisions to promote ployee stock ownership plans (ESOPs).

"all of the above" energy agenda to make full use of our abundant energy resources, including traditional oil, gas and nuclear sources as well as wind, solar and other renewables. We support moving forward on major energy infrastructure projects, such as the Keystone XL and Dakota Access pipelines.

We favor streamlining regulations to create reasonable and predictable permitting processes. Our private sector can be expected to make hundreds of billions of dollars in energy investments across a wide range of exploration, generation and distribution sectors—but only if regulatory processes are streamlined.

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- **Regulatory Reform:** We have been deeply concerned over the adverse impact of a number of recent regulatory initiatives affecting our industry. These should be repealed or significantly modified.

Recent Department of Labor examples: The so-called "blacklisting" rule is so ill-conceived that it requires firms to report alleged and unproven violations of federal labor rules; moreover, the rule is duplicative of mechanisms already in place to ensure compliance with federal rules. The recently finalized "sick time" rule mandates requirements on firms that will limit their flexibility in designing benefits packages to meet both market conditions and the needs of their employees.

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Sincerely,
David A. Raymond
President & CEO

TIME TO THINK DIFFERENTLY ABOUT TRANSPORTATION

As Congress addresses transportation funding in 2017, engineering executives want lawmakers to look beyond traditional ideas. For example, self-driving cars and other innovations have profound implications for the future design of highways.

"The impulse with highways is often to add more pavement to increase vehicle capacity," says Elizabeth Burkhart, executive vice president, Collins Engineers, Inc.

"But as transportation evolves with automated cars, adaptive cruise control and other intelligent transportation developments, our infrastructure investments must consider where transportation technology will be in five, 10 or 15 years," she adds. "Rather than simply investing new money in traditional approaches to transportation, we need to design projects intelligently to ensure we have a transportation system for the next generation."

Trump has proposed spending $1 trillion on roads, bridges, airports, pipelines and the electrical grid, compared to the $305 billion, five-year FAST Act approved by Congress in late 2015. His plan calls for using $137 billion in tax credit incentives to help subsidize equity costs, which would in turn leverage additional funds and spur public-private partnerships totaling as much as $1 trillion over 10 years for transportation funding.

In his letter to Trump, Raymond urged the new administration to pursue a balanced approach in its infrastructure agenda, coupling initiatives to promote private investment and public-private partnerships (P3s) with new funding for core federal programs, including the Highway Trust Fund.

"The FAST Act provided short-term funding certainty for improving our transportation infrastructure, but we're approaching another funding cliff for the Highway Trust Fund in 2020," says Lisa Glatch, executive vice president, CH2M. "It would serve us well to establish a sustained investment program to address that gap sooner rather than later."

Industry representatives would like to see more reliable funding mechanisms for large-scale projects, so their clients can accurately plan multiyear initiatives. Funding options that are top of mind for many engineers are P3s. "The FAST Act has provisions to encourage P3s, which would apply for state and local infrastructure," Burkhart says. "The federal government also owns transportation infrastructure, such as locks and dams on the inland marine transportation system, that still need to be addressed."

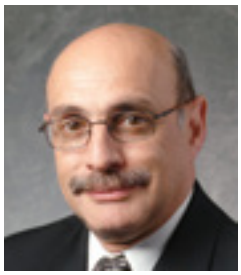
Tynan calls the need for a long-term transportation funding fix "pretty dire." While the recently enacted FAST Act was fully funded over its five years, the Highway Trust Fund revenues will again run drastically short at the end of the act and a solution needs to be found soon. "But each of the potential funding mechanisms has political challenges associated with it," Tynan says.

This sets the stage for the engineering industry to become politically active in the months ahead. "We need to keep pressing for a solution that's long term and sustainable, so we don't have to keep coming back and fighting the same fight over and over," Tynan says.

WATER AND TAXES

Engineers also agree that funding for water projects should be a major focal point. "To avert a national water crisis, we need to increase federal funding and financing programs to support local communities" adds Glatch.

Others say comprehensive tax reform may have a ripple effect on several industry issues. "One of the pieces of legislation that is necessary for the country is comprehensive tax reform," says Paul Yarossi, executive vice president, HNTB Corp. "Good things have happened for our industry in the years when there has been comprehensive tax reform. The last two significant increases in



"One of the pieces of legislation that is necessary for the country is comprehensive tax reform."

PAUL YAROSSI | HNTB CORP.

transportation funding, for example, came during the tax reform process."

ENERGY REFORM

A comprehensive energy bill also is vital. Creating a bridge from coal to gas is critical for energy security, says Hand. "Everybody wants a CO2-free environment, and we've been doing a nice job moving in that direction by replacing old coal plants with combined-cycle natural gas facilities that produce significantly fewer emissions," Hand says. "We have to continue the transition from coal to natural gas, and during that process we'll need to make energy storage more viable. All of this should absolutely be a part of a comprehensive energy bill we would like to see—unfortunately, it's not included in the bill of the recent Congress."

The need continues to exist for Congress to speed up the federal permitting process for large projects. "We have seen electric delivery lines, gas pipelines, natural-gas combined-cycle plants all being delayed by lack of momentum in environmental permitting. For example, our firm is working on a project to build a transmission line. We're about eight years into the process of just getting the environmental permits," Hand says. "In California, delays like that have been the norm for decades, but until recently that hasn't been the case in the rest of the U.S. That's holding up billions of dollars ready to be invested in infrastructure." ■

CAMERON DAVIDSON/GETTY IMAGES

CYBERSECURITY

The flood of headlines describing the latest hacking incidents hitting different industries is bringing cybersecurity to the forefront. Many engineering firm leaders would like to see a set of national cybersecurity standards to achieve safe transfer of electronic information among firms and their clients.

Currently, a number of federal agencies, including the National Institute of Standards and Technology, have issued multiple security guidelines, and this diversity means that each client may ask a firm to comply with different policies. Forging national agreement on a uniform set of standards would make compliance less onerous, says Jack Hand, chairman of POWER Engineers. "We all need to agree on which cyber protocols and standards to use," he adds. "Otherwise, having too many protocols becomes too cumbersome."

Toward this end, ACEC is engaged in the development of a power sector cybersecurity standard governing the procurement of engineering services. Under development by the North American Electric Reliability Corporation (NERC) at the direction of the Federal Energy Regulatory Commission, ACEC seeks to assure that the electric power sector procurement standard does not improperly allocate liability to engineering firms for cybersecurity incidents beyond their control. The standard developed by NERC is expected to broadly influence infrastructure procurements involving industrial control systems.

__Alan Joch__ is a business and technology writer based in Francestown, New Hampshire.

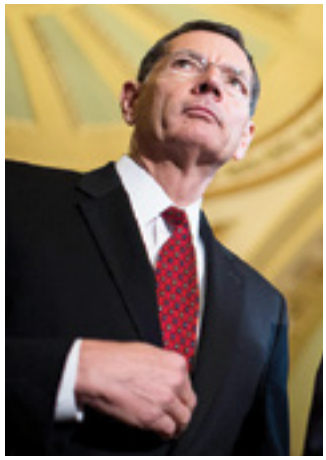
2017 Infrastructure Agenda Takes Shape

The infrastructure agenda for the incoming Congress in 2017 will feature a number of ACEC priorities, including reauthorization of Federal Aviation Administration (FAA) programs and airport funding, and working with the Trump Administration on an infrastructure investment package.

On the aviation front, the current extension of FAA programs expires Sept. 30. The relevant congressional committees are expected to pick up where they left off in 2016, when a long-term reauthorization bill stalled in the House over objections to a proposal to transfer air traffic control functions out of the FAA to a private, nonprofit entity. ACEC will seek to increase funding for core infrastructure accounts, including the Airport Improvement Program and FAA Facilities and Equipment, as well as raising the cap on passenger facility charges collected by airports to finance projects. The Council will also look to expand the application of Qualifications-Based Selection and other key federal procurement requirements, and facilitate the further utilization of unmanned aircraft systems by firms.

The new Congress and the administration are also expected to develop a tax reform package that will include a robust infrastructure component. Much of the attention thus far has been on infrastructure financing, including tax credits to spur private investment and facilitate public-private partnerships. ACEC has recommended an expansion of existing tools, including the Transportation Infrastructure Finance and Innovation Act, private activity bonds and State Revolving Loan Funds, while also highlighting the need for additional funding for core programs. In particular, ACEC has called on lawmakers to advance a permanent solution to persistent shortfalls in the Highway Trust Fund, which would give state and local agencies long-term funding certainty and undergird a broader infrastructure investment and economic development effort.

New leadership on the Senate Environment and Public Works Committee may impact work on infrastructure legislation. Sen. John Barrasso, R-Wyo., will be the new chairman of the committee, and Sen. Tom Carper, D-Del., takes over as the senior Democrat. ACEC has very good relationships with both lawmakers.



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Sen. John Barrasso, R-Wyo., new chairman of the Senate Environment and Public Works Committee

Energy Effort Moves to New Congress

Lawmakers in Congress are expected to build on progress made in 2016 to pass major energy legislation early in the new year that reflects the energy priorities of the new administration.

Both the House and Senate passed major energy bills in the last Congress, but the short legislative calendar after Election Day and the prospect of working with a new administration pushed further consideration into 2017.

President-elect Donald Trump's support for an energy strategy built around traditional fossil fuels, coupled with regulatory reforms to facilitate the development of energy infrastructure, will likely shape the new legislation and could prove beneficial to projects awaiting approval, such as the $7 billion Keystone XL pipeline and the $3.8 billion Dakota Access Pipeline. Energy industry data indicates that regulatory reforms on permitting and other requirements could result in the investment of hundreds of billions of dollars in new energy infrastructure over the next decade.

ARCHIVE PHOTOS/GETTY IMAGES

JOHN HUMBLE/GETTY IMAGES

Regulatory reforms on permitting could result in the investment of **hundreds of billions of dollars** in new energy infrastructure over the next decade

Congress Clears Water Resources Bill

House and Senate leaders succeeded in passing a major ACEC-backed water infrastructure bill in the closing hours of the 2016 legislative session, and President Obama has signed the measure into law.

The Water Infrastructure Improvements for the Nation (WIIN) Act (including WRDA 2016) authorizes over $11 billion for numerous Army Corps of Engineers projects to improve locks, dams, and ports, as well as to mitigate against storm and disaster damage. The legislation includes $170 million to help the city of Flint, Michigan, address lead contamination of its drinking water system, as well as additional funding to assist schools and communities to replace lead pipes, and assist small and disadvantaged communities to comply with the Safe Drinking Water Act. The measure also provides $515 million for water reuse, recycling and storage projects.

THE WASHINGTON POST/GETTY IMAGES

James Inhofe, chairman, Senate Environment and Public Works Committee

BLOOMBERG/GETTY IMAGES

Bill Shuster, chairman, House Transportation and Infrastructure Committee

The WIIN Act reauthorizes the Great Lakes Initiative to authorize $1.5 billion in clean water infrastructure and habitat improvements, and also includes enhancements to the Water Infrastructure Finance and Innovation Act (WIFIA) program.

Following up on the passage of similar legislation in 2014, Congress has returned to a schedule of biennial approval of federal water infrastructure legislation, setting the stage for additional opportunities to address water issues in the new Congress.

ISSUES ON THE MOVE	WHAT'S NEXT
President's infrastructure agenda	Initial action expected in the spring
Overtime, blacklisting rules	Action in early 2017 to revise and overturn
Energy	Administrative actions early in 2017 on major energy projects

NEW ADMINISTRATION GIVES BOOST TO EFFORTS TO STOP THE BLACKLISTING RULE

ACEC and business coalition allies are working with lawmakers and the Trump Administration to eliminate the implementation of the U.S. Department of Labor's so-called blacklisting rule in the new Congress in 2017.

A temporary injunction stopped the implementation of the rule in October. If implemented, the blacklisting rule would phase in responsibilities for all federal contractors to report violations of federal labor laws (including alleged violations) while competing for and carrying out federal contracts. Subcontractors would also be covered and required to self-report via a government-run portal.

Lawmakers are considering an expedited process authorized under the Congressional Review Act to overturn the regulation. Such action would also prevent future administrations from reissuing the rule.

Overtime Pay Rule Put on Hold

In November, a federal judge issued a preliminary injunction that prevented the Department of Labor's overtime pay rule from taking effect Dec. 1 as scheduled. Had the rule gone forward, the salary threshold below which employees must be paid overtime would have increased from $23,660 to $47,476 annually.

The nationwide injunction will stand until the court has the opportunity to hear the full case challenging the rule. Congress did not take legislative action to stop the rule in December; however, it can still take action in 2017.

In addition, the injunction gives the president-elect the opportunity to direct the Department of Labor to revise the rule. ACEC has advocated that the salary threshold be raised, but by a more moderate amount in line with inflation.

