

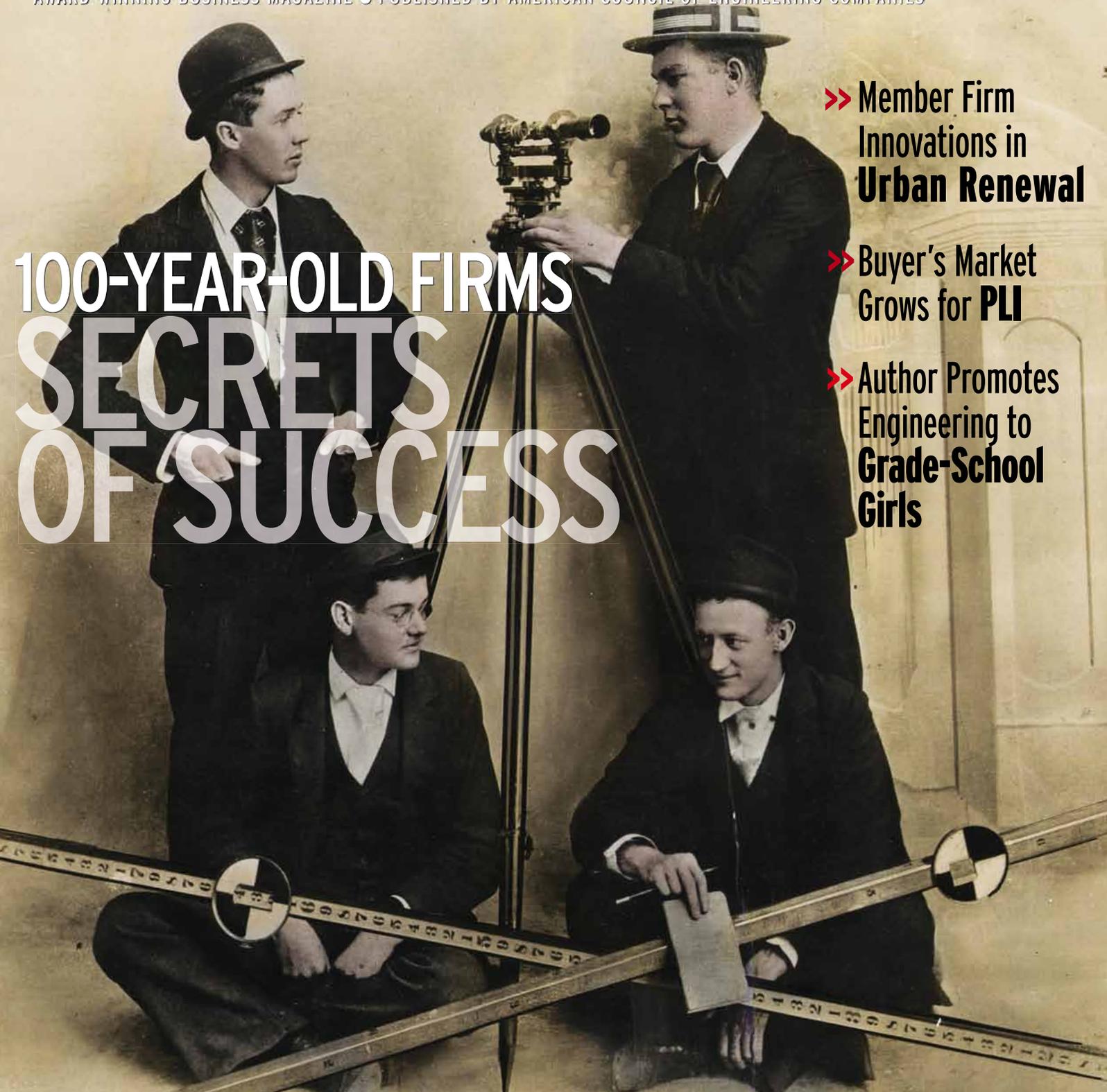
ENGINEERING INC.

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

100-YEAR-OLD FIRMS SECRETS OF SUCCESS

- >> Member Firm
Innovations in
Urban Renewal
- >> Buyer's Market
Grows for **PLI**
- >> Author Promotes
Engineering to
**Grade-School
Girls**



Arthur Diggles
Herbert Hoover

R.E. McDonnell
James White

SURVEYING SQUAD - STANFORD UNIVERSITY IN 1893

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SURVEYING SQUAD - STANFORD UNIVERSITY IN 1893

On the Cover: Burns & McDonnell co-founder Robert McDonnell (top right) and future U.S. President Herbert Hoover (bottom left) are engineering students on the 1893 Stanford University surveying team.

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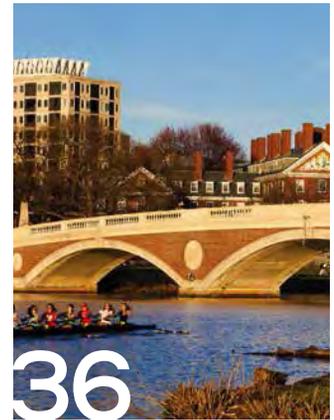
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2015 FALL CONFERENCE

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



From ACEC to You

Ballard to Receive Top ACEC Honor at Fall Conference

This spring your Council made progress on several fronts—most importantly securing important improvements in FHWA regulations and protection of QBS. We are hard at work this summer seeking passage of a long-term highway bill, energy legislation and tax reforms to improve our business environment. The overall health of our industry is strong, as reflected in our latest *Engineering Business Index* (EBI), which shows continued high CEO confidence levels. Our latest PLI Survey shows a buyer's market with high competition and low rates. (See page 27 for the PLI Survey report.)

Looking ahead to our Fall Conference in Boston, October 14–17, legendary oceanic explorer Dr. Robert Ballard—discoverer of the *Titanic*—will address “A New Age of Exploration” and receive ACEC’s Distinguished Award of Merit, which has previously been awarded to the likes of President Dwight D. Eisenhower, Carl Sagan and Neil Armstrong. Ballard is not only known for his discoveries of sunken vessels, such as the *Titanic*, *Lusitania* and *Bismarck*, but also for his revolutionary discovery of new life forms on hydrothermal vents at the bottom of the Pacific Ocean.

If you have not yet experienced an ACEC Fall Conference, with its wide range of interesting speakers and valuable business activities, we encourage you to join us and be among the more than 1,000 at this premier business event. (See the announcement on page 36 and the ACEC website for a complete agenda.)

Twenty-five Member Firms have celebrated 100-year anniversaries. Doing business for more than a century is no small feat. Congratulations to these firms, especially to Mason & Hanger of Kentucky, which is 188 years old! Six centenary firms are profiled beginning on page 8.

Have an enjoyable summer.



Ralph W. Christie, Jr.
ACEC Chairman



David A. Raymond
ACEC President & CEO



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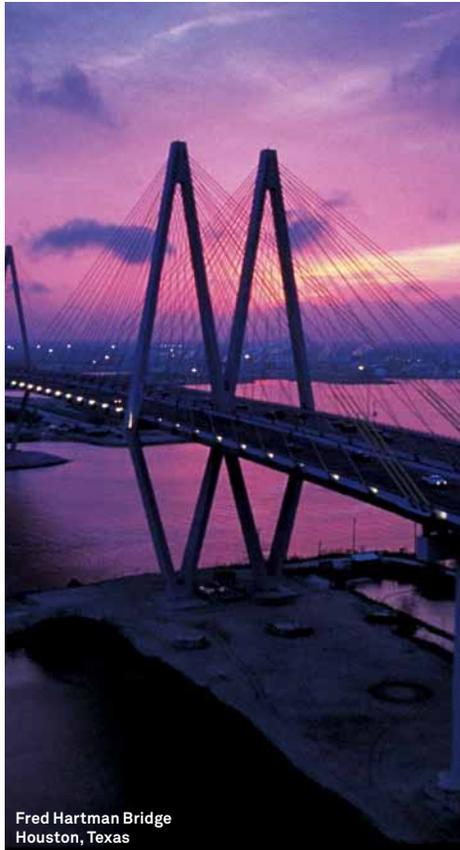
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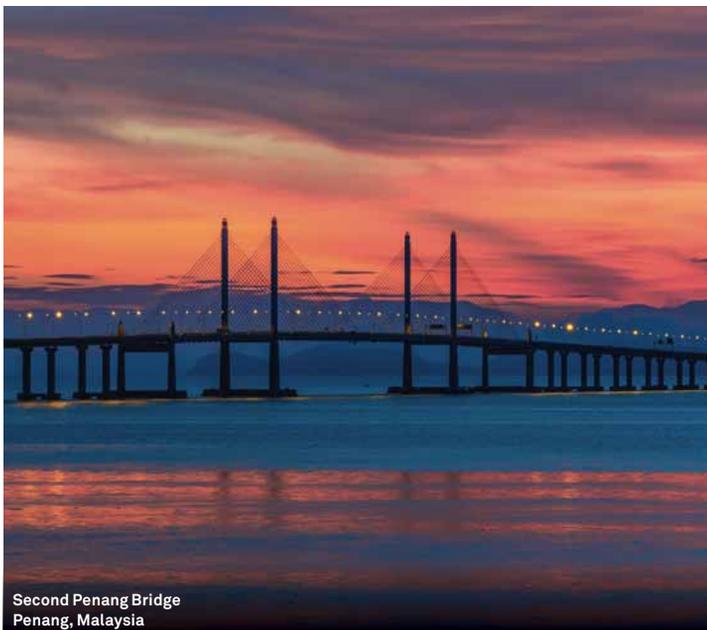
Sutong Bridge
Suzhou, China



Fred Hartman Bridge
Houston, Texas



Taizhou Bridge
Jiangsu, China



Second Penang Bridge
Penang, Malaysia

With nearly 100,000 employees serving clients in more than 150 countries around the world, AECOM is a premier, fully integrated infrastructure and support services firm. Our people are united by a shared commitment to create, enhance and sustain the world's built, natural and social environments.

With revenue of almost \$20 billion, AECOM is a leader in all of the key markets it serves, including transportation, facilities, environmental, energy, oil and gas, water and government. AECOM has provided engineering services on some of the world's longest and most innovative bridges.

Turbulent Times Ahead For Aviation Construction

Over the next five years, nearly 3,400 U.S. airports will require an estimated \$75.7 billion in infrastructure investment, according to analysis by Airports Council International-North America (ACI-NA).

That's \$15.1 billion a year to accommodate passenger increases, maintain and upgrade aging facilities, and meet enhanced safety and security requirements.

Like so many other U.S. infrastructure sectors, needs far outpace resources. ACI-NA estimates that available funding is just \$6 to \$8 billion per year—about half of what is required.

How well that gulf gets bridged will determine the strength of the airport design and construction market over the coming years.

"It all depends on funding," says Gary Luczak, aviation market sector leader and senior vice president for TranSystems in Philadelphia. With the ongoing Federal Aviation Administra-

Airport Capital Development Cost Estimates by Year and Airport Category
(Millions of Current Year Dollars)

Airport Category	2015	2016	2017	2018	2019	2015-2019	Percent
Large Hub	8,560	9,462	9,132	7,225	5,705	40,083	52.9%
Medium Hub	1,740	1,865	1,995	1,887	1,609	9,096	12.0%
Small Hub	1,422	1,176	1,126	1,436	2,497	7,656	10.1%
Non Hub	1,037	1,052	1,068	1,084	1,100	5,340	7.1%
Other	2,633	2,672	2,712	2,753	2,794	13,564	17.9%
Total	15,391	16,227	16,033	14,384	13,705	75,740	100.0%

Source: Airports Council International-North America and Federal Aviation Administration

tion (FAA) reauthorization discussions and the Passenger Facility Charge (PFC) cap debate, we should know more later this year. "I don't really see the market dropping, but I think it's more likely to be steady than up."

Funding Difficulties

Airport funding comes from three main sources. The largest federal program is the FAA Airport Improvement Program (AIP), which provides grants of up to 90 percent of the cost of airfield capital improvements or repairs.