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THE PACIFIC NORTHWEST LIES WITHIN ONE OF THE MOST DANGEROUS SEISMIC ZONES IN THE WORLD. THE RISKS ARE ENORMOUS, BUT PUBLIC OFFICIALS AND ENGINEERS ARE SCRAMBLING TO ENHANCE THE REGION'S EARTHQUAKE RESILIENCY

BY SAMUEL GREENGARD

IN THE CROSSH

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AIRS

An earthquake powerful enough to collapse buildings and bridges, snap power lines and gas pipes, and cause major fires may sound like the theme of a summer blockbuster movie, but it's a very real risk to residents in the Pacific Northwest.

While the Golden State has endured several major quakes over the last half century, the dangers of seismic destruction also extend north to Oregon and Washington. In fact, the region—which is part of the geologic formation called the Cascadia Subduction Zone—could see far more violent and destructive seismic events than anything experienced in California.

An earthquake in the Pacific Northwest could exceed a magnitude of 9.0 and last for three to five minutes

Experts say an earthquake in the Pacific Northwest could exceed a magnitude of 9.0 and last for three to five minutes. It could also unleash a tsunami that would devastate the coast and possibly wash entire towns away. The resulting damage could leave the region in shambles for years.

"We are introducing new materials, new designs and improved engineering techniques that make structures more earthquake and tsunami resilient."

STACY BARTOLETTI | DEGENKOLB ENGINEERS

"If a magnitude 9 or above earthquake shakes for up to five minutes and causes a tsunami, it will be a devastating event," says Kenneth Murphy, Federal Emergency Management Agency (FEMA) administrator for the region and former emergency management director for the state of Oregon.

According to Murphy, a Cascadia Subduction Zone earthquake could impact 140,000 square miles and "have farther reaching impacts than that of Katrina and Sandy combined." In fact, FEMA predicts it would be the worst natural disaster in U.S. history.

To handle this threat, public officials are devising contingency plans and engaging in emergency response drills, and architects and engineers are designing new and innovative buildings and bridges that take seismic safety into the future.

"We are learning from every earthquake," says Stacy Bartoletti, CEO and chairman of structural engineering firm Degenkolb Engineers. "We are introducing new materials, new designs and improved engineering techniques that make structures more earthquake and tsunami resilient."

A Cascadia Subduction Zone earthquake could impact 140,000 square miles

FEMA estimates damage could be in excess of $70 billion

Fault Tolerance

Although fault lines and earthquakes occur almost everywhere in the world, the Cascadia Subduction Zone, an 800-mile fault line that runs from Northern California to Vancouver, British Columbia, is particularly threatening. Seismic events, including earthquakes, occur less frequently there than in California (typically a few hundred years versus decades or approximately a century), but this type of geology produces far more devastating effects.

As one continental plate is pushed underneath another, deep earthquakes, volcanoes and tsunamis result. Making matters worse, a Cascadia subduction earthquake isn't the only risk. Other faults lie in the region. For example, the Seattle metro area, with a population of approximately 3.5 million, is built atop a fault appropriately named the Seattle Fault that could generate a 7.5 earthquake.

"These can be among the most violent events on the planet," says Chris D. Poland, founder of Chris D. Poland Consulting Engineer, who specializes in seismic issues.

The problem? Much of the infrastructure of the Pacific Northwest is not equipped to withstand violent shaking or an ocean wave that could reach 30 or 40 feet high and surge inland. Liquefaction is also a serious threat. Most of the major cities in the region enacted seismic building codes in the 1980s, says Ron Hamburger, senior principal at the structural engineering firm Simpson Gumpertz & Heger.

"The principal concern is with older buildings that were constructed in the 1970s or earlier," he says. "These structures were not necessarily designed to a reliable building code. Many of them have seismic vulnerabilities."

Similarly, many highway and river bridges do not meet modern seismic standards, including the American Association of State Highway and Transportation Officials codes adopted in the 1990s. Underground oil and gas lines would also likely sustain a great deal of damage. Yet, a tsunami might be even more devastating than the earthquake that caused it. Within Washington and Oregon, hundreds of thousands of residents and potential visitors are, at any given moment, located in low-lying areas vulnerable to a giant wave and surge. This includes senior facilities and schools where there is virtually no escape path from a tsunami that comes without warning. While a Pacific tsunami warning system exists, a quake in the Cascadia Zone would occur within the boundary of the system, which means it wouldn't be detectable.

According to FEMA, more than 10,000 could die in a Cascadia earthquake and tsunami, and 30,000 could be injured. Upward of 1 million people would need shelter, and 2.5 million would require food and water, FEMA estimates. Simply put, much of the region would be reduced to rubble, and coastal areas could become uninhabitable for years. FEMA estimates the damage could be in excess of $70 billion.

The danger extends beyond the initial seismic event. "The issue isn't only public safety and people losing their lives or being injured; it's also about the long-term economy of the region. The reality is that widespread damage could impact the region for months or years," Bartoletti says.

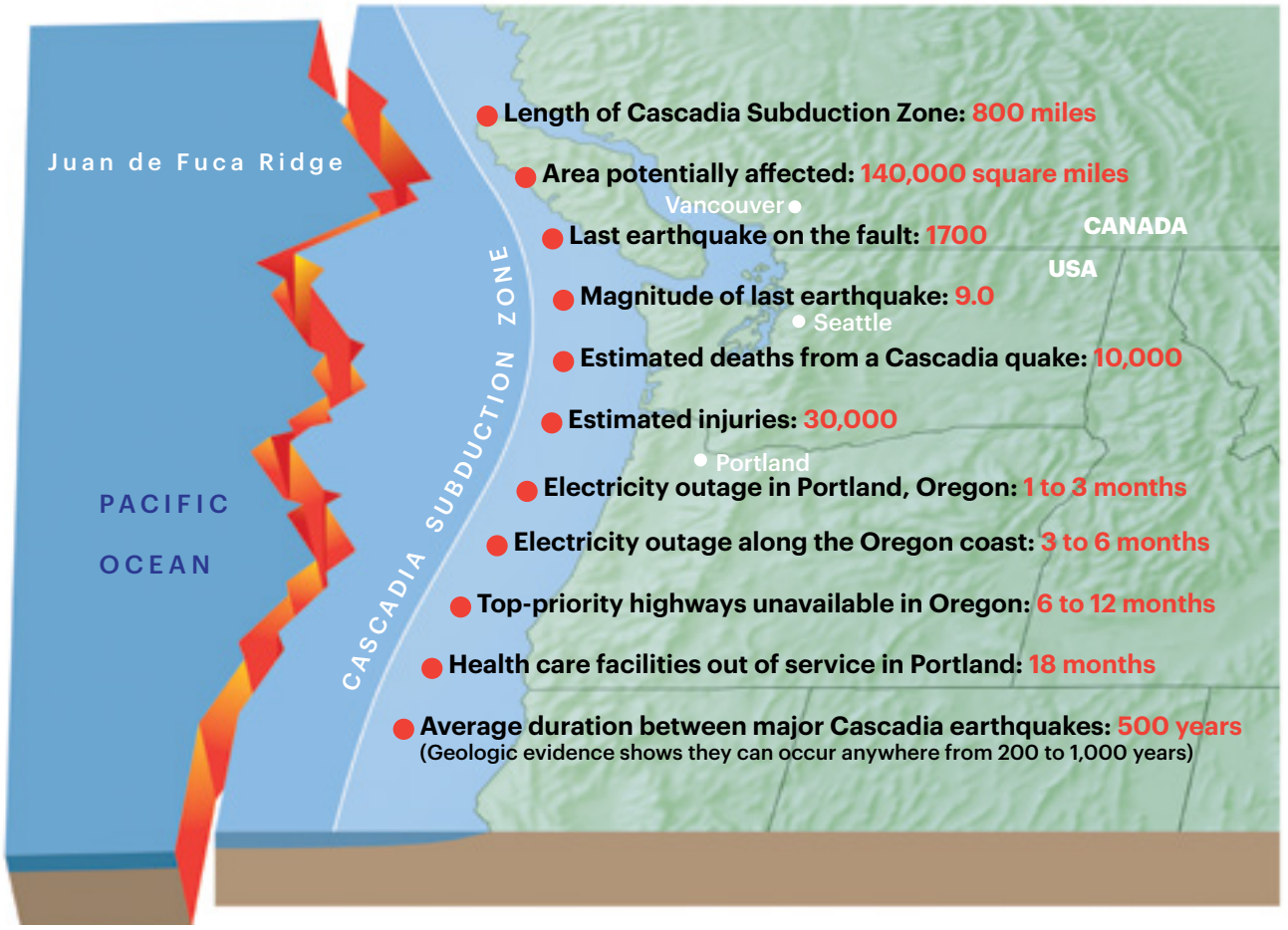
In the end, the Pacific Northwest could see a long-term exodus of population and businesses. It could become economically depressed similar to New Orleans, which has yet to completely recover from Hurricane Katrina.

Shaking Things Up

There have been some positive advancements, however. In September 2016, for example, the American Society of Civil

Cascadia Subduction Zone Fault Line

Facts and figures in case of an emergency



Engineers introduced a set of standards, which focuses on hazards resulting from earthquakes, tsunamis and other natural occurrences.

The tsunami standards pertain to steel-reinforced concrete buildings in "inundation zones." The goal is to build stronger and safer structures with only a moderate increase in cost. The initiative also establishes guidelines for applying U.S. Geological Survey hazard data to building structures, including bridges.

Engineering firms are putting those standards into practice in the Pacific Northwest. They're using computer models, simulations and other tools to better understand ground motions and how structures react in shaking, liquefaction and tsunami situations. In September 2015, T.Y. Lin International and HNTB completed construction on the 2016 EEA Honor Award-winning Tilikum Crossing, Bridge of the People, a 1,720-foot-long cable-stayed design over the Willamette River in Portland, Oregon.

The $135 million project, which carries transit and pedestrian traffic, is built to withstand a major seismic event, such as a 9.0 earthquake along the Cascadia Subduction Zone. At the cutting edge of design and engineering, the Tilikum Crossing incorporates two 160-foot pylons with supporting drilled shafts and pylon caps that were designed for non-linear soil-structure interaction in an extreme earthquake.

"Liquefaction and lateral spreading were significant factors for design," says David Goodyear, chief bridge engineer for T.Y. Lin International. "In an earthquake, the approach rail bed would likely be more affected by liquefaction than the bridge."

But bridges and roadways aren't the only structures needing upgrades—everyday facilities, such as schools and hospitals, are getting safety enhancements. At Ocosta Elementary School

"Right now, we need to focus on updating, upgrading and retrofitting infrastructure far beyond the modern seismic standards that focus on life safety and not recovery."

CHRIS D. POLAND | CHRIS D. POLAND CONSULTING ENGINEER

in Westport, Washington, Degenkolb Engineers designed an elevated gymnasium structure to withstand tsunami-induced hydrostatic, hydrodynamic, scour and impact forces through various engineering methods. The pile foundations are designed to resist liquefaction; concrete shear walls resist seismic and inundation forces; and structural steel gravity columns resist expected impact loads.

In addition, the design incorporated moment-resisting beam column connections that provide alternate path progressive collapse resistance. The structure, which was completed in 2016 for $13 million, is the first tsunami vertical evacuation structure in the U.S. "There were critical considerations revolving around the height of the wave and designing a structure that could withstand the impact of floating debris," Bartoletti says.

However, a new bridge or an occasional tsunami shelter, though important and innovative, cannot address the broader issue of replacing or upgrading existing infrastructure that doesn't meet earthquake safety standards. Although some large companies such as Intel and Boeing have spent millions to retrofit buildings in the region, other facilities, such as schools, hospitals and prisons, are mostly lagging behind. In addition, rail systems and other transportation networks, particularly along the critical I-5 corridor, aren't designed to withstand a quake—and many systems would be rendered unusable for weeks or months afterward.

According to Plan

Not surprisingly, both Washington and Oregon have detailed resilience plans in place—though budget and funding restraints are an ever-present problem. What's more, as Goodyear points

"In an earthquake, the approach rail bed would likely be more affected by liquefaction than the bridge."

DAVID GOODYEAR | T.Y. LIN INTERNATIONAL

The Tilikum Crossing Bridge over the Willamette River in Portland, Oregon, carries transit (below) and pedestrian traffic. The bridge is designed to withstand a seismic event such as a 9.0 earthquake along the Cascadia Subduction Zone.

TOM PAIVA PHOTOGRAPHY

TOM PAIVA PHOTOGRAPHY

out, the design focus and funding is for extreme events for new structures, leaving vulnerabilities on many older structures behind.

Oregon's plan, finalized in 2013, focused on completing a statewide inventory of critical buildings—including those needed in an emergency—along with transit and rail lines, utilities, schools and other infrastructure. Moreover, the plan creates incentives for the private sector—including the health care and hospitality industries—to retrofit and upgrade structures to meet modern seismic requirements.

FEMA, too, has a contingency plan to deal with a major earthquake and tsunami in the region. It would coordinate the movement of food, water and other essential items in from across the nation using whatever means it can. "We are trying to build a flexible plan that can deal with different scenarios," Murphy says.

In June 2016, Washington, Oregon and Idaho participated in a four-day disaster drill FEMA called "Cascade Rising." Public officials and others rehearsed scenarios on how various agencies would work together in response to a seismic disaster. Nearly 20,000 people from all levels of government and the private sector were involved.