In the four-year FAA Mod-

ernization and Reform Act of 2012, the AIP was authorized at approximately \$3.5 billion annually, but getting that money to airports has proved problematic. Congressional gridlock has disrupted the appropriations process and delayed the distribution of already approved funding.

"The grants haven't been reaching our clients until August, September or October, which is too late in the year for airport construction in the Mountain states," says Chuck Larson, chairman of J-U-B Engineers, Inc., in Salt Lake City. "Congress needs to get in gear and get those grants out on time."

The second big funding source is the PFC, which totaled \$2.8 billion in 2014 and accounts for about 30 percent of U.S. airport capital investment. The PFC is funded through the collection of \$4.50 from each departing and connecting passenger at an airport.

"Because it's based on passenger totals, the PFC doesn't provide much benefit to smaller, regional airports," Luczak says. "It really comes into play in the top 30 airports, providing them with a steady stream of income."

U.S. airline passenger traffic is projected to increase from 700 million to 1 billion annually within the next 10 years, which means PFC totals will continue to grow. But because the levy hasn't been increased since 2000, inflation has cut its purchasing power to the equivalent of \$2.42. Current FAA funding expires in September 2015. ACEC is advocating for a long-term FAA reauthorization bill that increases airport funding through the AIP in addition to raising the cap on PFCs.

Further compounding the PFC funding shortfall, many airports have pledged large percentages of their current and future PFC revenue streams to service bond offerings for past projects, significantly decreasing the amount available to fund new infrastructure.

The third major source of airport funding is non-aeronautical revenue generated at each airport, primarily fees collected from concessionaires, such as retail and rental car companies.

"The concessionaire market has been really strong for us over the past five years," Luczak says, "because the airports have been looking there as a way to bring in new revenue."



MARTIN BARREAU/GETTY IMAGES

Projected U.S. Air Passenger Growth (millions)

2014	756.3
2015	775.8
2020	851.1
2025	927.4
2030	1,027.1
2035	1,136.5

Source: Federal Aviation Administration

One potential source of revenue that has not been tapped to any significant degree is the airlines, many of which are enjoying record profitability. The airlines have long resisted providing consistent funding, although they have stepped

up when a specific project would improve their business operation.

“When they want to get something done at an airport, airlines have been willing to bring in their own money to make it financially feasible,” Luczak says.

Big Airport, Small Airport Split

The nation’s 30 largest hub airports will account for 52.9 percent of all capital development needs through 2019, around \$40 billion, followed by non-commercial airports (\$13.6 billion), medium-hub airports (\$9.1 billion), small-hub airports (\$7.7 billion) and

non-hub airports (\$5.3 billion).

“A lot of this work has to be done,” Luczak says. “Facilities have gotten old, and basic infrastructure needs to be taken care of.”

According to ACI-NA, 55.2 percent of projects at large-hub airports through 2019 will focus on terminals, followed by surface access (14.7 percent) and capacity (9.3 percent) projects.

“We’re seeing large programs at some of the big airports,” Luczak says. “Los Angeles and San Francisco are still strong. Florida and Texas airports have a lot of new construction going on.”

Smaller airports are focused

on bringing facilities up to safety and security standards, renovating existing facilities, and increasing capacity. But limited PFC funding and fewer opportunities for non-aeronautical revenue mean general aviation and smaller airports are largely reliant on AIP funding.

“General aviation may receive only \$150,000 in AIP grants on an annual basis,” Larson says, “so they may have to save up for several years until they have enough to undertake a decent-sized project.”

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

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EPA Releases Final Wetlands Rule

The Environmental Protection Agency (EPA) released the final “Waters of the United States” rule in late May, which seeks to clarify criteria for federally funded waters and wetlands.

ACEC, along with many other industry groups, had expressed concerns of EPA’s initial proposal to broaden and clarify federal jurisdiction over tributaries, adjacent waters and wetlands. In the final rule,

EPA sought to further clarify coverage of adjacent or neighboring waters, putting wetlands, ponds, oxbows, impoundments and other water features in the 100-year-old floodplain, and within 1,500 feet of a “navigable” water, under federal jurisdiction.

EPA has yet to publish the rule in the *Federal Register*, which will start the clock on the 60-day deadline for implementation. The House has already voted twice this session to kill the water rule, which has

generated opposition from a number of government and industry organizations, including the National Association of Counties, the National Association of Homebuilders, the U.S. Chamber of Commerce and the National Association of Manufacturers.

The rule may also draw court challenges, as attorneys general from Arkansas and Oklahoma have already indicated plans to take legal action to block the measure.

Congress Advances Legislation to Curb Patent Trolls

The House and Senate Judiciary Committees have cleared bipartisan legislation to protect engineering firms and other businesses from so-called patent “trolls.”

Patent trolls send letters to businesses demanding payment for infringement of certain business process pat-

ents, such as commonly used technologies to scan and send documents.

The Senate bill (S. 1137), introduced by Judiciary Committee Chairman Chuck Grassley (R-Iowa), would require judges to award attorneys’ fees to defendants in patent disputes if the plain-

tiff’s case is determined to be unreasonable. It would establish rules governing demand letters, such as requiring more information on the alleged patent infringement, and empower the Federal Trade Commission to enforce the new rules. It would also require patent holders to sue

manufacturers before going after users of the technology.

House Judiciary Committee Chairman Bob Goodlatte (R-Va.) authored the companion House bill (H.R. 9). Floor action is expected this summer. President Obama has indicated his support for the legislation.

FHWA Finalizes Regulations On Engineering and Design Services

The Federal Highway Administration (FHWA) has published new regulations governing the procurement, management and administration of engineering and design-related services on federal-aid highway projects. The wide-ranging rules include changes and clarifications to state DOT procurement policies and qualifications-based selection procedures, contract negotiation and administration, audit and accounting of allowable costs, and program management and oversight.

The updates are consistent with current policy and best practices, which the Council has helped to shape. ACEC secured several improvements to the rules as initially proposed, including allowing firms serving in program management roles to also perform other services for agency clients. ACEC also defeated efforts by public-employee unions to mandate the in-sourcing of certain engineering and inspection activities.

The rules took effect June 22. State DOTs will have one year to update their policies and procedures to comply with the new regulations.

Tax Reform Debate Continues

Congressional tax-writing committees are continuing their efforts to reform the federal tax code. Five bipartisan tax reform working groups reported their findings to the Senate Finance Committee leadership; the findings cover specific proposals on international tax rules to more limited points of agreement in other areas. In April, ACEC submitted its tax reform principles to the working groups; they emphasized the need for comprehensive reform that treats all business structures equally.

ACEC also responded to a letter from Senate Finance Committee Chairman Orrin Hatch (R-Utah) and House Ways and Means Committee Chairman Paul Ryan (R-Wis.) asking for the Council's input on how to treat passthrough businesses, such as S corporations, partnerships and sole proprietorships, if

Congress and the administration cannot reach agreement on lowering individual tax rates as well as the corporate tax rate. Passthrough entities pay their business income taxes on the individual tax returns of the firm's owners. ACEC suggested that Congress consider creating a business equivalency tax rate for passthrough businesses that is tied to the corporate tax rate.

Congress also continues to consider the possibility of pairing some type of business tax reform with multiyear funding for the Highway Trust Fund.

Failing agreement on broader legislation, Congress may choose to move a smaller tax package to extend various expiring or expired provisions, such as the R&D tax credit and higher Section 179 expensing limits. This effort could also include changes to international tax rules and could provide a vehicle to finance the reauthorization of MAP-21.

ISSUES ON THE MOVE	WHAT'S NEXT
MAP-21 Reauthorization	Action on another extension in July
Tax Reform	Further action in the fall
Patent Trolls	House, Senate vote this summer

Congress Stalls Again On Highway Funding

With a July 31 deadline looming over federal highway and transit programs, House and Senate leaders are advancing another stopgap bill to last through the end of the calendar year. An impending shortfall in the Highway Trust Fund will require a transfer of general funds to maintain timely project reimbursement payments to states.

ACEC told members of the House Ways & Means and Senate Finance Committees in a pair of June hearings that sustainable, long-term transportation funding is vital for the nation's continued economic growth. "A modest increase in motor fuels charges—a measure endorsed by highway users and the trucking industry representing those paying into the system—is a relatively small price to pay for improving safety, enhancing mobility, and ensuring American competitiveness," the Council stated in its written testimony.

ACEC and its coalition of stakeholder partners have launched a grassroots campaign to engage lawmakers and the public on the need to end the disruptive cycle of short-term extensions. Hundreds of ACEC Member Firm leaders sent messages to their representatives on the impact of uncertainty on state agencies and the consequences of inaction for deteriorating systems and increased project costs.

Republican leaders of the transportation and tax-writing committees in the House and Senate want to tie transportation funding with tax code changes, either through a broader international business tax reform package or the year-end extension of expiring tax provisions. However, no definitive plan or timeline has taken shape yet.



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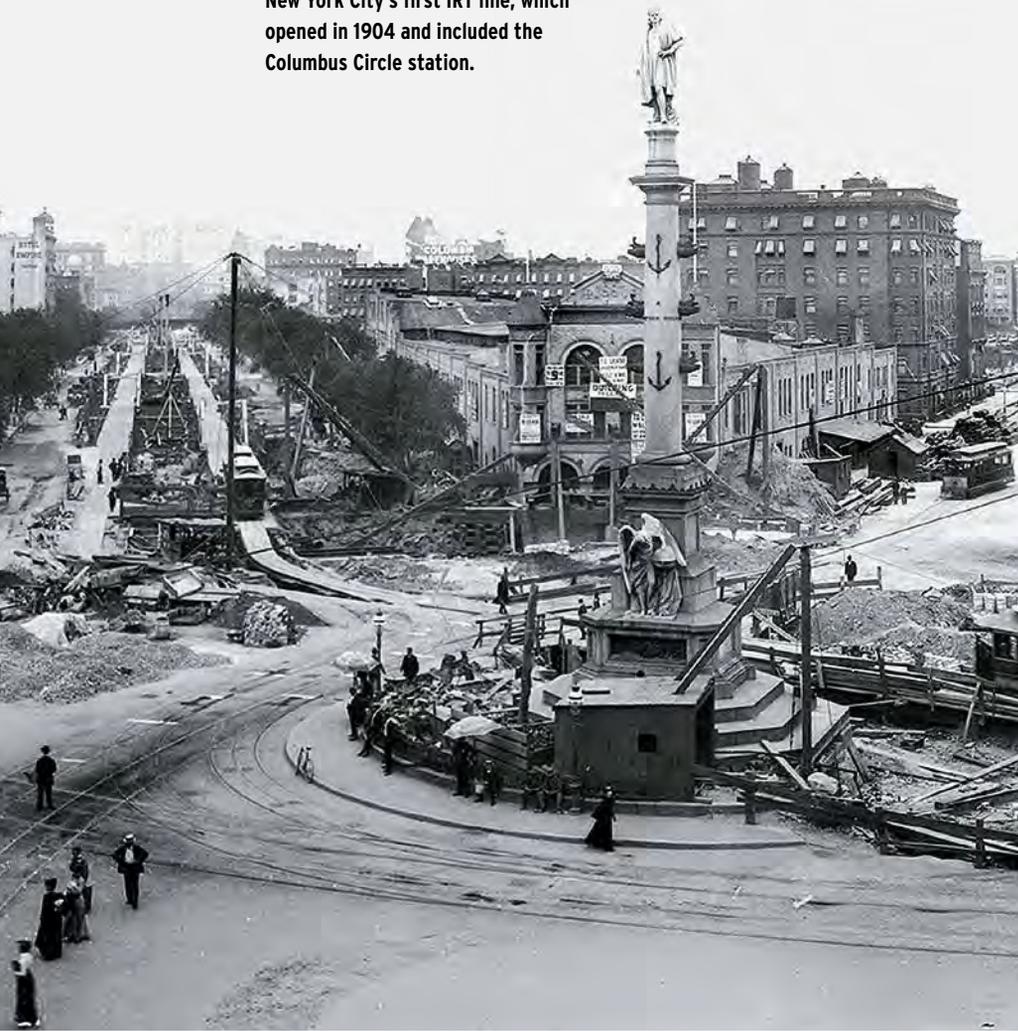
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William Barclay Parsons designed New York City's first IRT line, which opened in 1904 and included the Columbus Circle station.