Murphy says he would like to see the Pacific Northwest follow the lead of Japan (and more recently California) and develop an early warning system for quakes. Even 10 or 15 seconds' warning could help shut down or slow train and transit systems, stop elevators, and temporarily halt airport activity and other crucial infrastructure. It also could give residents a few seconds to get to a safer place.

In the end, Poland believes public officials, engineers and others must focus on building and rebuilding existing infrastructure—and hope that the big one doesn't occur anytime soon because there certainly are no quick or simple fixes.

"Emergency response plans are in place. After a quake, we can open an emergency operations center and stabilize the community. The bigger problem is handling the recovery—particularly if this process takes months or years," Poland says. "Right now, we need to focus on updating, upgrading and retrofitting infrastructure far beyond the modern seismic standards that focus on life safety and not recovery." ■

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

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2016 PROFESSIONAL LIABILITY INSURANCE SURVEY OF CARRIERS

STABILITY REIGNS... BUT RISKS LOOM

BY BOB WOODS

It continues to be a buyer's market for professional liability insurance (PLI). That's one of the major takeaways from the 2016 ACEC survey of insurance carriers, conducted jointly by ACEC with the National Society of Professional Engineers/ Professional Liability Committee (NSPE/PLC), the American Institute of Architects (AIA) and the AIA Trust. As in 2015, 18 carrier firms were polled, and 12 of them participated in post-survey interviews in September. Collectively the carriers provide PLI coverage to about 95 percent of ACEC Member Firms.

STEPHANIE MODENESE/FOAP/GETTY IMAGES

Characteristics in the Premium Determination Process
(1 is the highest level of influence; 8 is the lowest)

	ACE USA/ Chubb	AIG/Lexington Insurance Company	Allied World Insurance Company	Aspen Insurance	AXIS Insurance	Beazley	Berkley Design Professional Underwriters	Euclid A/E	Hanover Insurance Company	Ironshore	Liberty International Underwriters	Markel	Navigators Management Company, Inc.	RLI	TM/HCC	Travelers Insurance	XL Catlin
Location of firm	5	7	8	8	4	6	4	6	1	2	8	7	4	5	6	4	7
Location of projects	6	6	7	7	8	5	8	7	1	8	7	8	7	7	4	7	8
Type of practice	4	5	4	2	2	2	3	2	1	3	3	2	3	1	1	3	2
Type of projects	3	4	3	4	6	4	6	4	1	4	4	4	5	3	2	5	3
Annual billings	1	1	1	1	1	1	2	1	1	1	1	1	1	2	5	1	1
Claims history	2	2	2	3	3	3	1	3	1	6	2	3	2	4	3	2	4
Firm experience	7	3	5	5	7	7	5	5	1	5	6	5	6	6	7	6	6
Other	*	*	6	6	5	8	7	*	*	7	5	6	8	*	8	*	5

*Did not answer
Source: 2016 ACEC/NSPE/AIA/AIA Trust Professional Liability Insurance Survey of Carriers

"ACEC firms are in a stable market," says Al Rabasca, director of industry relations at XL Catlin. "The capacity for professional liability insurance is still at historic levels of accessibility and availability."

Indeed, there are now nearly 50 carriers in a PLI market saturated with capital, says John Farrar, vice president at Clark Dietz Engineers and a member of the ACEC Risk Management Committee, which conducts and analyzes the annual PLI survey. The glut has helped create a competitive environment where most carriers expect rates to stay flat or rise only slightly, he adds. At the same time, he says, the actual PLI premium often goes up because of the increased volume of work over the last few years following the dramatic downturn in projects during the Great Recession.

Claims levels are essentially unchanged since last year's survey. Still high on the list are claims involving condominiums and residential properties, a trend that remains problematic for PLI carriers. Design or technical errors, however, have become the major cause of claims, several carriers report. Technology-related risks also continue to rank high among survey respondents, a majority of whom voiced a concern over cybersecurity, specifically ransomware attacks on A/E firms' computer systems.


MARTIN BARRAUD/GETTY IMAGES

"Firms are locked out of their computer systems until a ransom is paid to regain access to their files and data," says Tim Corbett, founder and president of consulting firm SmartRisk and a member of the ACEC Risk Management Committee.

"We're keeping an eye on trends in water filtration, HVAC systems and product liability cases."

AL RABASCA | XL CATLIN

Claims Trends

Most carriers say that frequency of claims was the same in 2016 as the year before, but most also indicate that severity was up slightly. A significant factor in this relative stability, says Kevin Collins, senior vice president for professional liability at Victor O. Schinnerer & Co., has been the A/E industry's resurgence. "In the last few years, infrastructure and development projects have started to pick up," Collins says. As the overall U.S. economy continues its gradual uptick, along with the real prospect of increased spending on infrastructure projects in coming years, steady growth should continue, he says.

One trend over the past year, says John Rapp, managing director at Travelers, is a slight increase in claims for mechanical engineers. Collins agrees, noting that the majority of claims at Schinnerer are directed against architects. "We do see mechanical engineers and structural engineers with a higher frequency and severity of loss in projects, including HVAC and geotechnical ones," Collins says. "That ends up being between 15 to 20 percent of our claims over that last five years." XL Catlin is seeing

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	Dealey Renton & Associates
CO	USI Colorado LLC
CT	Smith Brothers USA
DE	KT & D Inc.
FL	USI Insurance Services / Suncoast Insurance
GA	Crow Friedman Group LLC
HI	Finance Insurance Ltd.
ID	The Hartwell Corporation
IL	Holmes Murphy & Associates
IN	ONI Risk Partners
IA	Holmes Murphy & Associates
KS	Holmes Murphy & Associates
KY	The Underwriters Group
LA	Alexander & Sanders Insurance Agency Inc.
ME	Clark Insurance
MD/DC	CBIZ/Ebersberger
MA	Poole Professional Ltd.
MI	Professional Concepts Insurance Agency Inc.
MN	H. Robert Anderson Associates Inc.
MS	HUB Gulf South
MO	Crane Agency
MT	The Hartwell Corporation
NE	The Harry A. Koch Co.
NV	American Insurance & Investment Corporation
NH	Poole Professional Ltd.
NJ North	Risk Strategies Company
NJ South	Wortley/Poole Professional Ltd.
NM	R.J. Dean & Associates
NY North	Poole Professional
NY South	Risk Strategies Company
NC	BB&T Insurance
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	Smith Brothers USA
SC	BB&T Insurance
SD	TRJ Professional Group
TN	Crow Friedman Group LLC
TX North	McLaughlin Brunson Insurance Agency
TX South	USI Southwest
UT	Benchmark Insurance
	American Insurance & Investment Corporation
VT	Poole Professional Ltd.
VA	CBIZ/Ebersberger
	BB&T Insurance Services
WA	USI Northwest/Kibble & Prentice
WV	Oswald Companies
WI	Holmes Murphy & Associates
WY	USI Colorado LLC
PUERTO RICO	Fulcro Insurance
CANADA	
AB	Quadrant Insurance Services
BC	Metrix Professional Insurance Brokers Inc.
MB	Oldfield Kirby Esau
NB	HUB International Atlantic
NT	Quadrant Insurance Services
NS	HUB Interinational Atlantic NS
NU	Quadrant Insurance Services
ON	Pro-Form Sinclair Professional / Hubb International Ontario Limited
QC	Vestas Inc.
SK	Quadrant Insurance Services

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may not be quite as high as in some more complex, larger-risk projects because of their relative worth, he maintains, but as the post-recession market for condos continues to gain momentum, claims are going to go up.

The residential housing market is still the largest driver of claims among middle-market and small A/E businesses covered by Beazley, says James Schwartz, the carrier's U.S. A/E focus group leader. "Within that, condominiums remain hot, even though the market dried up from 2008 through 2012," he says.

Condos are another segment where claims have popped up years after they were built, Schwartz adds. "We still get claims for projects completed in 2005, 2006 and 2007. There's still some latent risk from more recent projects that hasn't yet percolated," he says.

Considering these claims trends, most of the carriers believe that they're able to operate profitably within their present rate structures. The survey reveals that the three most important factors in establishing an A/E firm's rates are annual billings, claims history and type of practice.

Several carriers noted a rise in ransomware attacks on their A/E clients, who paid between $2,500 and $30,000 to hackers who rendered their computer systems inoperable by encrypting files

similar claims activity, according to Rabasca. "We're keeping an eye on trends in water filtration, HVAC systems and product liability cases," he says.

Carriers also report that municipalities and other public agencies are filing more claims. Third-party personal injury claims continue to be a problem, and a large portion of the bodily injury claims are settled at trial rather than in mediation, which tends to raise both legal and total claims in such cases.

Surprisingly, Farrar says, for the first time, several PLI carriers stated that technical errors are the leading cause of claims. In the past several years, most claims activity was around contractual issues, where designers did not communicate well enough with their clients. Some carriers say the rise in technical errors may be that as work has expanded after the recession—during which scores of senior-level, higher-paid A/E practitioners and managers lost their jobs—there haven't been enough qualified engineers to handle the increased workload and that they weren't mentored properly, according to Farrar. Plus, the long tail on such claims, usually three to five years, is starting to come in now.

"This should be a wake-up call for carriers," Corbett says. "They need to focus on their quality-assurance and quality-control processes and their peer reviews before documents go out. Having the right people in place has to be key."

When it comes to the worst risk in the industry, according to almost all the participating carriers, the undisputed leader remains the residential market, particularly condos.

"Most carriers don't like condos," says Daniel Cecchi, president at Collins Engineers, Inc. and a member of the ACEC Risk Management Committee. "They are a prevalent area of concern for carriers and where a great deal of claims come from." The severity

"We're not looking to raise rates at all," Collins insists. "It's really dependent on what firms can control—such as loss experience and growth—and how they want to progress, which is how the market should be. Firms that have good risk-management practices and quality control should benefit in the long term because they're doing things the right way."

Choosing a PLI Carrier

The current stability within the crowded PLI marketplace gives A/E firms leverage when it comes time to think about renewing an existing contract or looking for a new carrier. Regardless, as recent surveys of both carriers and A/E firms have confirmed, premium price is important, yet a carrier's track record and value-added service offerings shouldn't be overlooked.

A carrier's financial stability and rating are extremely important considerations when choosing a PLI carrier, says Eric Moore, vice president of Moore Insurance Services, Inc., and president of a/e ProNet,

"Firms that have good risk-management practices and quality control should benefit in the long term because they're doing things the right way."

KEVIN COLLINS | VICTOR O. SCHINNERER & CO.

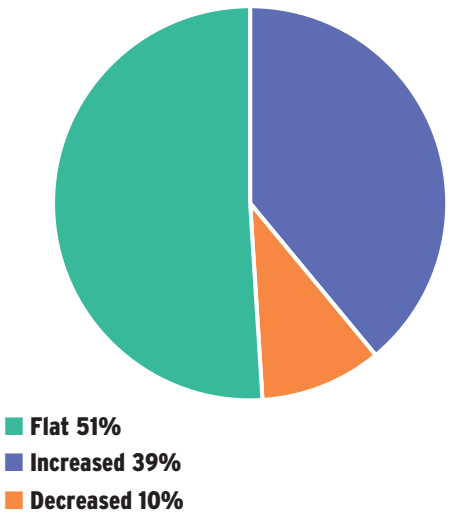
which represents independent agent/brokers. A low premium from a relatively new carrier in the market, he says, may be due to an overly aggressive pricing model. "Is the low price sustainable, or is it a lowball offer that may increase substantially once actual claims mature with the carrier's book of business?" Moore says.

The risk of going the price-first route, warns Mary Lodwick, president of Professional Liability Agents Network and president of Stuckey Insurance, is that not all liability policies are the same. "You must ask yourself, did this insurer finally crack the code and figure out how to provide outstanding service at half the price of their competitors?" Compare policy forms, the experience and caseload of claims adjustors, and the different educational and risk-management services provided by a carrier, she says.

The current stability within the crowded PLI marketplace gives A/E firms leverage when it comes time to think about renewing an existing contract or looking for a new carrier

"New carrier entrants are eager to grow their book and make an impact on the PLI marketplace," says Dino Fidanza, senior vice president at Marsh Sponsored Programs, a service of Seabury & Smith. Key to that strategy is offering lower premiums. "Once claims catch up, they are forced to increase prices or exit the market," Fidanza says. "This is disruptive to a client's insurance program expectations, budgets and ability to build a strong working relationship with a carrier."

Have Your Rates Increased, Decreased or Remained Flat Over the Past Three Years?



Source: 2016 ACEC/NSPE/AIA/AIA Trust Professional Liability Insurance Survey of Carriers (13 of 18 firms responding)

Legacy carriers are apt to be more stable due to their claims experience and overall understanding of the market, Moore says. "That's not to say that a new entrant shouldn't be given consideration," Moore says. "Their management may be from a legacy carrier that has good knowledge and experience of the market."

"Is the low price sustainable, or is it a lowball offer that may increase substantially once actual claims mature with the carrier's book of business?"

ERIC MOORE | MOORE INSURANCE SERVICES, INC.