> T. Baker Smith (far right) developed much of the early infrastructure, including this 1940 bridge, in Terrebonne Parish, Louisiana.



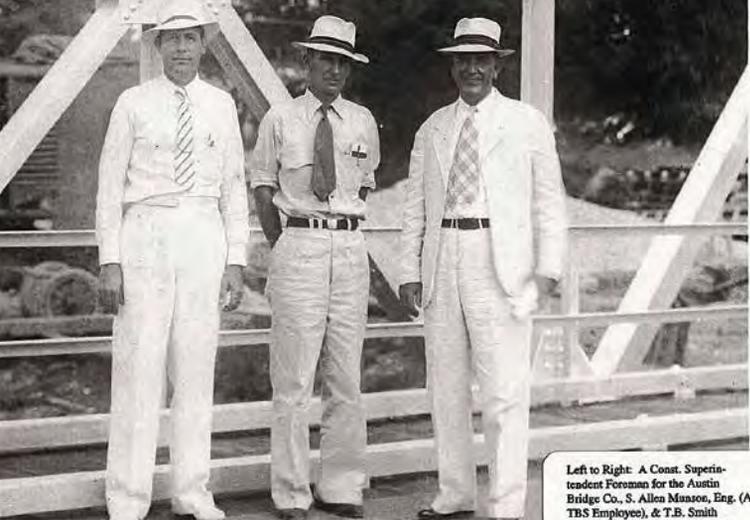
In 1923, Burns & McDonnell designed a tunnel project through rugged terrain in Washington state to bring fresh water to Port Angeles.



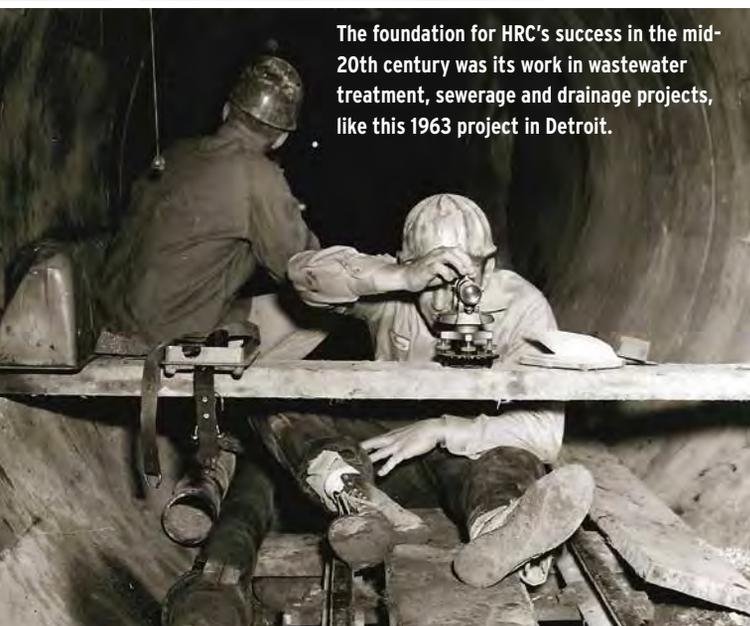
HNTB has a long history in design and support services for tunnel structures, such as the Devil's Slide Tunnels, which opened in 2013 beneath California's San Pedro Mountain.



Some of today's landmark structures in the United States, including the Thomas Jefferson Memorial in Washington, D.C. (completed in 1943), are among STV's earliest projects.



Left to Right: A Const. Superintendent Foreman for the Austin Bridge Co., S. Allen Munson, Eng. (A TBS Employee), & T.B. Smith



The foundation for HRC's success in the mid-20th century was its work in wastewater treatment, sewerage and drainage projects, like this 1963 project in Detroit.

SIX FIRMS OVER

100

SHARE INSIGHTS INTO
MAINTAINING SUCCESS AMID
ERAS OF BOOM AND BUST

SECRETS
OF THE

CENTENARIANS

By Samuel Greengard

Thriving for more than a century is tough for any business. Within the engineering field, radical changes in design, materials, technology and regulations have forced firms large and small to continually adapt and reinvent the way they approach the marketplace. In addition, military conflicts, economic swings and an increasingly competitive and global business environment have created operational pressures that could easily overwhelm a less than resilient company. Yet, amid all the marketplace changes and disruption, several engineering firms have managed to navigate both opportunities and challenges and establish themselves as business and innovation leaders over a 100-year span. In this special report, *Engineering Inc.* highlights six of those firms. >>

Burns & McDonnell

Kansas City, Missouri

FOUNDED: 1898

SIZE: 42 offices in the U.S. and throughout the world with approximately 5,000 employees

SPECIALTIES: Power generation and transmission, water treatment and environmental remediation, refineries and industrial facilities, airports, military bases and defense facilities, hospitals and institutional buildings

CURRENT CHAIRMAN AND CEO:

Greg Graves

While celebrating a 100-year anniversary is an incredible achievement for any organization or business, Burns & McDonnell passed that milestone 17 years ago, with sights firmly set on another century of success.

Founded in 1898 by two Stanford graduates, Clinton Burns and Robert McDonnell, the Kansas City, Mo.-based firm specialized in providing clean water, reliable power and effective sewer systems to municipalities throughout the growing Midwest.

The founders chose Kansas City because they thought the city and surrounding region greatly needed water, sewer and power projects and was ready to make that leap. The firm's first major project was a combination water and light plant for the city of Iola, Kan. Similar projects in Cherryvale and Osawatomie, Kan., soon followed.

Over the decades Burns & McDonnell has maintained those core practices while expanding its energy work into refining, transmission and nuclear power, and into other fields such as airports, aerospace, government and commercial offices, transportation, and food and beverage.

"As you might expect from a firm with a 117-year-history, there isn't a particular project that has been responsible for our growth. The success has come with growing a suite of 11 different business divisions," says Chairman and CEO Greg Graves. "Each has started in the same way, with a smaller opportunity that led to bigger and more challenging projects, usually with the same clients. We've always been proud that 80 to 90 percent of our work is being done for repeat clients that have resulted in very collaborative, lasting relationships."

In 1986, the firm became employee-

In 1925, Burns & McDonnell designed this iron removal and water softening plant for the town of Springfield, Ill. The plant was among the first in what soon turned into a nationwide water softening movement.



owned, which Graves points to as a key landmark in its history. "To some, employee-ownership may be viewed as another benefit—a retirement plan or better dental," he says. "But to Burns & McDonnell, employee-ownership is everything. It's the spirit of how we do work—it is part of our DNA. We talk about it every single day as if our business depends on it—because it does."

The firm has been a regular on *Fortune* magazine's "100 Best Companies to Work For" since 2009 and ranks No. 17 on the 2015 *ENR* "Top 500 Design Firms." It is the third-largest engineering design firm serving the electrical power industry.

To accommodate current and future growth, the firm broke ground in June 2014 on a 450,000-square-foot expansion of its headquarters. The \$140 million, two-phase expansion could house an additional 2,100 employees over the next decade.

STV Incorporated

Douglassville, Pennsylvania, and New York, New York

FOUNDED: 1912

SIZE: More than 40 offices across the U.S. with approximately 1,800 employees

SPECIALTIES: Planning, environmental, design, program and construction management, and specialty services for the transportation, design-build, institutional and commercial building, advanced technology, industrial and defense markets

CURRENT CEO: Milo Rivero

In 1912, Elwyn Seelye, a graduate of Cornell University, started a small structural engineering firm and began working with many of the acclaimed architects of the day, including Charles Platt, John Russell Pope and Joseph Freedlander.

A year later, Albert Stevenson, a fellow Cornell engineering graduate, joined the company. Together, they tackled an array of prominent projects, including the Westchester County Courthouse in

STV played a critical role in the design of NASA's Vehicle Assembly Building, still the largest single-story building in the world.



Kenneth Smith (fifth from left) visits with field crew at a project site in Breton Sound in spring 2010.



1915 and the rebuilding of New York City Hall in 1917 after a fire. By the 1920s the company had emerged as one of the region's preeminent engineering firms, and its reputation grew

over the next few decades. The firm's later contributions included the Thomas Jefferson Memorial and the Smithsonian's Freer Gallery of Art in Washington, D.C.

During World War II, the company ventured into civil, electrical and mechanical engineering. Later, STV (previously SSV&K) expanded into military and federal work and grew through a series of acquisitions. In the mid-1960s, the firm built NASA's iconic Vehicle Assembly Building at Kennedy Space Center, at the time the largest single-story building in the world. The firm has also designed several light rail systems around the country.

The overarching theme of the company's work, says Executive Chairman Dominick Servedio, is offering a broad menu of services for highly complex, first-of-a-kind projects. Along the way, the firm grew through mergers.

In 2001, the company went private, and it is now 100 percent employee owned. The transaction closed just a few weeks prior to 9/11.

Servedio says that the firm's structure has helped it adapt to challenging times. "Over all the years, we have stayed true to our core values, our traditional business model and our high ethical standards.

There has also been tremendous continuity in the firm's top management. These are the building blocks of our success and longevity," he says. "The key has been to remain nimble and flexible in order to meet the changing needs of the marketplace and our clients."



T. Baker Smith

Houma, Louisiana

FOUNDED: 1913

SIZE: Nine offices in the Gulf Coast region with approximately 300 employees

SPECIALTIES: Environmental services, civil engineering, coastal engineering, surveying for construction management, and mapping

CURRENT CEO AND PRESIDENT:

Kenneth Smith

After founder Thomas Baker Smith graduated from Tulane University with a degree in civil engineering, he headed back to his hometown of Houma, Louisiana—located about 60 miles southwest of New Orleans—to develop infrastructure in the then rural suburb. "At the time there were no paved roads, electricity, drainage or other infrastructure," says current CEO Kenneth Smith, the founder's grandson, who has led the firm since 2000. The founder built a booming engineering business, survived the Great Depression and then witnessed an oil boom that transformed his business—and the entire region. Thomas Baker Smith became an expert in surveying and in the reconstruction of original townships as well as pipelines. "He built a very diverse practice," Kenneth Smith explains.

Three generations of Smiths have run the business. And the privately owned firm has continued to evolve, expanding to handle large drainage projects, roadway expansions and hurricane protection systems. In fact, the firm currently serves as program manager for a proposed comprehensive hurricane protection system in the Gulf Coast region, an idea that former CEO William Clifford Smith introduced and worked with the U.S. Congress to fund and develop.

The company also is moving into the LNG market and continuing to expand

Other 100-Year-Plus ACEC Members*

MASON & HANGER

Lexington, Ky.
Founded: 1827

JAMES W. SEWALL COMPANY

Old Town, Maine
Founded: 1880

HARDESTY & HANOVER

New York, N.Y.
Founded: 1887

HALEY AND WARD, INC.

Maynard, Mass.
Founded: 1897

WESTON & SAMPSON

Peabody, Mass.
Founded: 1899

MEAD & HUNT

Madison, Wis.
Founded: 1900

HARLEY ELLIS DEVEREAUX

Southfield, Mich.
Founded: 1908

TKDA

St. Paul, Minn.
Founded: 1910

WOOLPERT

Dayton, Ohio
Founded: 1911

TIGHE & BOND

Westfield, Mass.
Founded: 1911

BURGESS & NIPLE

Columbus, Ohio
Founded: 1912

STANLEY CONSULTANTS

Muscatine, Iowa
Founded: 1913

FAY, SPOFFORD & THORNDIKE

Burlington, Mass.
Founded: 1914

GREELEY AND HANSEN

Chicago, Ill.
Founded: 1914

W.H. DEMMONS

Portland, Maine
Founded: 1914

GANNETT FLEMING

Harrisburg, Pa.
Founded: 1915

ALLEN & HOSHALL

Memphis, Tenn.
Founded: 1915

BLACK & VEATCH

Overland Park, Kan.
Founded: 1915

BKF ENGINEERS

Redwood City, Calif.
Founded: 1915

*Compiled from *Last Word* and State Organization inquiries

its internal expertise. Smith says that the success of the firm comes down to a very simple proposition: “We only handle meaningful work. We absolutely have to know what the project is about and believe that it will make our community better, hands down. If it doesn’t meet these criteria, and we don’t understand the value of it, we’re going to walk away from it.”

HNTB Corporation

Kansas City, Missouri

FOUNDED: 1914

SIZE: 63 offices with approximately 3,600 employees

SPECIALTIES: Infrastructure-related services across numerous industries, including aviation, design-build, freight rail, high-speed rail, highways and water

CURRENT CEO: Robert J. Slimp

In 1914, John Lyle Harrington, Ernest Emmanuel Howard and Louis Russell Ash established the civil engineering firm Harrington, Howard & Ash in Kansas City, Missouri. The founders had particular expertise in transportation infrastructure, including large and complex bridges and moveable bridge designs for railroads. In fact, Portland, Oregon’s, double-deck vertical-lift Steel Bridge, designed by Harrington in 1912, remains in use today.

Over the past century, the company has established itself nationally as a technical leader and has operated offices wherever it does business. “Since our founding, HNTB has been dedicated to serving our clients

and exceeding their expectations,” states CEO Robert Slimp.

The firm’s list of projects is impressive. HNTB designed the Maine Turnpike, the nation’s first modern toll highway; the 4,200-foot-long Tom Lantos Tunnels in California; and Boston’s Leonard P. Zakim Bunker Hill Memorial Bridge, the widest cable-stayed bridge in the world. HNTB also played an instrumental role in designing and building the U.S. Interstate Highway System. And following Hurricane Katrina in 2005, the firm rebuilt the St. Louis Bay Bridge in Mississippi. With an aggressive design and construction schedule, the bridge was completed in 24 months, instead of the typical three- to five-year construction timetable.

Slimp says HNTB’s toughest challenge in the past century was surviving the Great Depression. “The firm was struggling along with the rest of the country. There was talk of folding, but Ernest Howard kept the firm afloat with his own money.”

HNTB handled a number of bridge projects in the U.S. and Canada during that span, and by the end of World War II, it had emerged stronger than ever. In 1993, HNTB became a public corporation and in 2000 transitioned to employee ownership.

Says Slimp: “HNTB has a culture defined by technical excellence, integrity, on-time and on-budget delivery, client satisfaction and sustainability. These are among the reasons HNTB is one of the few design firms founded in the early 1900s still in business.”



Wastewater projects such as Detroit’s sewage system helped establish HRC as a leader in civil engineering.

Hubbell, Roth & Clark, Inc. (HRC)

Bloomfield Hills, Michigan

FOUNDED: 1915

SIZE: Four offices in Michigan with approximately 175 employees

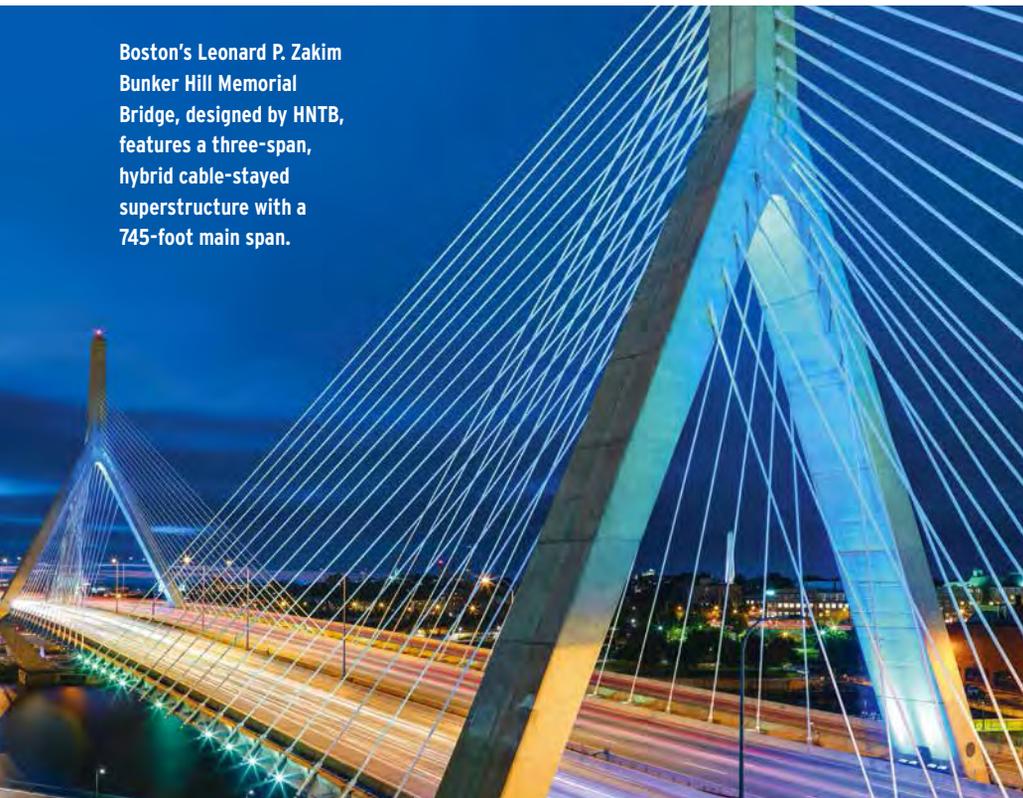
SPECIALTIES: Civil engineering, construction services, architectural services, environmental engineering, electrical services, wastewater systems, roadway design and traffic engineering

CURRENT PRESIDENT: George Hubbell

By the early 1900s, the Detroit River had become incredibly polluted and a source of numerous diseases, including typhus. Clarence Hubbell, who had started a small engineering firm in downtown Detroit in 1915, landed a project a year later to survey the river and provide recommendations to the city. The resulting 200-page report served as the foundation for a primary treatment plant designed to process 400 million gallons of raw sewage a day. The project is recognized as one of Michigan’s top civil engineering achievements, and it established the firm as a pioneer and leading authority in the field.

HRC went on to design and build other municipal and industrial sanitary and wastewater treatment plants during World

Boston’s Leonard P. Zakim Bunker Hill Memorial Bridge, designed by HNTB, features a three-span, hybrid cable-stayed superstructure with a 745-foot main span.





War II and beyond. Over the ensuing years, navigating both booms and busts in the local and national economies, HRC emerged as an innovation and technology leader. In 2002, the company partnered with Lawrence Technological University to design and reconstruct the award-winning Bridge Street Bridge in Southfield, Michigan. It was the first bridge of its kind, reinforced with carbon fiber rather than steel.

The company has stayed small by design. “We have a core philosophy that has served us well over 100 years,” Hubbell explains. “We do the best job we can on each and every job, and our clients are the No. 1 priority. We have worked hard to develop a workforce that is equipped to handle complex projects. Everyone knows everyone. It’s very hands-on, even for the senior leaders.”

Hubbell and the other principals at the firm are all offspring of the founders. “There are strong ties to the past and a deep respect for the company,” Hubbell says. “The firm’s principals have been exposed to the culture from an early age, but as we move forward, we also are taking on younger partners so we have diversity of thinking. The people we bring on share the same core values.”

WSP|Parsons Brinckerhoff

New York, New York

FOUNDED: 1885

SIZE: 500 offices in 39 countries with approximately 32,000 employees

SPECIALTIES: Environmental remediation, urban planning and smart cities, infrastructure, transportation networks, building design and engineering, power and energy

CURRENT CEO: Gregory A. Kelly, U.S. Region

When William Barclay Parsons and Harry de Berkeley Parsons opened a small consulting and engineering practice in New York City in January 1885, they recognized that the “age of engineering” was emerging. What’s more, the city was undergoing enormous growth and change. Over the next few years, the pair worked on a number of major regional projects, including railroads, water systems and hydroelectric plants. By the late 1800s, William was named chief engineer for the Board of Rapid Transit in New York City, which was responsible for building the New York City Subway. “It was a project that established the firm as a leader in the field and set the stage for the company’s later success,” states U.S. CEO Gregory Kelly.

That success included design of the Arlington Memorial Bridge in Washington, D.C., in 1932, the Detroit-Windsor Tunnel in 1935 and the Buzzards Bay Bridge on Cape Cod the same year. By the 1970s, the firm had established itself as a leader in the transportation field.

It played a key role in the design of San Francisco’s Bay Area Rapid Transit (BART) system and Atlanta’s MARTA regional rail system. Later, Parsons Brinckerhoff handled rail projects in Singapore, Los Angeles and Caracas, Venezuela.

The company’s portfolio also includes Boston’s \$15 billion Central Artery/Tunnel Project (the Big Dig) and more recently, the Port Miami Tunnel. “One of the things that has helped the firm flourish is we have a reputation for handling large and complicated projects,” Kelly says.

In 2009, British contractor Balfour Beatty purchased Parsons Brinckerhoff for \$642 million. Last year, Canadian firm WSP Global acquired Parsons Brinckerhoff for \$1.3 billion.

Today, the firm continues to work on large and ambitious projects and is venturing into the emerging smart transportation and smart cities market. ■

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



San Francisco’s BART (Bay Area Rapid Transit), which opened in 1972 after nearly a decade of construction, established Parsons Brinckerhoff as a leader in modern transportation.

STATE OF

THE

ACEC Executive Committee members discuss opportunities and challenges ahead

By Stacy Collett

Several new and positive dynamics taking place in engineering markets have members of the 2015–2016 ACEC Executive Committee optimistic about their industry's future.

Prospects in the private sector and increased public awareness of the importance of infrastructure investment are just a few reasons Council leaders are confident that opportunities for engineers will continue to grow.

But ExCom members also warn of concerns that still threaten business success—from commoditization fears to skills shortages.

In this special *Engineering Inc.* report, ExCom members discuss the possibilities and pitfalls ahead and offer insights on how ACEC will help Member Firms navigate these challenges. >>

ETERNITY IN AN INSTANT/GETTY IMAGES

INDUSTRY



Private Sector

The ACEC Annual Convention in April featured many speakers who highlighted opportunities in private sector markets, including healthcare, urban redevelopment, and commercial and mixed-use properties. “Clearly there’s a lot happening in those markets,” says **Gregg Spagnolo**, vice president of AECOM in Arlington, Va. “We’re seeing it.”

He recalls three to four years when there was no private sector spending, and federal government projects carried the day. “Now those spending curves have crossed,”

Spagnolo says.

Colorado is also experiencing a robust return of the private sector, says ExCom Vice Chairman **Lauren E. Evans**, president of Pinyon Environmental, Inc., in Lakewood, Colo.

“We’re seeing a lot more commercial real estate deals and development at a rate that hasn’t been seen since pre-2008,”

Evans says. But she noted that the overall recovery has been uneven.

ACEC/Virginia Executive Director and National Association of Engineering Council Executives President (NAECE) **Nancy Israel** says there’s optimism in Virginia among engineers. “We’re beginning to see pickup in some segments,” she says. “Virginia is fairly diverse compared to other states—we have coal, ports, Navy and Army, so there’s a lot of room for opportunity.”

Vice Chairman **Mitch Simpler** says there are several major market dynamics at play, with the most significant being low interest rates, which he believes have spurred capital investment in the private as well as public sectors.

“We all know that interest rates are and have been for some time at near record lows,” says **Simpler**, managing partner of Jaros, Baum & Bolles in New York. “Because interest rates will not remain this low forever, many market leaders in the built environment, including academic, healthcare, residential and commercial, are pressing to lock in rates and beat the inevitable market-driven inflation, which from a construction perspective has already begun.”