Managing Risk

Carriers and their insureds agree that risk management is a cornerstone of their business relationship, and carriers differentiate themselves on the various risk-related programs they offer clients, some of which can lead to premium credits or other benefits. Travelers, says Rapp, offers quarterly webinars that qualify for continuing education credit. Schinnerer's insureds can earn a 4 percent credit for demonstrating good risk-management practices during the application process, says Collins. "There's an additional 3 percent credit for firms that take our voluntary risk-management education program online," Collins says.

Technology-related risks continue to be of great concern among PLI carriers and A/E firms, with the issue of cybersecurity especially pronounced in the survey. Most carriers offer some type of cyber protection, as well as education programs on how to mitigate the risks. "XL Catlin has a new policy that will offer a cybersecurity suite with comprehensive coverage," Rabasca says, adding that the carrier's cyber unit provides 24/7 services. "It's something we've taken to heart."

Several carriers noted a rise in ransomware attacks on their A/E clients, who paid between $2,500 and $30,000 to hackers who rendered their computer systems inoperable by encrypting files. This puts intellectual property at an unprecedented risk, says Corbett. "The outcome of obtaining unauthorized access to design documents…to a power plant, a chemical facility, schools, hospitals or other critical infrastructure could be devastating," Corbett says.

Collins Engineers has already been hit twice by ransomware attacks, Cecchi states, though the firm refused to pay the ransoms because it had backed up its data. "It made me sit and think about what if one of our main servers was attacked and we were down," he says. "We are now doing some different things to enhance our security and have a different backup system, so recovery is faster. But it is difficult. It's a continuing process to keep your doors locked." ■

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

SOLAR AND WIND ENERGY INDUSTRIES, THANKS TO A CONFLUENCE OF FAVORABLE FACTORS, ARE GAINING MOMENTUM

BY BOB WOODS

POWER SURGE

ER

Not so long ago, the mention of solar panels and wind turbines didn't generate a lot of enthusiasm in a U.S. energy industry heavily reliant on oil, natural gas and coal to produce electricity. Now, as the long-term outlook for fossil fuels keeps diminishing, the prospects for the solar and wind energy sectors have never looked brighter.

The likelihood of a dramatic increase in solar and wind projects presents tremendous opportunities for engineers—not only assisting in the construction of solar and wind farms, but also designing the infrastructure needed to transport and deliver all the electricity that will be produced.

DOE aims to reduce the cost of solar power nearly 75 percent by 2020

YANOPHOTO/GETTY IMAGES

"It's creating a fundamental change in the U.S. power industry," says Erin Inman, president and CEO at Primera. "Utilities have to get ready to put renewables on their systems."

Brian Raine, project director and lead design engineer at Arup Energy, points to another significant reality. "The big advantage solar and wind have is there's no fuel cost. When the development phase of the projects achieve economy of scale, they will be cheaper and lower risk" in comparison to price-volatile fossil fuels.

Renewables Gaining Momentum

While solar and wind are still relatively small players in the overall U.S. energy mix, they, as well as other renewable sources (biofuels, geothermal and hydropower), are rapidly gaining momentum and outpacing the growth of fossil-fuel generation. Wind capacity, measured in gigawatts, increased by more than 100 percent, and solar electricity capacity increased by more than 900 percent between 2009 and 2015, says the U.S. Energy Information Administration (EIA), the analysis arm of the federal Department of Energy (DOE), in its March 2016 projections.

"The power industry is going from analog to digital in one giant leap."

ERIN INMAN | PRIMERA

Wind and solar capacity growth represented about half of gross capacity additions over the same period, EIA says, although the wind and solar shares of total capacity in 2015 were modest, at 6.7 percent and 2.0 percent, respectively. Comparatively, natural gas accounted for 32 percent of the nation's energy production in 2015, according to EIA, while petroleum accounted for 28 percent and coal for 21 percent.

A number of critical factors have led to the surge in wind and solar energy—and economics are chief among them. "Over the last decade, the cost to install solar energy systems has dropped by 70 percent," says Tom Kimbis, interim president of the Solar Energy Industries Association (SEIA). The biggest cost-decline opportunity, SEIA says, exists in soft costs, including labor, supply chain and overhead considerations. DOE plans to continue that trend through its SunShot Initiative, which aims to reduce the cost of solar electricity nearly 75 percent by 2020.

"Innovations in wind turbine technology and site selection have helped cut the cost of wind energy by two-thirds in just six years," wrote Tom Kiernan, CEO of the American Wind Energy Association in *The Huffington Post* in September 2016. "In many parts of the country, wind is now the cheapest source of electricity, and it's cost-competitive in many more."

Both the solar and wind industries have been boosted by federal tax credits, though congressional appetite for these incentives has fluctuated. "The key federal tax credits that have helped spur a lot of the growth over the last decade are set to phase out over the next four to five years," says Christopher Namovicz, team leader for renewable electricity analysis at EIA. Meanwhile, a number of state governments have set ambitious goals for upping their renewable energy antes, which may contribute to new projects being built, Namovicz adds.

Potential of Solar and Wind

As the political winds continue to shift—such as Congress' contentious debate over climate change and lobbying battles pitting renewable and fossil-fuel forces—the public's support for solar and wind is overwhelmingly strong. According to a 2016 poll from the Pew Research Center, 89 percent of American adults favor building more solar projects, and 83 percent want more wind farms. Conversely, support for expanding coal mining and natural gas fracking weighs in at 41 percent and 42 percent, respectively.

All of this portends well for ACEC Member Firms, which while committed to fossil-fuel clients, can embrace solar and wind projects too. "We have worked on utility-scale wind projects over the last eight years," says Inman, using the industry term for renewable installations that generate at least 1 megawatt of electricity—enough for 164 homes. "But our main focus is on power grid enhancements [and] strengthening infrastructures to accept renewable sources."

The firm's utilities division is involved in distribution substation and transmission design, which—along with upgrading wire and cables—also includes IT in order to collect and analyze data flowing back and forth along smart grids. "Data analytics is the new buzzword in the utilities," Inman says. "The power industry is going from analog to digital in one giant leap."

Arup is similarly concentrating on integrating solar and wind energy into power grids, often focusing on the work related to a developer's installation, Raine says. "Our transaction advisory team helps clients understand the best projects, carrying out due diligence on equipment and methods and developing strategies for executing and developing long-term agreements," he adds.

89 percent of American adults favor building more solar projects

Solar electricity capacity increased by more than **900 percent** between 2009 and 2015

For example, Arup is advising Northern California's Bay Area Rapid Transit (BART) on how best to run its trains and stations with solar electricity. "We're providing them with regulatory, financial and technical assessments," Raine says. BART needs about 80 megawatts to power its trains. "We're looking at how to generate solar energy on BART properties and feed energy directly to trains," he adds.

Arup has also been involved with several wind farm projects in the U.K. and elsewhere in Europe, including offshore installations that are seen as an important component in renewable

"The beauty of the floating technology is that you assemble everything right at the shore."

RICHARD HALL | SGC ENGINEERING

energy. While European nations have thousands of offshore turbines in operation, the U.S. only recently put its first online, albeit a modest one. The Block Island Wind Farm comprises five massive towers capable of powering about 17,000 homes, including those on the 110-square-mile island off Rhode Island.

POWER Engineers was subcontracted by AECOM, under contract to the Providence, Rhode Island-based developer Deepwater Wind to design the underwater cable system that carries electricity from the GE-built, 6-megawatt turbines about 3 miles to Block Island. "We interconnected cable from tower to tower, and then a common 'home run' back to the island," says Greg Clark, senior project manager for POWER. The firm also designed a link back to the mainland.

83 percent of Americans want more wind farms

Even though Americans say they favor offshore wind farms, developers have run into public opposition in the form of NIMBY—not in my backyard. Such was the case with Cape Wind, a 130-turbine project off Massachusetts' Cape Cod, which was ultimately scrapped after overwhelming resistance from oceanfront homeowners who complained that the turbines, about 8 miles offshore, would be an eyesore.

Lessons learned from that experience have led developers of several offshore wind projects now underway to locate turbines at least 15 miles offshore. ACEC Member Firm SGC Engineering is one of several contractors working on a novel project to install floating offshore wind turbines—technology being developed by the University of Maine's Advanced Structures and Composites Center.

"We were the electrical engineers associated with a 1-to-8-scale model," known as the VolturnUS wind project, says Richard Hall, senior project manager at SGC Engineering. The next phase is to tether two full-scale turbines—erected on floating concrete platforms about 3 miles off Monhegan Island—to the

Primera provided structural analysis and design of substation structures including buses, supporting frames, drilled piers and transformer foundations for Fowler Ridge Substation in Benton County, Indiana.

SGC Engineering collaborated with the University of Maine on the VulturnUS 1:8 prototype of a floating wind turbine.

sea floor 300 feet below. It's scheduled to begin pumping electricity into the Maine grid in 2019.

"We connect the cable inside the turbines, then at the other end of the cable, we design the interconnect to the grid," Hall says. "It's pretty much the same job we do for onshore systems." SGC has been involved with all nine of the utility-scale wind farms operating in Maine. "The beauty of the floating technology is that you assemble everything right at the shore," he adds. "Once it's assembled, a tugboat takes it to the site." The process will ultimately be cheaper than building fixed offshore turbines, Hall says.

"The big advantage solar and wind have is there's no fuel cost."

BRIAN RAINE | ARUP ENERGY

Managing Cost

Cost has been a conundrum within the renewable energy industry when put up against fossil fuels, especially as the price of oil and natural gas have plummeted in recent years. While prices of solar panels, wind turbines and related hardware continue to decline, solar and wind producers still grapple with the cost of transmitting electricity on grids.

Utilities, even as they're required to increase their renewable sources, must also buy back surplus electricity from customers who generate their own. "Those people will still want to be connected to the utility in case of a cloudy [or windless] day and need to buy electricity from the utility," Inman says. "So there needs to be some fair way for both parties to pay for the cost of the infrastructure."

The threat of rising costs to consumers is a sticking point of the Clean Power Plan, President Obama's 2015 proposal for reducing climate-changing carbon emissions from fossil-fueled power plants. An opposition lawsuit by 27 states went to court in October 2016, and the outcome remains uncertain.

Coincidentally, enacting the plan would surely accelerate solar and wind projects, presenting a potential boon for the engineering industry.

"If that moves forward, undoubtedly there would be a lot of additional capacity that would need to be brought online," Clark says.

POWER Engineers and other ACEC Member Firms will be keeping close tabs on the outcome. ■

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

DRONE ON

Increasing Member Firm use of unmanned aircraft technology delivers improved field efficiency, project delivery, job safety and service value

BY KYLE CLAPHAM

PROJECT:
Kekaha Ditch Improvements, Kauai, Hawaii

FIRM: The Limtiaco Consulting Group

PROJECT:
DASNY-Brockport Masonry Repairs, Brockport, New York

FIRM:
Greenman-Pedersen, Inc. (GPI)

PROJECT:
UAS Feasibility for Coastal Surveys
Wrightsville Beach and Eagle Island, North Carolina

FIRM: McKim & Creed

PROJECT:
Calistoga Setback Levee, Orting, Washington

FIRM: Parametrix

WAN FAHMY REDZUAN WAN MUHAMMAD/EYEEM/GETTY IMAGES

Siphon Rehab Overcomes Site Conditions

Overhead video from a drone documented the challenging site conditions throughout the entire project.

PROJECT: KEKAHA DITCH IMPROVEMENTS, KAUAI, HAWAII

FIRM: THE LIMTIACO CONSULTING GROUP, HONOLULU, HAWAII

The Kekaha Ditch Irrigation System supplied water to the Kekaha Plantation and other sugarcane fields until the Kekaha Sugar Mill closed in 2000. Today, the system serves approximately 5,000 acres of agricultural land—which includes corn, taro and mixed vegetables—with nearly 25 million gallons of water daily, and feeds two hydropower plants in western Kauai.

The "Black Pipe" Siphon, an integral part of the system, needed rehabilitation to repair corrosion and deterioration. But the 48-inch-diameter siphon sits on a mountainside and lies at a slope of almost 90 percent at its steepest part. Surveying the entire pipe firsthand would have required someone to hike through the rocky and overgrown terrain on foot or climb down the pipe itself.

Kyle Kaneshiro

"The way we would get up to the project site—it was basically dirt roads," says Kyle Kaneshiro, a principal of The Limtiaco Consulting Group. The dirt roads meant riding in a repurposed military vehicle that one of the farmers owned. "It was really out there," he says.

The irrigation system could only be taken out of service for two months, which further limited the options available. Cushnie Construction Co., Inc., which served as project contractor, employed a drone to document the site conditions before, during and after construction. A helicopter had to deliver most of the equipment and materials, such as concrete for the new headwall at the siphon inlet.

"They would video it from above, showing the layout, so we could see it before it was even constructed—basically how it's going to look," Kaneshiro says. "With the drone, we were able to see a lot more than if we were just walking the ground."

Without drone technology, the project team would have been hard pressed to overcome the unique site conditions and satisfy a tight timeline. "If we went beyond that [deadline], it would start impacting their crops," Kaneshiro says.