Infrastructure

ACEC Chairman **Ralph Christie** credits several transportation industry and ACEC-partnered campaigns and events—such as

Rally for Roads and America’s Infrastructure Alliance—for succeeding in improving infrastructure awareness by the public. The hope is that increased public pressure will impact stalled federal transportation policies.

“There’s a new grassroots, groundswell support for infrastructure funding,” says **Christie**, who is chairman of Merrick & Company in Greenwood Village, Colo. “It keeps the economy humming, and people are recognizing the connection. Now, Congress just needs to act.”

Chairman-elect **Peter Strub** agrees. “This is the only major issue right now where there is overwhelming agreement among the House, Senate and the administration,” says **Strub**, principal and senior vice president at TranSystems Corporation in Kansas City, Mo. “The problem is how do we pay for it? All sides must be willing to talk about ideas and not just shoot them down.”

Many states, including Maryland, Pennsylvania, North Carolina and Georgia have, or are developing, funding plans of their own. Idaho recently passed a gas tax increase for roads and bridges, notes ExCom Vice Chairman **Philip L. Houser**, principal and director of quality management at Alfred Benesch & Company in Chicago.

“States are realizing they have to take the ball and run with it,” **Houser** says. “They can’t wait for federal funding.”

Christie says it’s important for states to advocate on their own behalf because of regional engineering needs. “For instance, it’s hard to compare Colorado with Florida,” he says. “There’s not a lot of elevation in Florida, and it doesn’t have the need for hydropower like the Northwest. That’s why ACEC is a federation of states, and we will be there to help provide the best economic and environmental solutions for the particular region. The more we can address the needs of regions, the farther we’re going to move the needle.”

ExCom Treasurer **Harvey Floyd** believes Congress should study some of the successful state infrastructure funding models as clues to solving the federal funding dilemma.

“Increasing revenues to be used for transportation when constituents know there’s a need for it doesn’t necessarily mean they’re going to vote you out of office,” says **Floyd**, executive vice president of KCI Technologies Inc. in Sparks, Md.

Houser notes that some members of Congress “are now starting to talk openly” about raising the federal gas tax.

Other ExCom members believe additional funding alternatives, such as public-private partnerships, will become more attractive as projects continue to lag.

“The longer we go through a protracted downturn in financing, P3s will become more popular,” **Spagnolo** says. “It’s just a matter of time.”

Energy

Just a year ago, the industry was abuzz about opportunities in the energy market.

Vice Chairman **Randall A. Neuhaus**, president and CEO of S&ME Inc., in Raleigh, N.C., says he is not deterred by the

changing energy market despite downward price pressures resulting from rapidly increased production levels of U.S. crude oil and natural gas.

“I’m still pretty bullish on the energy and power market,” **Neuhaus** says.

“The production side has backed off a little bit, but there’s still a lot of opportunity in the midstream or downstream market. So we’re still going to move toward energy indepen-

dence, and that’s going to create infrastructure opportunities for pipelines and other facilities.”

On the renewable energy front, **Houser** believes that millennials, who have grown up demanding more renewable energy, will make a significant difference.

“A lot of states are passing legislation that require the use of renewable energy,” says **Houser**. “As they demand more renewable energy to be used, they’re creating more pressure to develop it.”

Increased Commoditization

While future industry prospects are encouraging, many ExCom members also recognize that many market subtleties are at play. In past years when times were especially

“There’s a new grassroots, groundswell support for infrastructure funding.”

—Ralph Christie, ACEC Chairman

Meet the 2015–2016 ACEC ExCom



Ralph Christie
Chairman



Dave Raymond
President & CEO



Peter Strub
Chairman-Elect



Harvey Floyd
Treasurer



Lee Cammack
Vice Chair



Lauren E. Evans
Vice Chair



Philip L. Houser
Vice Chair



Randall A. Neuhaus
Vice Chair



Mitch Simpler
Vice Chair



Gregg Spagnolo
Vice Chair



Nancy Israel
NAECE President

difficult, several firms fell into the practice of “chasing everything, cutting each other’s throats on prices and turning us into a commodity,” says ExCom Vice Chairman **Lee Cammack**, president and CEO of J-U-B Engineers Inc., in Kaysville, Utah.

“We’re selling our time to try to stay alive and in business instead of selling the value we provide,” **Cammack** says. “Commoditization is something we’ll have to battle probably for a long time.”

According to responses by ACEC Member Firm leaders to the quarterly *Engineering Business Index*, commoditization is the third leading threat to an engineering firm’s success, behind only adverse economic conditions and lack of public/private funding.

Spagnolo believes the solution to commoditization lies with education. “Educate owners about the risks they’re undertaking not just to themselves, but to the entire industry, and convince them not to go that way,” he says. “When you’re headed into a death spiral—where firms continue to undercut each other—you cut margins and service so much that you end up with a higher probability of your project being a failure.”

Talent Squeeze

A byproduct of an improving economy is a renewed demand for talent. **Neuhaus** reports that his firm is already feeling the

squeeze in Nashville and in the metropolitan areas of the Carolinas and Florida. “There are more opportunities for our professional staff, and many are looking for greener pastures,” he says. “Employee replacement is costly to a firm.”

Skills in demand range from college-educated engineers to qualified technicians for construction inspection, **Floyd** says. In Maryland, there is such a need for certified construction inspectors that his firm has taken matters into its own hands. “Our company has started our own training program” in conjunction with the Maryland Highway Administration to certify high school graduates. “There’s a need, so we’re going to grow them ourselves.”

NAECE President **Israel** would like to see ACEC increase its focus on cultivating younger talent and leadership. “Member Firms are having a hard time finding talent in the five- to 15-years’ experience range,” she says. “Focusing on those people, looking at the talent they have in [specific] areas and focusing on their leadership in those areas would be really positive.”

More Voices Needed

While keeping Member Firms educated on fluctuating market trends is more important than ever, ExCom members agree that a strong Council voice on legislative and regulatory issues, both at the state and federal level, remains just as imperative.

With the regulatory climate becoming more restrictive, Vice Chairman **Evans** believes Council committees need to be prepared to respond quickly to proposed regulations. “I’m a member of the Energy and Environment Committee, so when the ‘Waters of the United States’ regulation came out, we responded back with comments,” **Evans** says. “ACEC has great staff to do that, but if we could get more people involved around the country, it would be helpful to everybody.”

Members also must be encouraged to become more involved in local and state issues, as well as national issues, **Cammack** says. “If elected officials and the public are only hearing from one or two voices, regardless of how many people they represent, it’s only one or two voices,” he says. “There needs to be a thousand voices. It would be fantastic if ACEC/PAC reached its goal of raising \$1 million this year from 10,000 people giving \$100 each. It would mean we now have 10,000 voices.”

ACEC President and CEO **Dave Raymond** agrees that more extensive member participation in all ACEC advocacy programs would increase the Council’s already high influence. “Participation is 90 percent of success,” he says. “The greater our participation, the greater our success.” ■

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

In Market Research, Actionable Data Trumps Big Data

By Mike Ryan

Solid market research is the backbone of every successful business development effort. Whether it is doing background work on a potential client, making sure you are familiar with what existing clients are doing or knowing what the competition is winning, it all starts with research.

In the current world of *big* data, it is equally critical that you differentiate *actionable* data from generic *big* information. With so much data available, one has to guard against being consumed by it and losing focus of the real target. That target, of course, is to win projects. Timely actionable data saves valuable resources and takes the guesswork out of your business development strategies.

Here is the good news. We have seen a 35 percent increase in A/E/C projects between 2011 and 2014. As the economy begins to come out of the doldrums from the past several years, public sector agencies are beginning to push out projects as fast as money allows. As good as that is for all of us, it brings its own set of issues. In short, who is doing what? More important, how do we keep track of it all and still have time to establish or maintain client relationships?

Market research is a daunting task with only so many hours in a day, but one that is vital to the success of all business development efforts. At the same time, quality and timely data are also critical to business development. As the market begins to breathe new life, it is more important than ever to wrestle big data to the ground and focus on the actionable data.

So what is big data? As defined by TechTarget, it is "...the process of examining large data sets containing a variety of data types...to uncover hidden patterns, unknown correlations, market trends, customer preferences and other useful business information. ...The primary goal of big data analytics is to help companies make more informed business decisions by enabling data scientists, predictive modelers and other analytics professionals to analyze large volumes of transaction data."

This all sounds great and it can be, but as business development professionals we are not data scientists or predictive modelers. In the business development world, time is our most valuable resource. When trying to use big data as part of their marketing resources, most people squander a vast amount of

their most valuable resource—time—with very little to show for it. At best, you will end up with market trends based on historical information and forward-looking projections based solely on extrapolations of that same historical data. At worst, you create inaccurate results based on poor assumptions and incomplete data. In either case, seldom will the results provide market research with immediate benefit.

In a *Harvard Business Review* article entitled "Marketers Flunk the Big Data Test," three major reasons for flunking were highlighted: (1) using only 11 percent of the data collected for decision-making and relying too much on their gut; (2) struggling to understand statistics derived from the data; and (3) being dangerously distracted by the data. The return on time benefit is extremely low.

Actionable data is forward-looking and not based on historical information. Big data market trends don't lend themselves to immediate actionable tasks because they are macro in nature. Actionable data is micro data derived from current forward-looking material. Examples of micro data would be an agency's current year CIP budget, last week's city council's approved agenda and last November's city schools' bond measure passage—all project-specific with anticipated deadlines and therefore actionable items. The bond measure just passed for your local school and its action items are far more important to the marketer than the bond trend analysis of the last five years based on bond measures for the city, county or state.

As mentioned earlier, the real target in market research is to win projects—not to have the best trend analysis. With a limited amount of time and a growing amount of available raw data, the best marketers will follow the *actionable* data and stay away from the slippery slope of *big* data.



Mike Ryan is CEO, Integrated Marketing Systems, a nationally respected research firm specializing in public-sector project announcements for architecture, engineering and construction firms.



PROJECT:
CitySquare
Worcester, Mass.
FIRM: Nitsch Engineering,
Boston



PROJECT:
Brooklyn Basin
Oakland, Calif.
FIRM: ENGEQ, Inc.,
San Ramon, Calif.



PROJECT:
The Flats
Wilmington, Del.
FIRM: Landmark
Science & Engineering,
New Castle, Del.



PROJECT:
2700 Remington Ave.
Baltimore
FIRM: Structura, Inc.,
Baltimore

RESHAPING CITIES

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Firms
transform
inner-city
settings with
innovative
urban renewal
designs >>

By Darlene Bremer



From a Mall to Mixed-Use Development

PROJECT: CitySquare, Worcester, Mass.
FIRM: Nitsch Engineering, Boston

Worcester wants to revitalize its downtown and attract people into the city to work and live. Nitsch Engineering was enlisted to turn an unsuccessful outlet mall into an exciting mixed-use development renamed CitySquare. The project reestablishes city streets that were disconnected when the mall was built in 1968 and links the development to City Hall and nearby transportation hubs. It is projected to include 640 housing units; 400,000 square feet of street-level retail, entertainment and health care facilities; an 860-car underground parking garage; and about 1 million square feet of office space over four blocks.



Chelsea Christenson

Nitsch has provided land surveying, civil engineering and transportation engineering services for the project since 2004, and is currently overseeing the garage construction. The final residential and retail space is slated to open in 2016.

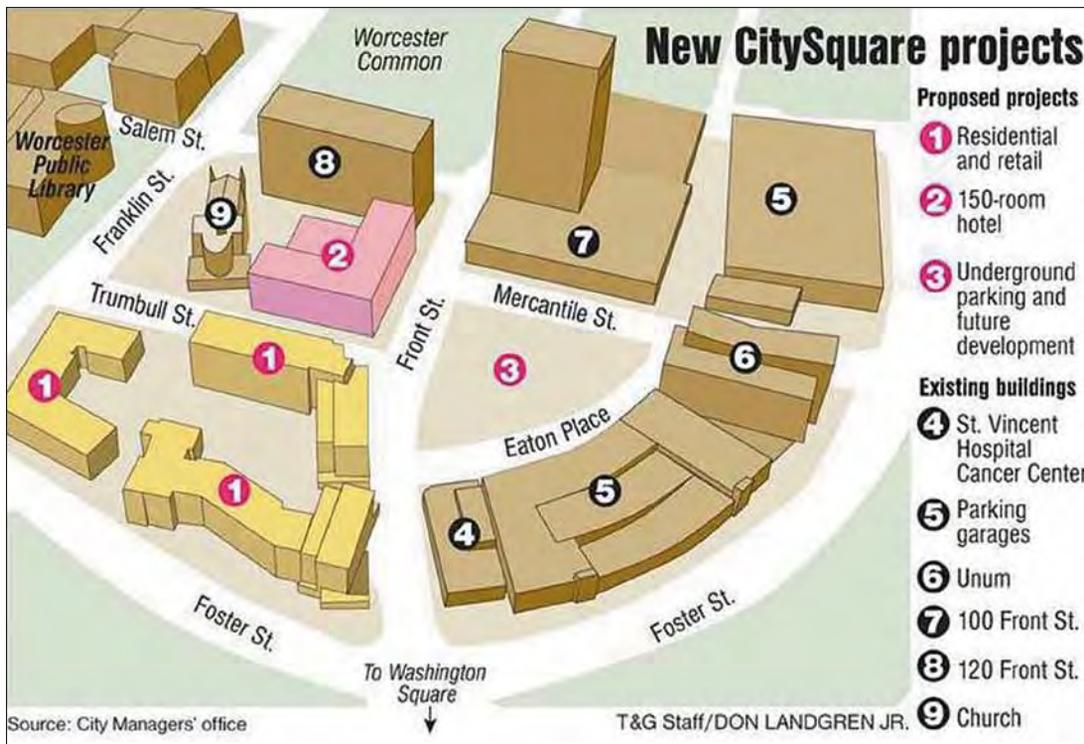
“In designing the roadways, grading and utility infrastructure that will serve the project, Nitsch is helping bring parts of the city back together in a way that will encourage growth, renewal and employment,” says project manager Chelsea Christenson. The company’s scope of work has also included topographic,

property line and land title surveys as well as municipal site and Massachusetts Department of Environmental Protection (MDEP) permitting.

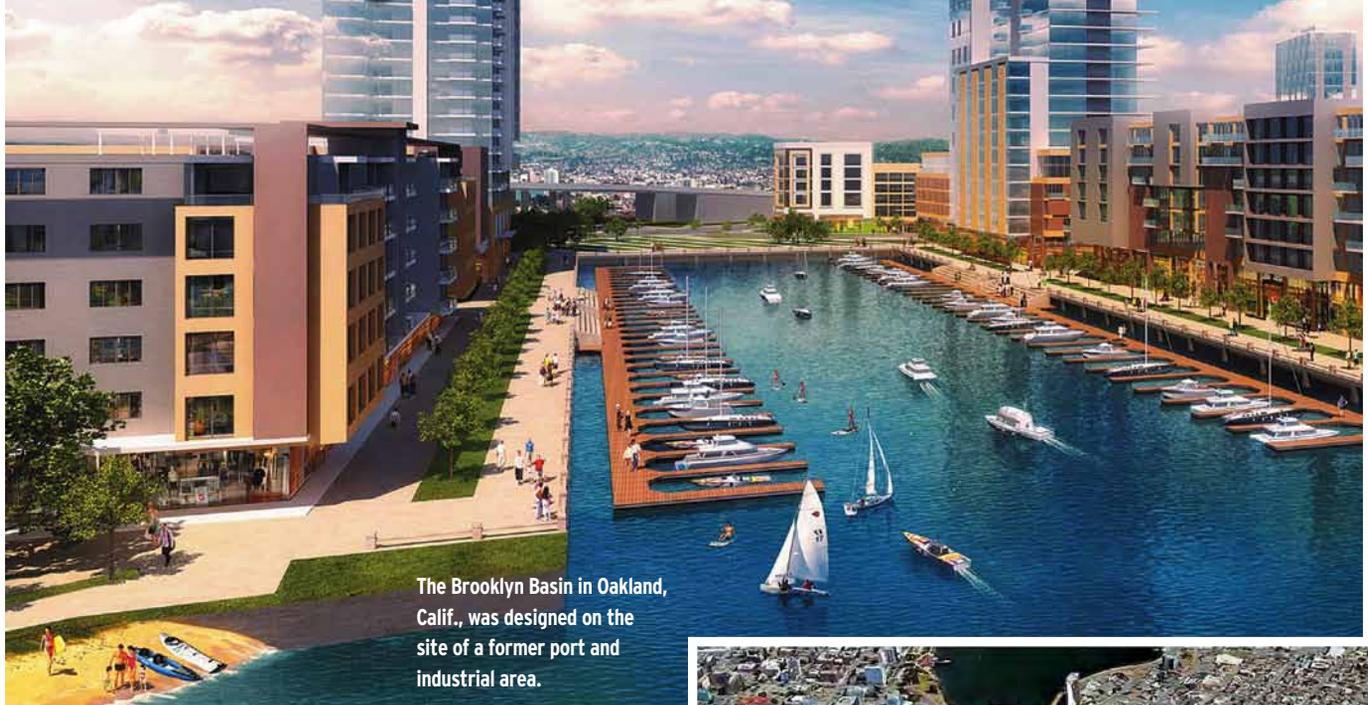
The project’s underground garage required Nitsch and the design team to integrate the roadways’ storm drain, fire protection, power and communications infrastructure with the parking structure. The company also designed roads to be built on the existing floor slab of the abandoned mall. “By using lightweight fill for the roadway base, we were able to create a pitched roadway over a flat building slab,” Christenson says. The road design is completed; the challenge now is to integrate the developer’s building plans into the road infrastructure. “Our design will enable the developers to allow door openings anywhere along the street, so retail tenants can design their stores with increased flexibility and with a varied range of square footages,” she says.



Tennessee-based insurance company Unum is the first to occupy office space at Worcester’s CitySquare development.



Waterfront Neighborhood Springs From Cargo Terminal



The Brooklyn Basin in Oakland, Calif., was designed on the site of a former port and industrial area.

PROJECT: Brooklyn Basin, Oakland, Calif.

FIRM: ENGEO, Inc., San Ramon, Calif.

The Brooklyn Basin, a 65-acre, waterfront neighborhood development located on the site of a former transportation terminal at the Port of Oakland, is one of the largest construction projects in the city of Oakland's history.

Built in the late 1920s, the terminal handled ships moving bulk commodities. The site included a marginal wharf with a warehouse, rail lines and other structures. As navigation of the Oakland Estuary by larger vessels grew restricted, the site was used less.

In 2009, ENGEO began providing conceptual engineering services, seismic design and storm-water consultation, and geotechnical engineering to a public-private redevelopment partnership between the city and Signature Development Group. Construction of the mixed-use development began in early 2014.

The environmentally sustainable urban master plan includes 3,100 residential units, 200,000 square feet of retail and commercial space and 30 acres of parks, public trails and open spaces, plus new marinas and renewed wetlands.

"The goal is to take this underutilized area of Oakland that was separated from the downtown area by the construction of the 880 freeway and to bring redevelopment further south along the waterfront," explains project manager Jeff Fippin. The project, scheduled to take 10 to 15 years, is also spurring resi-



Jeff Fippin



dential and commercial redevelopment of old industrial areas in adjacent Alameda.

The company's role in the redevelopment includes mitigation recommendations to alleviate post-construction settlement, design measures to retrofit portions of the wharf structure and historic warehouse building that will remain (including upgrades for current seismic standards) and geotechnical recommendations for the design of new shoreline structures and infrastructure.

The biggest challenge so far has been its location on reclaimed marshland that is underlain by soft, compressible Young Bay Mud (defined as water-saturated estuarine deposits less than 10,000 years old). "The existing soil conditions presented constraints in relation to raising the site to address sea level rise and shoreline stability," Fippin says. The company is still working on the issue and is currently using a combination of lightweight cellular concrete and lightweight concrete to raise site grades. It also is designing a waterfront bulkhead to stabilize the soil for the retrofit construction at the terminal site.

Remaking a Century-Old Housing Development



PROJECT: The Flats, Wilmington, Del.
FIRM: Landmark Science & Engineering, New Castle, Del.

Wilmington's The Flats neighborhood was built in 1902 as an affordable housing community for 390 Bancroft Mill families. Self-sustaining for most of its existence, its aging housing stock and rising maintenance costs took their toll over the years until the rental community could no longer pay its own way. In addition, residents' utility costs were becoming prohibitively expensive.



Ted Williams

"Renovation was considered, but functional obsolescence, lack of energy efficiency, and small, outdated floor plans served as driving forces for redevelopment," says Landmark Science & Engineering President and former ACEC Chairman Ted Williams.

In 2013, Landmark began obtaining rezoning, site amenity and historic review approvals for a \$100-plus million project that will replace the existing 430 townhomes with more than 450 residential units. By mid-July 2014, the company had begun preparing construction plans for phase I of the seven-phase project, and construction is slated to begin in March 2015. All phases should be complete in about a decade.

The project's master plan incorporates quality, low- to mid-rise, human-scaled urban housing on compact, interconnected blocks and includes several rows of attached dwellings with red brick elevations, covered porches and stoops, and shallow front yards along tree-lined streets. "Unlike many affordable housing projects, The Flats focuses on common green areas and has an emphasis on energy savings, water conservation and previously



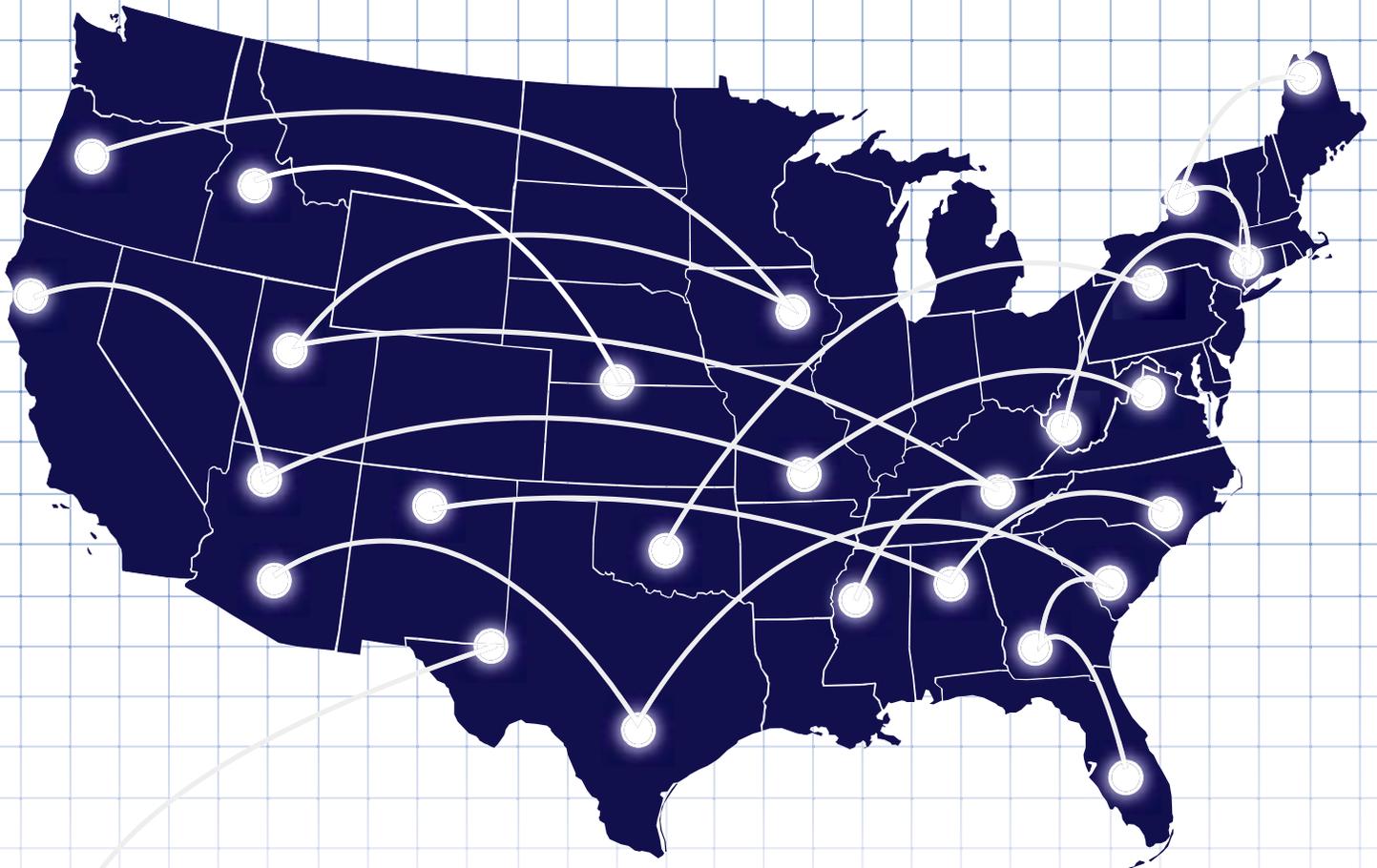
The Flats will contain more than 450 residential units. Above: Looking down on the site of the neighborhood redevelopment.

nonexistent storm-water management," Williams says.