Dormitory Assessments Meet Tight Deadline

PROJECT: DASNY-BROCKPORT MASONRY REPAIRS
BROCKPORT, NEW YORK

FIRM: GREENMAN-PEDERSEN, INC. (GPI), BABYLON, NEW YORK

Before the Dormitory Authority of the State of New York (DASNY) could proceed with structural repairs for three buildings on the Brockport campus, the organization needed a visual assessment of the existing conditions. DASNY contracted Greenman-Pedersen, Inc., (GPI) to prepare the appropriate documents for the exterior masonry facade, roof parapet and roofing membrane of Bramley, Briggs and Perry halls—each one being 10 stories tall.

"[It] would typically involve manlifts and scaffolding and getting people up there with a camera taking pictures," says Christer Ericsson, a senior vice president at GPI. "Rather than putting people in harm's way up on scaffolding and manlifts, we came up with a solution."

Christer Ericsson

After using terrestrial LiDAR scanners to establish a 3D model of each building, GPI flew a drone near the facade to capture high-resolution images. The firm stitched together the overlapping photos to form a complete orthomosaic and integrated it with the LiDAR point cloud and 2D CAD documents to produce an accurate pictorial representation that depicted the scope of work.

The bid package had to be ready by the summer, however, so a contractor could perform the repairs while the dormitories were mostly vacant. GPI also had to notify the buildings when the firm planned on carrying out drone flights because of privacy issues, and it had to close all of the entrances in order to comply with FAA regulations about flying drones over nonparticipants.

"They restricted us to fly when the school wasn't in session, which was over spring break and then at the end of the term," Ericsson says.

The use of drones on this project ultimately minimized campus disruption, reduced costs, saved time and improved safety while establishing a complete documentation of existing conditions for three buildings in need of repair.

Drones provided high-resolution images for three buildings to help complete an accurate pictorial representation of the project.

Survey Test Shows Application of Drones

PROJECT: UAS FEASIBILITY FOR COASTAL SURVEYS
WRIGHTSVILLE BEACH AND EAGLE ISLAND, NORTH CAROLINA

FIRM: McKIM & CREED
CLEARWATER, FLORIDA

Hurricane season officially begins June 1, but coastal communities must prepare for a severe storm year-round. On May 16, 2016, Esri—an international supplier of geographical information system software—hosted a proof of concept event to test the feasibility of using an unmanned aircraft system (UAS) to perform coastal surveys.

McKim & Creed, a firm that has a long history of conducting coastal surveys with more conventional methods, completed the UAS data acquisition for the project, which took place at Wrightsville Beach as well as Eagle Island in North Carolina, during National Hurricane Preparedness Week.

"When we put together this proof of concept, we wanted to show that from a technology standpoint—when conducted correctly—you can get some pretty astounding results that are cheaper, safer and faster than other methods," says Christian Stallings, research and development manager for McKim & Creed.

Christian Stallings

Most municipalities conduct beach-monitoring surveys twice a year—once in the spring before hurricane season and once in the winter. The surveys analyze beach performance in terms of erosion and accretion, and they help predict as well as plan for maintenance and renourishment events. If a significant loss of beach occurs, municipalities can use the surveys to help secure emergency funds for restoration.

"The most important thing with this data and collecting data is to be able to measure accurately on the shorelines where the beaches are—you measure change in the beaches—especially post-storm," Stallings says. "Because of the low price, you can collect that information more often."

The project team processed data from both sites and—when compared with conventional surveying technologies—produced a more detailed digital elevation model quicker and at a lower cost.

A detailed digital elevation model, produced using a drone, helped surveyors analyze beach erosion and accretion.

New Levee Helps Protect City From Flooding

A drone was beneficial in tracking the progress of a levee construction and settling a dispute with the contractor.

PROJECT: CALISTOGA SETBACK LEVEE, ORTING, WASHINGTON

FIRM: PARAMETRIX SEATTLE, WASHINGTON

Parametrix received a Section 333 Exemption in August 2015 and purchased its first fixed-wing drone the following November. The firm has used UAS technology to help document preconstruction conditions and construction progress, and to gain perspective of hard-to-reach places such as underneath bridges, above landfills, over waterways and along cliffs.

"[Clients often] want certain perspectives of a project that we just can't get—or can't get reasonably—with people," says Bob Pusey, surveying supervisor for Parametrix. "We're finding more opportunities as we go; it's definitely been a handy tool to have."

Matt Kastberg

Bob Pusey

For example, the Puyallup River in Orting, Washington, would often overwhelm the levee during large storms, threatening homes, schools, businesses and infrastructure. The city began working with Parametrix following a major flood event in 2006, and the firm's construction management team realized that a drone would be beneficial in tracking the progress of a new levee and also capturing the story for the city.

"We were working on behalf of the city to basically keep the contractor on schedule and on task and make sure the scope was fulfilled," Pusey says.

When the landscape subcontractor—tasked with killing an invasive species of vegetation called reed canary grass—requested a meeting to discuss payment, Parametrix flew a drone over the area in question to take pictures and settle the dispute.

"We actually ended up reducing the amount that we were paying them from 50 percent down to something less than that based on the photos that we had," says Matt Kastberg, community building division manager for Parametrix.

The new 1.6-mile levee not only protects the city from flooding, but it also widens the river channel, restores natural habitat and promotes salmon recovery. The project received a bevy of awards, including a 2016 EEA National Recognition Award; the 2016 Gold Award—Water Resources, from ACEC/Washington; Project of the Year, International Right of Way Association, 2015; and the Municipal Excellence Award from the Association of Washington Cities in 2015. ■

2017 Market Outlook; Impact of New Leadership

The emphasis President-elect Donald Trump has placed on infrastructure, energy and tax certainly creates potential opportunities for our industry and the broader economy.

Infrastructure: According to a white paper released by two senior policy advisers to the Trump campaign, the new Administration will propose $137 billion in tax credit incentives to help subsidize equity costs, which would in turn leverage additional funds and spur public-private partnerships (P3s) totaling as much as $1 trillion over 10 years. On the drinking water and wastewater side, the Trump campaign included a proposal to triple funding for the state revolving fund programs to help states and local governments finance projects.

Questions arise however as to whether a P3 approach is sufficient to address the breadth of infrastructure needs in the country and whether the plan will also include funding for core federal infrastructure programs, including the Highway Trust Fund. While a small percentage of infrastructure projects may produce a revenue stream that is attractive to the private sector, replacing water pipes in Flint, Michigan, or building a new I-90 off-ramp in Montana may require a more traditional approach with public funding.

Taxation: To free private money to invest in the economy, Trump has proposed providing sizable tax cuts to both individuals and businesses.

Trump's plan has been studied by some well-known D.C. think tanks. The Urban-Brookings Tax Policy Center (TPC) estimates that the Trump plan would reduce federal revenue by $6.2 trillion in the first decade. TPC's model, which takes into account macroeconomic feedback effects, indicates that the plan would boost gross domestic product (GDP) in the short run, reducing the revenue cost of the plan. However, including interest costs, the federal debt would increase by at least $7.2 trillion over 10 years.

The nonpartisan Tax Foundation, using its own model, estimates that the plan would reduce federal revenues by between $2.6 trillion and $3.9 trillion, after accounting for the economic growth and broader tax base created by the plan. The organization states that the significant reduction in marginal tax rates and the cost of capital would result in higher GDP, wages and jobs. It would also lead to slightly higher after-tax income for all taxpayers, with a significant increase in income going to the top 1 percent of taxpayers.

The Urban-Brookings Tax Policy Center estimates that the Trump plan would reduce federal revenue by $6.2 trillion in the first decade

Energy: The energy sector may be one of the earliest beneficiaries of the Trump presidency. The campaign platform included an aggressive agenda for energy development. Near term, this could include moving forward on major energy infrastructure projects, as well as a focus on streamlining regulations for permitting energy infrastructure. According to the Energy Information Administration, it is estimated that as much as $25 billion each year will be invested in transmission, oil and gas pipelines in the U.S. in the foreseeable future. However, industry observers note that this may be contingent upon a more efficient and orderly regulatory process.

For the long term, the American Petroleum Institute (API) has identified over "145 pending regulations or other actions" that are barriers to affordable and reliable energy production. Through 2025, API suggests that removal of these barriers will enable more than $1.1 trillion in potential energy investment. In that case, significant additional growth will occur in asset classes such as LNG liquefaction facilities, gas processing capacity, natural gas underground storage formations and crude oil pipelines. This case is highlighted by a substantial growth in U.S. LNG exports and the construction of an additional major North-South crude oil pipeline transportation corridor. The API estimates that these projects will support 1,147,000 jobs, boost GDP by $120 billion, increase labor income by $75 billion and add government revenues in excess of $27 billion.

Additional impacts of a Trump presidency on the energy sector could include a resolution of nuclear decommissioning and waste uncertainties, adoption of advanced nuclear technology, deployment of carbon capture and storage, and increased energy trade with Mexico and Canada.

International: Trump says he will withdraw from the Trans-Pacific Partnership—and has threatened to withdraw from the North American Free Trade Agreement, which he

Construction Put in Place
Change from Prior Year–Current Dollar Basis, 3rd Quarter 2016 Forecast

	2017	2018	2019	2020
Residential Buildings				
Single Family	5%	3%	3%	5%
Multifamily	4%	2%	3%	4%
Improvements	2%	2%	1%	2%
Total Residential	**4%**	**3%**	**2%**	**4%**
Nonresidential Buildings				
Lodging	5%	2%	1%	2%
Office	5%	4%	2%	1%
Commercial	4%	2%	1%	2%
Health Care	5%	7%	7%	6%
Educational	5%	6%	6%	5%
Religious	2%	3%	2%	2%
Public Safety	1%	4%	4%	4%
Amusement and Recreation	5%	2%	2%	1%
Transportation	4%	5%	4%	3%
Communication	4%	5%	4%	3%
Manufacturing	4%	3%	3%	2%
Total Nonresidential Buildings	**4%**	**4%**	**4%**	**3%**
Nonbuilding Structures				
Power	6%	5%	5%	2%
Highway and Street	2%	3%	2%	2%
Sewage and Waste Disposal	2%	3%	4%	5%
Water Supply	1%	3%	5%	6%
Conservation and Development	5%	7%	7%	7%
Total Nonbuilding Structures	**4%**	**4%**	**4%**	**3%**
Total Put in Place	**4%**	**4%**	**3%**	**3%**

Source: FMI

PRAIWUN/THINKSTOCK

calls "the worst trade deal in history"—if he cannot renegotiate.

Trump says he supports free trade and his policies will "not be protectionism but accountability," but he also says he would impose tariffs on countries to force trade concessions. Economists say that such a strategy raises the likelihood of retaliatory tariffs, which would make it more difficult to sell U.S. products and services abroad.

Federal programs, including the Export-Import Bank and other foreign assistance mechanisms, may face new challenges from the Trump Administration. He has voiced support for eliminating the bank altogether, or at least limiting its reach, and has proposed the consolidation of various agencies engaged in export promotion.

Immigration: Trump's hardline immigration policy propelled him into the national spotlight, including his plan to build an "impenetrable physical wall on the southern border" and tighten immigration rules.

Trump's uncompromising view on immigration could hurt the engineering industry in a couple of areas. First, because immigrants make up a big share of the construction industry workforce, fewer construction workers mean increased labor costs and project delays. Second, many engineering firms rely on securing talent from abroad to make up for the lack of engineering graduates at home. Organizations such as ACEC that advocate for more H-1B visas to facilitate this flow of talent will likely find it harder to

sell lawmakers on the merits of this policy during the Trump Administration.

Short-Term Outlook

Minus the Trump impact, most forecasters are predicting that the long, sluggish U.S. economic recovery will continue to putter along through 2017 and into 2018.

"We're in the ninth year of recovery, which is unprecedented," says FMI Capital Advisors Director of Investment Banking Greg Powell. The slow pace of GDP growth during the recovery, averaging just 2.1 percent annually, has also been unprecedented.

In his "Dodge Data & Analytics Construction Outlook," Chief Economist Robert Murray foresees the U.S. GDP increasing by 2.4 percent in 2017. His forecast is on the higher end of the spectrum: The Conference Board predicts 1.9 percent GDP growth, while the Federal Reserve Bank of Chicago's forecast comes in at 2.2 percent.

Driving Murray's confidence are the continuing low unemployment rate and stabilizing oil prices. "The weak global economy and negligible inflation in 2016–2017 should help keep long-term interest rates low for the near term," he says.

Specific short-term prospects for the engineering markets are also positive. Powell forecasts 3 to 4 percent growth in 2017, with the power distribution, communication, health care and industrial sectors outperforming expectations.

A good leading indicator for the engineering industry is *The Dodge Momentum Index*, which tracks the first report for nonresidential building projects in the planning stage. Over the first three quarters, the index performed strongly, suggesting steady work for firms over the next 12 to 18 months.

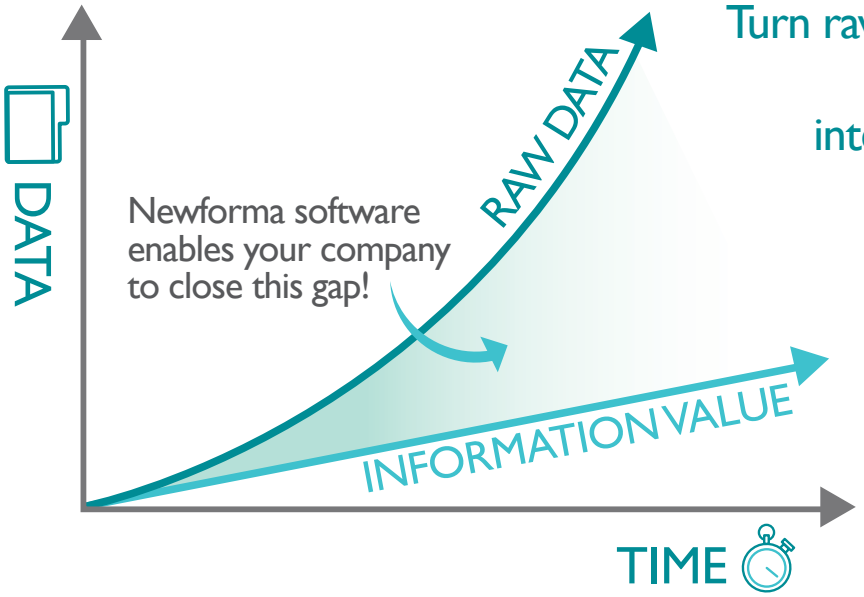
ACEC's *Engineering Business Index*, a quarterly survey of Member Firm leaders about prospects for their firms and the industry, rose in the third quarter of 2016 on optimism that the market would continue to expand over the coming year.

Many forecasters were also predicting the economy will turn down in about 18 to 24 months. Such a natural cyclical slowdown, says Powell, would actually bode well for the industry. "The engineering and construction industry typically lags the broader economy by one to two years," he says. In that scenario, engineering firms could look forward to continued growth through as late as 2020. ■

Through 2025, the American Petroleum Institute suggests that removal of these barriers will enable more than $1.1 trillion in potential energy investment

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

Is Data Growing Faster Than Your Ability To Put It To Work?



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A VHB team recently competed in the first annual Boston Children's Hospital Corporate Cup held at Harvard Stadium. Led by Team Captain Elsa Chan, the VHB roster included Mark Arnoldy, Christopher Berganti, Larry Capriotti, Andrew Cole, Aleksandar Loncarevic, Michael Lovett, Jennifer Marquis, William Nichols, Griffin Ryder, Nick Skoly, Chris Wagner and Sarah Wetmore.

In honor of Childhood Cancer Month, VHB employees and their families participated in the TD Hub on Wheels Event to support the Boston Children's Hospital.

VHB CEO Mike Carragher takes a shot at the 18th Annual Northern New England VHB Jimmy Fund Golf Tournament in Portsmouth, New Hampshire.

TALENT, TIME AND MONEY: THREE WAYS VHB EMPLOYEES HELP THOSE IN NEED

Professionals at VHB are constantly working to improve their communities—through pro bono professional services, fundraising and hands-on volunteer efforts

BY CALVIN HENNICK

VHB—a 1,250-person professional services firm whose engineers, scientists, planners and designers work out of 23 offices along the East Coast—has a long history of encouraging its employees to contribute to their communities.

The company established its employee-run charitable giving campaign, VHB Cares, in 1979, and the effort has since raised more than $2 million for nonprofit organizations. In 2016, the *Boston Business Journal* honored the firm as a "Top Charitable Contributor" in Massachusetts. And across the firm's offices, employees run a variety of annual regional programs and one-off efforts that benefit charity groups.

For VHB employees, giving back has different meanings. Some of them find that getting out into their communities and meeting the people they're helping is the most rewarding way of contributing. Others work to

support worthy causes through fundraising efforts. There are some employees who leverage their professional skills, volunteering their time to work on site plans and permitting for nonprofits.

"It really goes back to our people," says Marshall Agee, a project engineer in VHB's Richmond, Virginia, office. "VHB really develops people as employees but also as friends of each other, stewards of the environment around us and contributors to the vitality of the local economies we serve. It's almost like a triangle—donations of our work services, donations of our time to work in the community with those in need and financial donations.

"Those three principles are almost a triangle of sorts that show how much we care about our communities," he adds. "That's certainly VHB's goal: to mix it up in as many ways as possible and help out the community in any way we can."

VHB's Watertown, Massachusetts, office participates in Building Impact events about six times a year

Raising Money, Fostering Community

Each year, employees from five VHB offices gather to compete on the links, meet colleagues from outside their office and—most important—raise money for a good cause through the Mid-Atlantic VHB Golf Tournament.

"It's a way to have people from other offices that don't usually get a chance to interact [in person] to put a face to the name," says Agee, who coordinates the tournament. "We have our instant messenger, and we can get in touch with people, but we don't usually get that personal face time."

"VHB really develops people as employees but also as friends of each other, stewards of the environment around us and contributors to the vitality of the local economies we serve."

MARSHALL AGEE | VHB

The tournament, which Agee estimates is 15 or 20 years old, takes place at Kiskiack Golf Club in Williamsburg, Virginia. The event attracted more than 40 golfers this year. Unlike many corporate golf tournaments, this one is closed to partners and other outside participants, giving VHB employees a chance to create closer bonds with one another as they spend the day raising money and trying to break par.

The tournament brought in $565 this year, largely through a raffle. With VHB's 100 percent corporate match, it resulted in a $1,130 donation to the Wounded Warrior Project, which offers programs and services for wounded veterans and their families.

Agee says VHB's corporate sustainability program focuses on four main pillars: the firm's people, operations, communities and projects. Events such as the Mid-Atlantic VHB Golf Tournament touch on at least two of these areas, helping the firm's people to make connections with one another and providing funding for organizations in communities where the firm works.

The tournament is just one of many events held by VHB employees throughout the year. "That's one of the main reasons that people come to work at VHB," Agee says. "The company will just about support any type of community engagement opportunity or service or financial donation to a charity. Every office has their ways that they contribute."

Hands-On Helping

In VHB's Watertown, Massachusetts, office, Jocelyn Mayer, a project engineer for land development, coordinates with the nonprofit group Building Impact to find as many ways as possible for employees to roll up their sleeves and make a difference.

"They take the legwork out of pulling together these volunteer events," Mayer says of Building Impact, which connects individuals and companies with volunteer opportunities. "They coordinate with the charities and, if we do a food drive, they organize picking up the food, delivering it to the food pantry and any other coordination that's needed.

"They make it so easy for companies to find ways to volunteer," she adds. "All you really have to do is show up, which is amazing."

Mayer estimates VHB participates in Building Impact events about six times a year. Often, these events are simple activities that take place in the company lunchroom. Mayer will send out e-mails a couple of weeks before the event, the firm will order in pizzas and then dozens of employees will spend their lunch breaks together, making holiday cards for people in assisted-living facilities, crafting dog and cat toys for a local animal shelter, writing letters to soldiers overseas or putting together coloring books for children in foster care.

"The majority of people want to somehow give back or contribute to their communities, but life gets in the way," Mayer says. "Trying to find the opportunity to do that can be challenging for a lot of people. But when it's brought to them in the lunchroom, and they're walking right by it, it's an easy way to jump in and satisfy their desire to give back."

The company also participates in Building Impact's Service Made Simple nights, which gather people from different companies for "speed volunteering" opportunities. Last year, VHB participated for the first time in Building Impact's Day of Service, doing landscaping work at an elementary school and food pantry.

Led by VHB's Joe Bushey, a 29-person crew of engineers, friends and family members rode in the 36th annual bike-athon for the Virginia-West Virginia Chapter of the National Multiple Sclerosis Society.

"I think it's nice to get out and do something different that you don't do every day," Mayer says. "It challenges a different skill set. It makes you think a little bit differently, and all-around, it's just a good change."

Working Off-the-Clock

While meticulously reviewing sewer-permitting plans may not sound as heartwarming as working directly with children or delivering a large check to a charity, some VHB employees believe that they can make the largest possible impact on their communities by offering their professional services to organizations in need.

A handful of employees in VHB's Bedford, New Hampshire, office teamed up to provide free consulting services for an amphitheater at a nearby Boy Scouts camp. Steven Hodgdon, a project manager at VHB and chief structural engineer for the Northern New England region, says the firm was able to make suggestions to make the site more accessible to people with disabilities and also to help extend the life of the structure.

"We were able to polish the edges a little bit and give them some things to help it last a little bit longer, and maybe make it more useful and serviceable for more people," he says. "For us, it's rewarding. We always try to be helpful to our communities and make a difference."

In Orlando, Florida, about a half-dozen VHB employees put in hours on nights and weekends over the course of several months to provide civil engineering, landscape architecture and permitting work for a Ronald McDonald House on the site of Nemours Children's Hospital. Ronald McDonald Houses provide lodging to the families of hospitalized children who are receiving treatment.

"Everyone felt that this was the most useful they could be toward the project," says Joseph Kolb, regional land development services director for VHB. "It's our expertise. It's not only that we're doing something to help, but it's in the highest possible, most effective way. Without [this work], you don't get the permits, you don't begin construction, and you don't build what's out there today."

Younger staffers, in particular, jumped at the chance to help, Kolb says. The crew spent at least four Saturdays in the office working on the project, along with "a lot of late-night stuff," and Kolb estimates the market value of the services at more than $100,000.

Now that the project is complete, VHB employees plan to volunteer preparing meals at the Ronald McDonald House, Kolb says. "That will be that personal side," he adds. "It's nice that when employees go out there, they'll see the VHB plaque and know that not only are we out there helping them and meeting people, but we were a large contributor to the construction project. You're the unsung, behind-the-scenes hero." ■

VHB Cares has raised more than $2 million for nonprofit organizations

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

Protecting Your Assets When Disaster Strikes: The Business Case for Split Limits in PLI

By Glen R. Mangold and Charles W. Kopplin

After a long day, you sit down in your favorite chair to watch the evening news. The lead story shows aerial footage of a building engulfed in flames and collapsed portions of the structure. The newscaster reports that it's a multiple-alarm fire of unknown origin on a project under construction. You realize this is one of your firm's projects, and your mind races thinking about what could possibly have gone wrong.

The magnitude of the loss—if the firm is liable—means the total loss would vastly exceed your policy limits because your firm carries a single limit professional liability insurance (PLI) policy. Your firm would also be operating without any coverage for the remaining eight months of your policy year.

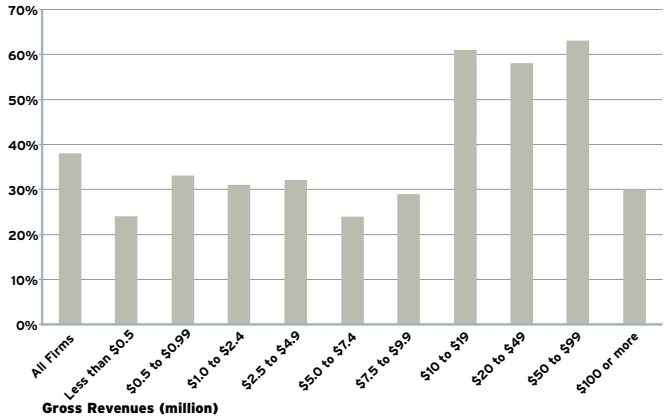
Before the embers have cooled, your firm receives a notice of intent to file a lawsuit from the project owner's attorneys ordering your firm to preserve all documents pertaining to the project. This includes hard copy and electronic, as well as e-mails. Fortunately, there were no deaths or injuries, but there are indications that a design error contributed to the loss. Furthermore, the losses are expected to exceed $80 million, which would be 40 times the $2 million limit of your PLI.

Although you believe your firm was not at fault, you contemplate the chances of a jury finding the firm to be at least 5 percent at fault. That would be $4 million, twice the limit of your policy. After many discussions with your insurance carrier and attorney, you begin settlement talks with the attorneys for the project owner. An agreement is reached for the limits of your firm's PLI policy, which includes providing your firm with the appropriate indemnifications from other lawsuits.

Consequently, your firm has exhausted its PLI coverage, and it may no longer be in compliance with some of its existing contracts.

Unfortunately, this problem could have been avoided if your firm had purchased a split limits PLI policy. Split limits provide one limit for the maximum payment for any one claim during the policy year and another limit for all claims during the policy year. According to the ACEC 2016 Professional Liability Insurance Survey, almost 40 percent of all firms have a split limits policy. For firms with gross revenues between $10 million and $100 million, over 60 percent of the firms have a split limits policy.

Firms Utilizing Split Limits PLI



Source: ACEC 2016 Professional Liability Survey

The cost of split limits PLI depends on many factors, including the type of services provided, size of projects, claims history, and the size and type of deductible. For a firm with a policy limit of $1 million, it would cost between 8 and 20 percent more for a $1 million per claim and $2 million aggregate limit PLI policy. For a firm with a $2 million per claim policy, it would also cost approximately 8 to 20 percent more for a $2 million per claim policy with a $4 million aggregate limit.