The design of the storm-water management system is most critical to the urban environment. The older infrastructure, which collected both sewage and storm water in a central pipe system for transport to the treatment plant, could no longer handle larger rain events, creating sewage backups that enter nearby rivers. Landmark designed a storm-water system that utilizes ground infiltration technology to reduce overall volume of storm water leaving The Flats.

Creating sufficient parking was another design challenge. "The new design provides for more than 350 off-street parking places that will be hidden from the streetscape by walls or by the dwelling units themselves," Williams says. This off-street parking will increase availability of on-street parking for nearby businesses and restaurants.

The redevelopment depends on federal low-income housing tax credits and other financing sources as well as grants and funding from the Delaware State Housing Authority. Williams says, "This project is a great example of a sustainable, urban community of opportunity that will allow continuation of the owner's mission for affordable housing well into the future."



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Transforming an Industrial Complex Into an Urban Neighborhood

PROJECT: 2700 Remington Ave., Baltimore

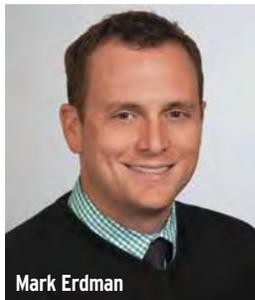
FIRM: Structura, Inc., Baltimore

Located at the foot of Johns Hopkins University, Baltimore's Remington neighborhood has gone largely unnoticed for years but is now considered to be on the verge of a major renaissance.

The 2700 block of Remington Avenue is a one-acre rectangle in an urban plaza that sits in the middle of four old cinder-block warehouses. Seawall Development engaged local architect Hord Coplan Macht and engineering firm Structura, Inc., to provide structural design of a building that will include 84,000 square feet of parking for 267 vehicles, 13,500 square feet of retail space, 27,500 square feet of commercial office space and 92,000 square feet of residential space.

Structura completed the final designs at the end of 2014, and construction began in the first quarter of 2015. The project is slated for completion sometime in 2016.

"Seawall's goal was not to turn around the whole neighborhood, but to provide lower-cost market-rate residential units and office space at discounts for younger people who are working nearby or attending Johns Hopkins and to attract a new influx of ambitious



Mark Erdman

populations to an underserved section of the city," says Mark Erdman, Structura's associate principal. The company's design is meant to respect the surrounding environment as well as the aesthetics and historical look of the immediate neighborhood.

Poor fill soils underlain by a thin layer of stiff soil, then bedrock, create unpredictability for the foundation system and have presented Structura with a major design challenge. During construction, this issue will be overcome by using a combination of spread footings at the lower elevations within the stiff natural soils and auger cast piles where the foundation subgrade is within the fill soils.

Early in the design, Seawall decided to dedicate the first level above the building's podium to offices rather than apartments. To accommodate the second level of transfer framing required for this change, the design team chose a system of LVL beams to be located beneath all bearing walls with a series of heavy timber columns aligned with the walls above.

"The use of wood provides a cost-effective structural solution, a relatively open floor plan for office use and maintains the use of exposed heavy timber elements akin to the mill and factory buildings located throughout Baltimore," Erdman says. ■





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2015
Professional
Liability
Insurance
Survey of
Member Firms
for F.Y. 2014

Buyer's Market

Bustling economy means
rates low, competition high

KLAUS VEDFELT/GETTY IMAGES

By Maureen Conley

The economic recovery is well underway according to the recently conducted ACEC Professional Liability Insurance (PLI) Survey of Member Firms for Fiscal Year 2014.

Three of five respondents (63 percent) report that revenues increased in 2014, a slightly higher growth rate than the previous year and well above the 35 percent in 2010—"a clear sign that the marketplace continues to recover," says Jim Messmore, senior vice president at Hanson Professional Services, Inc., and chair of the ACEC Risk Management Committee. >>

Rising revenues generally mean higher premiums because they are based on overall exposure, says Jeff Connelly, senior vice president of Marsh, the broker for the ACEC Business Insurance Trust. Connelly adds that 69 percent of firms report a decreased or flat premium—meaning it is still “a very soft market” in which carriers are doing everything they can to maintain their business.

Nearly all ACEC Member Firms (99 percent) are taking advantage of the current business climate and carrying PLI, according to the survey, although 4 percent of the smallest firms opted to “go bare” in 2014. Messmore calls this an improvement over the past several years; in 2013, 14 percent of the smallest firms had no PLI.

Fewer firms are changing PLI carriers, says consultant Chuck Kopplin, also a member of the ACEC Risk Management Committee—13 percent in 2014 compared with 18 percent in 2013. Most that changed carriers did so for lower premiums, but some cited dissatisfaction with pre-claims assistance. The highest turnover rate was among environmental firms.

Switching Carriers

With the economy doing better and pricing competitive, the only real incentive to switch carriers is if a firm is unhappy, says Eric Moore, current president of a/e ProNet and vice president of Moore Insurance Services in Hillsdale, Mich.

“But think carefully before changing carriers,” Connelly says. “Those relationships are really important.”

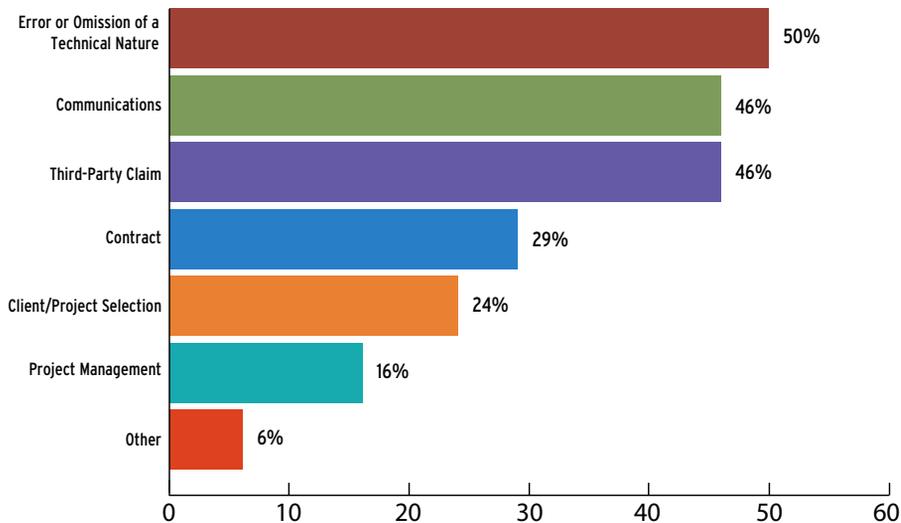
“The policies are so very similar. How a carrier handles loss prevention is key,” says Professional Liability Agents Network (PLAN) President Mike Cosgrove, also CEO of Professional Concepts Insurance Agency. That and a carrier’s philosophy can be more important than the actual policy language, he adds. Cosgrove sees better coverage, lower deductibles, or dollar-one defense—coverage for all costs unless a firm has a judgment against it—as factors that could drive a



“Think carefully before changing carriers. Those relationships are really important.”

JEFF CONNELLY
MARSH

Cause of Claims



Source: 2015 ACEC PLI Survey of Member Firms for F.Y. 2014

firm to switch carriers. Because claims are covered when they are made, not when the work was done, switching to a newer carrier just to save on the premium “could really come back to bite them in a bad way in the event of a hairy situation,” he says.

Firms should consider “what type of service they value,” says James Schwartz, U.S. A&E focus group leader and underwriter at Beazley. “If risk management is important to them, they should consider the risk management services a carrier provides.” He urges designers “to view the carrier as they’d like their clients to view them—not as a commodity, but as a firm that can provide a unique skill set.”

Limits, Deductibles

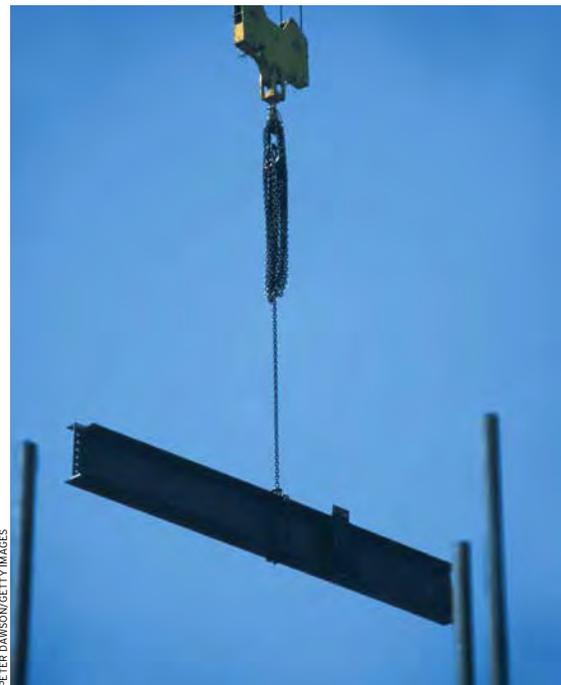
As project owners continue to ask designers to take on higher limits, the averages are shifting, according to Messmore. In the past, firms with revenues up to \$5 million tended to have \$1 million limits, but this year only firms with revenues up to \$2.5 million tend to have \$1 million limits.

In fact, the most common liability limit has doubled to \$2 million, says Kevin Collins, senior vice president for professional liability at Victor O. Schinnerer, and \$5 million limits

are becoming “almost standard.”

Carriers are also asking firms to shoulder higher deductibles. As revenues increase, carriers like to see the firm have “more skin in the game, and it helps to keep pricing in check,” says Connelly.

But firms do have some choice. Keeping a low deductible is a key part of SCS Engineers’ business strategy, says Senior Vice President and General Counsel Tom Barham. “We usually price PLI under multiple scenarios and don’t think higher deductibles are in our best interests when we look at our costs,” he says. “I think we pay a little more in premiums for that.”