"Split limits can offer a risk management alternative at reasonable cost. In addition, it may help architects and engineers meet contractual requirements," says Trey Reich, senior professional liability broker at CRC Insurance Services. Split limits PLI policies also provide an affordable means to protect a design firm against multiple claims in a policy year, and they eliminate the chance of a PLI policy being wiped out by one claim. By maintaining coverage for other claims, it could eliminate the need to purchase additional coverage if the PLI policy is wiped out by one claim. Talk to your insurance broker about how a split limits PLI policy can help protect your firm. ■

Glen R. Mangold, *CPCU, is managing director of the architects/engineers program for Markel Corp., a leading provider of professional liability insurance. He has more than 25 years' experience in the insurance industry. He can be reached at gmangold@MarkelCorp.com.*

Charles W. Kopplin, *P.E., FACEC, has more than 40 years' 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.*

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The Tale of the Sale

BY MICK MORRISSEY

In the complex world of mergers and acquisitions (M&A), selling a firm is one of the most important yet precarious undertakings for an engineering firm leader.

When it comes to selling your firm, understanding the process is critical to maximizing chances for a successful return. Following are five rules to keep in mind when considering a sale.

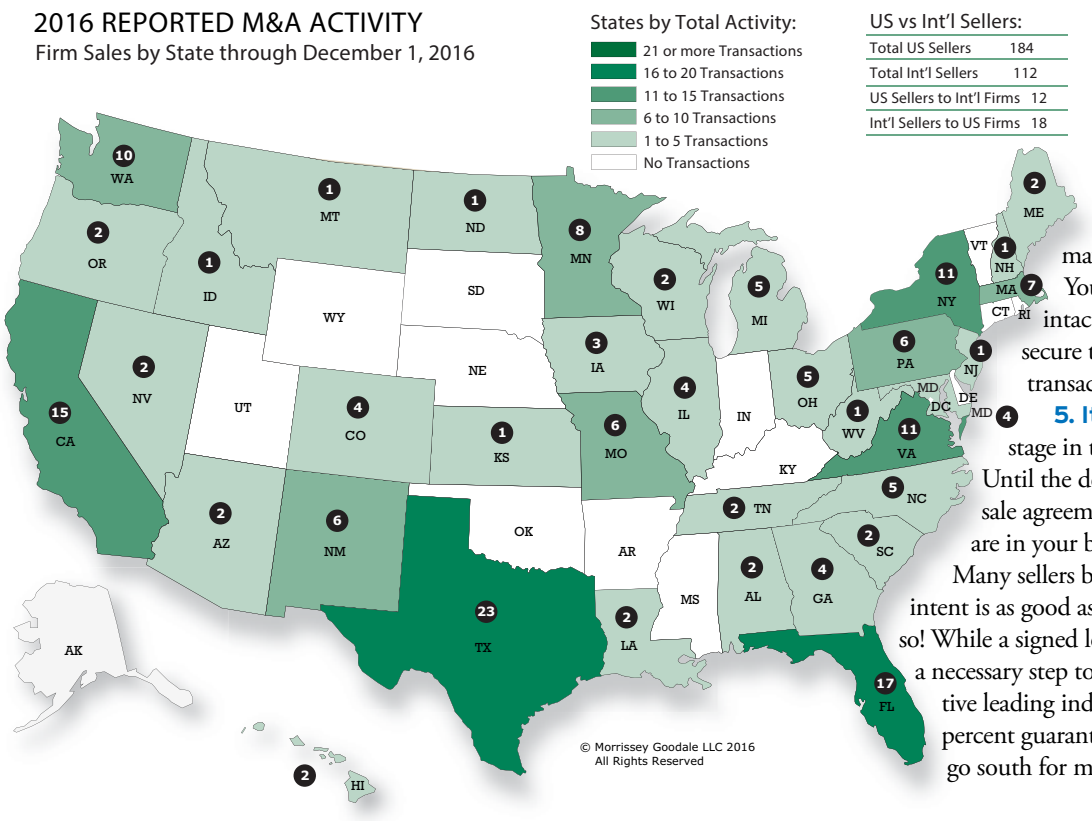
1. Know whom you are dealing with and protect yourself: Between two-thirds and three-quarters of all engineering firm acquisitions include an out-of-state buyer. The chances are high that you will sell your firm to an entity you may not have been familiar with before the sale process began. If a buyer approaches you, remember to do your homework. Find out if the buyer has made acquisitions before. If not, beware—don't let someone learn at your expense. Also, remember that not all buyers behave ethically. Protect your reputation by having a confidentiality agreement that covers any discussions between you and the prospective buyer, and protects your clients and staff by including nonsolicitation language.

2. Don't waste your time: Your time is valuable, and the M&A arena is full of tire-kickers and time-wasters. Here's a good rule of thumb to determine whether you are dealing with a legitimate sale potential. After you have met with potential buyers twice, ask them what information they need to put together a written term sheet that outlines an offer for your firm in 30 days. If they can't give you an answer, don't answer or tell you they cannot do it in 30 days, then chances are they are not serious buyers, and you should not spend any more time with them directly.

3. Not just the price: Refrain from focusing too much on the top-line price a buyer proposes for your firm. Depending on your corporate structure (C corporation or S corporation), the type of consideration (cash, debt, stock, earn-outs) the buyer is proposing and its timing, and the deal structure (asset purchase, stock purchase or merger), the tax implications to you can be significant. Make sure you have a lawyer who knows M&A deals and an experienced tax adviser.

4. Be prepared for your team dynamic to change—and possibly worsen: While you may have planned to sell your firm and are happy with the negotiated price and terms, it's not unusual to find that some members of your team are not. They may be surprised, shocked, dismayed or disappointed when you break the news to them. They may feel trust has been broken. Your job is to keep your team intact through the sale process to secure the best outcome from the transaction.

5. It ain't over till . . .: At no stage in the sale process can you relax. Until the deal is closed, the purchase and sale agreement is signed, and the funds are in your bank account, there is no sale. Many sellers believe that signing a letter of intent is as good as a done deal, but that is not so! While a signed letter of intent with a buyer is a necessary step to selling your firm and a positive leading indicator of success, it's not a 100 percent guarantee. We've seen numerous deals go south for multiple reasons between the



signing of a letter of intent and the scheduled close date. Some of these include a change in the buyer's or seller's business outlook, miscalculations on deal valuation by the buyer or—believe it or not—a better deal comes along for the buyer. That further underscores Rule No. 1—know whom you are dealing with.

RECENT ACEC DEAL-MAKERS

NOVEMBER 2016

ACEC member **DLR Group** (Minneapolis) acquired **MOMENTA** (Overland Park, Kan.), an architectural firm specializing in the design of education, civic and workplace environments.

ACEC member **Terracon Consultants, Inc.** (Olathe, Kan.), acquired **Geotechnical Consulting & Testing, Inc. (GC&T)** (Woodbridge, Va.), which provides geotechnical and materials testing services. The acquisition reflects Terracon's growth strategy in the mid-Atlantic area.

ACEC member **Surveying and Mapping** (Austin, Texas) acquired **So-Deep, Inc.** (Manassas Park, Va.), a provider of subsurface utility engineering services.

ACEC member **David Evans Enterprises, Inc. (DEEI)** (Portland, Ore.), has merged with **TriAxis Engineering, Inc.** (Corvallis, Ore.), a 25-person electrical engineering firm. TriAxis will become a division of DEEI subsidiary **David Evans and Associates, Inc.**

OCTOBER 2016

ACEC member **Arcadis** (Amsterdam) acquired **Environmental Strategies** (Eveleigh, Australia), an environmental remediation business. The deal increases Arcadis' local presence in Australia's substantial environmental remediation market.

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

ACEC member **H2M architects + engineers** (Melville, N.Y.) acquired **Pacheco Ross Architects (PRA)** (Voorheesville, N.Y.), which specializes in fire, police and ambulance station design.

ACEC member **Draper Aden Associates** (Blacksburg, Va.), merged with **Advanced Technical Services International** (Christiansburg, Va.). The merger enhances Draper Aden's existing technological capabilities while adding geotechnical services, including bedrock mapping and seismic surveying.

ACEC member **WSP | Parsons Brinckerhoff** (Montreal) acquired **Mouchel, Ltd.** (Woking, U.K.), from Kier Group (Sandy, U.K.). Mouchel is a highly recognized U.K. firm with a strong presence in public sector transportation.

ACEC member **AECOM** (Los Angeles) acquired the remaining 50 percent equity stake in **FT Services, Ltd. (FTS)** (Calgary, Canada). Formed in 2007 between AECOM subsidiary Flint Energy Services Ltd. and Broadspectrum Ltd., the venture specializes in large-scale maintenance services for Canada's energy industry.

ACEC member **BSA LifeStructures** (Indianapolis) joined forces with **H+sp** (Austin, Texas), an architecture & engineering firm. Both firms specialize in the design of health care facilities and interiors.

ACEC member **Stantec** (Edmonton, Canada) signed a letter of intent to acquire **Architecture | Tkalcic Bengert (Arch|TB)** (Edmonton, Canada), a 60-person firm offering architecture, interior design, urban design, technical consulting and creative services.

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

Watch the M&A Takeaway video that accompanies this article, presented by Mick Morrissey, at www.morrisseygoodale.com/ACECMergers/JanFeb2017.

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

ACEC member **CJL Engineering** (Moon Township, Pa.) acquired **RHL Engineering Inc.** (Frederick, Md.), a firm with service offerings in all phases of design and construction.

ACEC member **LaBella Associates** (Rochester, N.Y.) acquired **Gardner PLUS Architects, PLLC** (Rochester, N.Y.), which has extensive expertise in health care design.

ACEC member **Hillis-Carnes Engineering Associates** (Annapolis Junction, Md.) acquired **Atlantic Geotechnical Services, Inc.** (Ashland, Va.). The acquisition expands Hillis-Carnes' presence in Virginia and the firm's service capabilities to include geo-structural engineering, drilling and geo-construction services.

ACEC member **NV5** (Hollywood, Fla.), a provider of professional and technical engineering and consulting solutions, acquired ACEC member **JBA Consulting Engineers** (Las Vegas). JBA provides MEP engineering, acoustics, technology and fire protection consulting services from its headquarters in Las Vegas as well as from 12 offices in the United States and Southeast Asia.

ACEC member **Parkhill, Smith & Cooper (PSC)** (Lubbock, Texas) announced its merger with solid waste engineering firm **Gordon Environmental, Inc.** (Bernalillo, N.M.). The merger expands on PSC's existing solid waste engineering services and expands the firm's presence to include the Albuquerque, N.M., area. The expansion brings PSC its ninth location and second office in New Mexico. ■

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

On the Move

Christopher Sherry has been appointed president of Greenwich Village, Colorado-based **Merrick & Co.**, effective April 1, 2017. Sherry has served as senior vice president and COO for the past three years and will continue as COO as he assumes his new role. He succeeds **David G. Huelskamp**, who has served as president and CEO for the past four years and most recently was elected chairman. Huelskamp will continue as CEO and chairman.

Peter Zeeb has been appointed president & CEO of Atlanta-based **Geosyntec Consultants**, succeeding **Rudolph Bonaparte**, who served in that role for 20 years. Zeeb joined Geosyntec in 1999 and is a senior principal hydrogeologist based in Massachusetts. Bonaparte will continue as chairman and as a practicing professional in the firm.

Marlborough, Massachusetts-based **Tata & Howard, Inc.** has named current vice presidents **Karen L. Gracey** and **Jenna W. Rzasa** as co-presidents of the firm. Current president, **Donald J. Tata**, was appointed CEO, but will be working in a reduced capacity. As part of the company's leadership and transition plan, Gracey and Rzasa have been slated to assume leadership of the company for several years.

Netherlands-based **Arcadis** announced that **Renier Vree** has been appointed the company's interim CEO, upon the departure of Neil McArthur, CEO since May 2012, while the firm seeks a permanent replacement. Vree most recently served as the firm's CFO. **Peter Turton** was named vice president and project director. Turton, who will be responsible for managing the firm's multibillion-dollar rail transit projects, is based in the San Francisco Bay area.

Los Angeles-based **AECOM** announced the following appointments: **LaMont Wells** has been appointed executive vice president of business development of the firm's management services group. Wells most recently served as president and chairman of Technology Management Associates. **Randall A. Wotring** has been named president of technical and operational services and also will oversee government affairs. Wotring joined AECOM from URS Corp., where he served as president of federal services. **John C. Vollmer**, former executive vice president and COO of management services, will assume the role of president of management services. All three are based in the Germantown, Md. office.

Sparks, Maryland-based **KCI Technologies, Inc.**, announced the following promotions: **G. Scott Lang**, executive vice president, Sparks, Maryland, and **Gary M. Mryncza**, senior vice president, Brentwood, Tennessee. The following were all promoted to vice president: **Steven B. Cumor, James E. Deriu, Adam R. Gardner, Carolyn D. Roberts, Robert C. Macoy, Susan D. Miller** and **Christopher L. Overcash**, who are based at the firm headquarters; **Elizabeth R. Phipps**, who is based


Christopher Sherry


David G. Huelskamp


Peter Zeeb


Karen L. Gracey


Jenna W. Rzasa


Renier Vree


Peter Turton


LaMont Wells


Randall A. Wotring


John C. Vollmer


G. Scott Lang


Gary M. Mryncza

in Raleigh, North Carolina; **D. Scott Stockburger**, who is based in Irving, Texas; and **Larry K. Gregory**, who is based in Atlanta.

Pasadena, California-based **Parsons** appointed **Carey A. Smith** as president of its federal business unit, where she will serve agency customers in the defense, environmental, infrastructure, security and intelligence services markets. Smith, who is based in the Washington, D.C., office, formerly served as president of defense and space at Honeywell. **Thomas L. Roell**, who has been serving as interim president of Parsons' federal business unit since August, will resume his role as vice chairman, chief risk adviser.

Mark D. Johnson and **William M. Plumpton** have been appointed senior vice presidents of Harrisburg, Pennsylvania-based **Gannett Fleming**. Johnson, based in North Andover, Massachusetts, serves as the national practice director of environmental compliance and remediation services. Plumpton, based in the firm's headquarters, serves as a senior project manager and environmental scientist.

Montreal-based **WSP Global, Inc.**, announced that **Bruno Roy** was appointed CFO. He is based at the corporate headquarters. He formerly served as a senior partner in the Hong Kong office of McKinsey & Co. and also served as leader of the Private Equity Service Line in the Asia-Pacific region.

New York City-based **WSP | Parsons Brinckerhoff** announced the following appointments: **Eduardo Martinez** has been appointed senior vice president and managing director of the Miami buildings practice. He formerly served as executive vice president and managing principal for Cosentini Associates. **Robert Goossens** was appointed senior vice president, building systems, and will lead the commissioning department in Boston. The firm also appointed: **Tyler Fritz**, vice president, building systems, Denver office; **Jeremy Pinkham**, vice president, building systems, Boston office; and **Mike Zeuger**, vice president, building systems, San Jose, California, office.

Alpharetta, Georgia-based **Amec Foster Wheeler** appointed **Philip Luna** senior vice president of business development for the firm's Oil & Gas Americas business. Based in Houston, Luna most recently served as president and CEO of UniversalPegasus International.

Leofwin Clark has joined Walnut Creek, California-based **Brown and Caldwell** as vice president, integrated project delivery. Clark, who formerly served as a vice president and sales director for CH2M's water- and wastewater-related design-build market, will be based in the Denver office.

Watertown, Massachusetts-based **VHB** appointed **Michael J. Jelen** vice president and managing director of its National Capital District, which includes Tysons, Virginia, and Silver Spring, Maryland. Jelen will oversee VHB's projects for public and private clients, and expand services throughout the Washington metropolitan area. Jelen is also president-elect of ACEC/Metro Washington.

Trey Dawson was promoted to vice president of San Antonio, Texas-based **Pape-Dawson Engineers, Inc.** Dawson will manage the firm's land development services throughout the San Antonio region.


Carey A. Smith


Mark D. Johnson


William M. Plumpton


Bruno Roy


Eduardo Martinez


Robert Goossens


Philip Luna


Leofwin Clark


Michael J. Jelen


Trey Dawson

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News

Engineering Inc. Wins Five International Awards

ACEC's bimonthly magazine *Engineering Inc.* has won five top honors in the 2016 MarCom Awards—an international competition recognizing excellence in marketing and communications.

The 2016 MarCom competition included more than 6,500 entries from communications professionals in the U.S., Canada and 17 other countries.

Engineering Inc.'s November/December 2015 issue (Smart Roads Ahead) received MarCom's top award—Platinum—for overall excellence in a magazine by an association. The July/August 2016 issue cover story, "Cyber Defense," and the September/October 2015 feature "Avoiding the Threat of International Corruption" both received Gold awards for writing excellence. The "Cyber Defense" issue also earned Honorable Mention awards for overall magazine design and for magazine cover.

VHB Chairman Brustlin Appointed to ISI Board

Bob Brustlin, chairman of VHB, has been appointed to the board of directors of the Institute for Sustainable Infrastructure (ISI). Brustlin, who succeeds Tim Psomas, will serve a three-year term beginning Jan. 1, 2017.

In announcing the appointment, ACEC President/CEO Dave Raymond said, "Bob's familiarity with and strong commitment to ISI, as well as his valuable experience as a successful business leader, should greatly benefit the organization."

ISI was founded by ACEC, the American Public Works Association and the American Society of Civil Engineers.

Welcome New Member Firms

ACEC/Alabama
Borden Morris Garner Consulting Engineers
Montgomery
Hargrove Engineers + Constructors
Mobile

ACEC/Arizona
Cole Design Group, Inc.
Phoenix
Erie & Associates, Inc.
Phoenix
Hubbard Merrell Engineering
Flagstaff

ACEC/California
Cushman Contracting Corp.
Goleta
Engstrom and West, Inc. DBA Groza Construction
Monterey
ETIC Engineering, Inc.
Pleasant Hill
Geotechnical Exploration, Inc.
San Diego
Kyler Engineering
Monterey
Rajappan & Meyer Consulting Engineers, Inc.
San Jose
RMA Group, Inc.
Rancho Cucamonga
Talas Engineering, Inc.
Hayward
Technology Associates EC, Inc.
Carlsbad

ACEC/Georgia
ICA Engineering, Inc.
Atlanta
Southeastern Engineering, Inc. (SEI)
Marietta

ACEC/Louisiana
McManus Consulting Engineers, Inc.
Monroe

ACEC/Maine
Main-Land Development Consultants, Inc.
Livermore Falls

ACEC/Massachusetts
BL Cos.
Norwood
McPhail Associates, LLC
Cambridge
Stacey DePasquale Engineering, Inc.
Lawrence

ACEC/Michigan
Holland Engineering, Inc.
Holland
Metro Consulting Associates
Plymouth
WBK Engineering, LLC
Battle Creek

ACEC/Minnesota
Anderson Engineering of Minnesota, LLC
Plymouth
MN Best, Inc.
Roseville

ACEC/New York
Lynch Consulting Engineers, DPC
New York
MFS Engineers & Surveyors
New York

ACEC/North Carolina
A1 Consulting Group, Inc. DBA NFE Technologies
Morrisville
Brown Consultants
Asheville
Fleming Engineering, Inc.
Colfax
UMA, Geotechnical Construction, Inc.
Colfax

ACEC/Ohio
Clune Consulting Services, LLC
Minster
ADG, Inc.
Oklahoma City

ACEC/Oregon
Aligned Engineering, LLC
Aloha

ACEC/Pennsylvania
Stafford Bandlow Engineering, Inc.
Doylestown

ACEC/South Carolina
Civil & Environmental Consultants, Inc.
Greenville

ACEC/Texas
Musser Engineering Associates, Inc.
Austin
Odyssey Engineering Group, LLC
Houston
SurvWest, LLC
Fort Worth
The WCM Group, Inc.
Humble

ACEC/Utah
REDD Engineering & Construction, Inc.
Salt Lake City

ACEC/Washington
SoundEarth Strategies, Inc.
Seattle

JANUARY

17 Oh What a Feeling—From Bland to Brand (online class)

18 Lease Accounting Rules Update—How Will They Impact Your Firm? (online class)

19 Building a Social Responsibility Program That Improves Your Bottom Line (online class)

24 Secrets to Successfully Communicating Technical Topics (online class)

25 Broad Form Indemnification (online class)

31 Strategic Leadership and Management: Achieving Sustainable Growth and Profitability for Your Company (online class)

FEBRUARY

1 Brand Now: Refocus Your Brand and Help Your Firm Grow (online class)

1-2 Essential Training: Learn the Fundamentals of Effective A/E Operations Management, Washington, D.C.

2 Working Effectively on Multidisciplinary Projects as a Civil Engineer (online class)

8 Building Your Brand: Personally and Professionally (online class)

14 Command & Control: It Doesn't Work (online class)

16-18 2017 Small Firm Council Winter Seminar: Defining HR for Your Firm, San Diego

21 Earning a Seat at the Table: A Guide for Emerging Leaders (online class)

MARCH

1 Smart Buildings/Smart Cities and the Opportunities for Engineers (online class)

2 Attracting Clients: How to Talk About Your Firm in Two Ways That Bring in Clients (online class)

14 Managing Multiple Projects (online class)

15-18 Business of Design Consulting, Orlando, Florida

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

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

New Operations Management Course; SFC Winter Meeting Set

NEW COURSE: FUNDAMENTALS OF EFFECTIVE A/E OPERATIONS MANAGEMENT

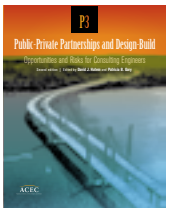
Operations managers in a consulting engineering business have their work cut out for them—they have to do it all. Beyond the technical work, they're tasked with many different responsibilities, including:

- Winning new work;
- Turning a profit;
- Maintaining cash flow;
- Developing/communicating with staff; and
- Managing risk

At every step, a firm depends on a manager with solid operations knowledge and management expertise. In just two days, attendees will gain the ability to recognize and mitigate risk in practical terms; understand financial reporting and metrics, including items such as the relationship between profit and cash flow, and the levers for improvement in each.

Join us for this important new program Feb. 1–2, 2017, at ACEC's National Offices in Washington, D.C. For more information and to register, visit: http://bit.do/acec-ae-operations-mgt.

NEW FOR 2017: *PUBLIC-PRIVATE PARTNERSHIPS AND DESIGN-BUILD: OPPORTUNITIES AND RISKS FOR CONSULTING ENGINEERS, SECOND EDITION*



Editors: David J. Hatem and Patricia Gary

As public-private partnerships (P3) and design-build (DB) approaches to designs for bridges, roads, transit, water/wastewater, rail and other public infrastructure projects continue to increase, consulting engineers need access to current knowledge and reliable expertise to make prudent decisions about project opportunities and risks.

In this second edition of *Public-Private Partnerships and Design-Build: Opportunities and Risks for Consulting Engineers,* readers will discover new industry information and experience on P3 and DB applications as well as timely recommendations about the rewards, challenges and risk exposures for succeeding in today's still evolving P3 and DB project work environment. Readers will also find updated information on risk allocation and professional liability issues specific to P3 and DB projects.

Order your copy at the ACEC Bookstore: http://bit.do/P3DB.

SMALL FIRM COUNCIL WINTER MEETING

The "2017 Small Firm Council Winter Seminar: Defining HR for Your Firm" will be held Feb. 16–18, 2017, in San Diego's Mission Valley. Presented by Barbara Irwin, principal and founder of HR Advisors Group, this 1½-day program will focus on how firms can create programs, processes and procedures that address the varied needs of the staff while continuing to focus on the bottom line.

Attendees will discover how to create a culture that matches their firm's vision and best practices for building employee engagement. This seminar is for any employee within a small firm tasked with making human resources decisions, including owners, principals, HR professionals, CEOs and CFOs.

For more information and to register, visit http://bit.do/SFC-2017-winter-seminar.

BUSINESS OF DESIGN CONSULTING MARCH 15-18, 2017

Managing a successful A/E business requires technical know-how and a broad awareness of today's best multidisciplinary business practices. To meet the business challenges in the current economy, managers also need to:

- Understand the intricacies of human relations and related legal elements;
- Create and manage client relationships and expectations;
- Manage risk and draft/adapt contracts;
- Know the fundamentals of business development; and
- Understand ownership transition and employee satisfaction factors.

ACEC's popular Business of Design Consulting course is an effective playbook for building leadership and managing your firm at its highest level. Join us March 15–18, in Orlando, Florida, where ACEC's expert faculty of industry practitioners will cover contemporary best practices and critical operational management methods.

For more information and to register, visit: http://bit.do/acec-BDC-Orlando-2017. ■

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Welcome new members

ACEC of Georgia
ACEC of North Carolina
Birkhoff, Hendricks & Carter, LLP
C.A.Wehsener Engineering, Inc.
Cascadia Associates, LLC
Civil Consulting Group
Gebau, Inc.
J4 Engineering Group
LandDev Consulting, LLC
MGA Structural Engineers, Inc.
Precision Civil Engineering, Inc.
Rani Engineering, Inc.
ReStl Engineers TX, LLC
R.W. Engineering & Surveying, Inc.
Standridge Design, Inc.
The Ratliff Group, LLC
WLA Consulting, Inc.

609 Consulting, LLC
68 West Engineering, Inc.
A&R Engineering, Inc.
A. Morton Thomas & Associates, Inc.
ARS Engineers, Inc.
Abonmarche Consultants, Inc.
ACEC Life/Health Insurance Trust
ACEC of California
ACEC of Colorado
ACEC of Georgia
ACEC of Massachussetts
ACEC of Minnesota
ACEC of Missouri
ACEC of Nebraska
ACEC of North Carolina
ACEC of New York
ACEC of Oregon
ACEC of Pennsylvania
ACEC of Tennessee
ACEC of Texas
ACEC of Virginia
ACEC of Washington
ADGI
Advanced Earth Sciences, Inc.
Ahneman Kirby, LLC
Al-Farooq Corporation
American Council of Engineering Companies
American Engineers, Inc.
American Geotechnics, Inc.
American Structural Engineering
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