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CA, San Diego Area	Cavignac & Associates Insurance Brokers
CO	USI Colorado
CT	Camilleri & Clarke/Smith Brothers
DE	KT&D, Inc.
FL	Suncoast Insurance Associates/USI Florida
GA	Crow Friedman Group, A Risk Strategies Company
HI	Finance Insurance, Ltd.
ID	The Hartwell Corporation
IL North	Holmes Murphy & Associates
	(PCIA) Professional Concepts Insurance Agency
IL Central	Holmes Murphy & Associates
IL South	The Crane Agency
IN	Old National Insurance
IA	Holmes Murphy & Associates
KS	Holmes Murphy & Associates
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LA	Alexander & Sanders Insurance Agency
ME	Clark Insurance
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NJ North	Singer Nelson Charlmers, A Risk Strategies Company
NJ South	Wortley/Poole Professional Ltd.
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NY North	Poole Professional – NY Inc.
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SD	TRJ Professional Group
TN	Crow Friedman Group, A Risk Strategies Company
TX North	McLaughlin Brunson Insurance Agency
TX South	USI Southwest
UT	American Insurance & Investment
	Benchmark Insurance
VT	Poole Professional Ltd.
VA	BB&T Insurance Services
WA	USI Northwest/Kibble & Prentice
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Risk Management

With insurance costs flat, firms can “differentiate themselves” through good loss experience and quality control practices, says Collins. “This really puts the control with the individual firm” and is an area where a specialty broker can be a real asset, he adds.

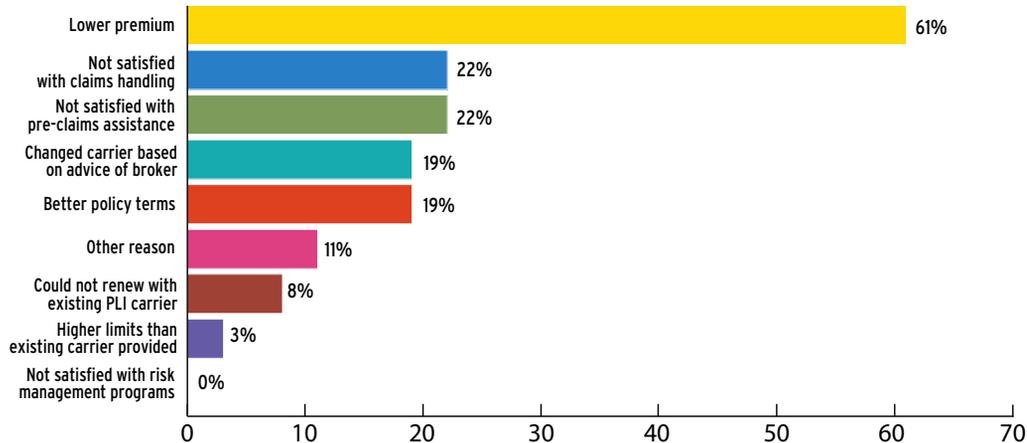
Survey results show the three most often cited reasons firms opt out of a project are: project risk (59 percent), contract language (52 percent) and client history (52 percent). The number of firms reporting that they “frequently” or “sometimes” turn down work has essentially remained unchanged since 2011, at 41 percent, representing \$89 million in forgone fees.

SCS Engineers does not often turn down projects, Barham says, and “will work very hard to get reasonable terms and a reasonable risk balance.” Affinis Corp. will turn down work or bypass opportunities because of poor contract language or if the project is awarded based on low price rather than a qualifications-based competition, says President Rick Worrel.

When facing a client or project with the potential for high risk, Affinis’ leadership will decide if the relationship is good enough to work through those challenges, Worrel says.

A common challenge often involves indemnification. Worrel says some clients ask to be held harmless and defended when a claim arises—something excluded under most PLI policies. Affinis “struggles with educating our clients”—mostly government agencies—and must weigh the costs and benefits. “Sometimes the risk is too high,” he says. These challenges make risk management education and contract review the most important aspect of PLI,

Reasons Why Firms Changed PLI Carriers



Source: 2015 ACEC PLI Survey of Member Firms for F.Y. 2014

Worrel adds, because the carrier can point out things that might not be insurable or identify deal breakers.

Brokers

The choice of a firm’s broker is stable this year, Kopplin says, with only 3 percent of firms changing brokers in 2014, compared with 8 percent in 2013. However, the reasons for switching are changing: Seventy-one percent of firms that switched in 2014 cited broker dissatisfaction versus 42 percent in 2013.

Meanwhile, only 14 percent reported that the new broker offered additional services in 2014, compared with 35 percent in 2013.

A good broker allows a firm to “build its knowledge of good risk management strategies and incorporate them into their in-house capabilities,” Collins says, adding that since consulting engineer PLI is “a completely different type of insurance, it is important that the broker knows this business.”

Moore notes that brokers specializing in PLI for engineers not only know the terminology and the business, but can also work with a carrier to solve risk management or pricing issues for the A/E firm. “For firms that do not have the resources to have on-

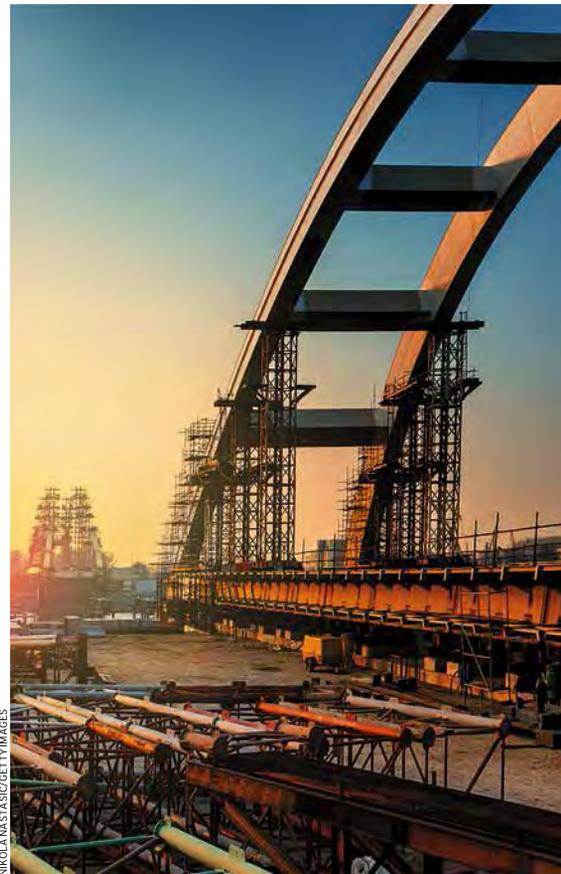
staff risk managers, we become the risk manager for the firm,” he says.

The largest benefit PLAN provides its clients is continuing education credits, says Cosgrove. “Brokers can go in and meet with the staff, talk about the nitty-gritty of what’s going on at the firm or other claims situations they see other firms having,” he says. These conversations allow the firm to reflect on what it is doing right and what it can do better to avoid a claim.



“We usually price PLI under multiple scenarios and don’t think higher deductibles are in our best interests when we look at our costs.”

TOM BARHAM
SCS ENGINEERS



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Claims

Design firms reported 424 claims made against them in this year's survey, mostly by clients (69 percent).

This number is higher than the 408 reported in 2014, when the number of survey respondents was higher, says Kopplin—suggesting claims are increasing as firms' exposures are growing. As in years past, technical errors and omissions and poor communications are the most prevalent causes for claims (50 percent and 46 percent, respectively). Third parties were also involved in 46 percent of claims.

Contract language comes in a distant fourth, with 29 percent reporting it was a factor. Kopplin says firms appear to be “doing a better job,” as project management as a factor for claims has slipped to 16 percent from 24 percent last year.

Results show that only 24 percent of claims were frivolous. Of the total, 215



“For firms that do not have the resources to have on-staff risk managers, we become the risk manager for the firm.”

ERIC MOORE
A/E PRONET AND
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claims were resolved, 81 without any payment by the firm; 62 percent were settled through negotiation and 26 percent through mediation. Only six, or 3 percent of claims, were resolved at trial. These claims cost firms more than \$55 million and 30,500 personnel hours to defend and settle.

Al Rabasca, director of industry relations at the Design Professional unit of XL Group, sees a correlation between dissatisfaction with claims handling and firms that “were simply shopping price.” He says XL works with insureds “as early as possible” to understand the true exposure if a claim arises. Schinnerer wants to “be hand-in-hand with the client to help them through

the process,” including in the selection of counsel, Collins says.

Designer claims are complex, and so are decisions to settle, notes Schwartz. If the standard of care was breached, or there

was personal injury or death even without liability, that needs to be weighed against “the cost going forward not only in dollars, but the commitment of resources to help defend the claim and the fatigue that goes along with that.”

Trends

Collins believes the future could include some markets pulling back on specific project types, such as condos, residential and pollution coverage. Others see carriers adding new bells and whistles to their policies. Some are adding cyber coverage for liabilities if the firm's system is hacked or if a major virus shuts it down for a few days. Moore is also seeing endorsements for identity theft, network protection, and management and fiduciary liability. While liability coverage for directors and officers is typically offered as a stand-alone policy for larger firms, some carriers now offer it as an endorsement to PLI, which Moore says may be attractive to smaller and medium-sized firms.

One troubling trend is engineering firms placing their coverage with non-admitted carriers, also called surplus lines, simply for price, says Connelly. These policies can be sound, but because the carrier is not recognized by the state, “there is no protection if a claim is being handled” if the carrier goes insolvent, he says. Most contracts clearly state that a firm's PLI “needs to be with an approved, admitted, licensed insurance carrier in the state they operate in,” Connelly says.

SCS Engineers is seeing more projects involving design-build and integrated project delivery (IPD), which allocate responsibility differently than traditional project delivery methods. Barham says it can be complicated to insure IPD, a direction the industry is clearly moving in. He describes the trend as “breaking down those silos” that grew up when architecture, engineering and construction became specialized fields. Today, “the industry is accelerating faster than the law,” he says, creating opportunities but requiring firms to “be willing to be entrepreneurial and take on a little risk to succeed in this environment.” ■

Maureen Conley is a technology and business writer based outside Washington, D.C.



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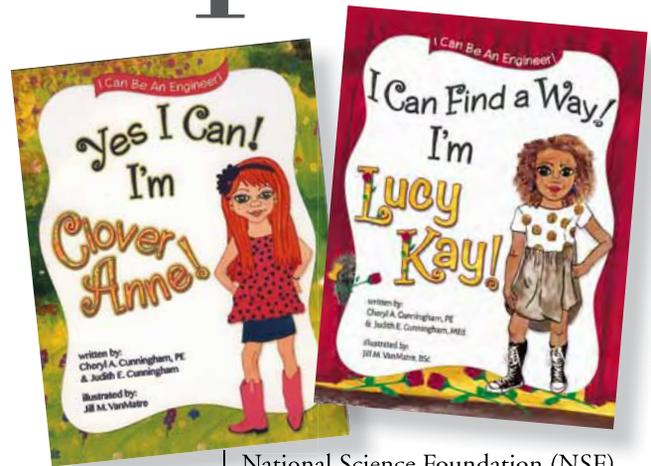
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Girl Empower

By Gerry Donohue

Children's books promote "Yes I Can" to engineering for grade-school girls



When reflecting on her 30-plus-year career as a civil engineer, Cheryl Cunningham can't help but get enthusiastic. "It's the coolest job in the world," says Cunningham, president of PCS Engineers, a 25-person civil engineering firm in Avon, Ind. "It's exciting. You get to use your imagination. You solve problems."

Now Cunningham is trying to share her passion with a demographic group that hasn't historically been attracted to engineering—grade-school girls. She and her sister, Judy Cunningham, are creating a series of *I Can Be an Engineer* children's books to encourage young girls to consider the possibilities of an engineering career. They have already published two books, *Yes I Can! I'm Clover Anne!* and *I Can Find a Way! I'm Lucy Kay!*

"It's frustrating to me that we have the same percentage of women in engineering today that we had when I graduated more than 30 years ago," Cunningham says. "Other professions, such as architecture, have figured out how to entice more women, but that hasn't happened in our industry."

Studies put the percentage of women in engineering between 10 and 20 percent. According to a 2013

National Science Foundation (NSF) report, women comprise about 12 percent of the 1.5 million U.S. engineers. In some practice areas, the percentage of women is remarkably low—among mechanical engineers, for example, women comprise less than 1 percent.

Cunningham believes the seeds of that disparity germinate in grade school. "I think the biggest reason that girls don't get into engineering is they don't even know what it is," she says. "The second biggest reason is they just don't see themselves doing it, because it's such a male-dominated profession."

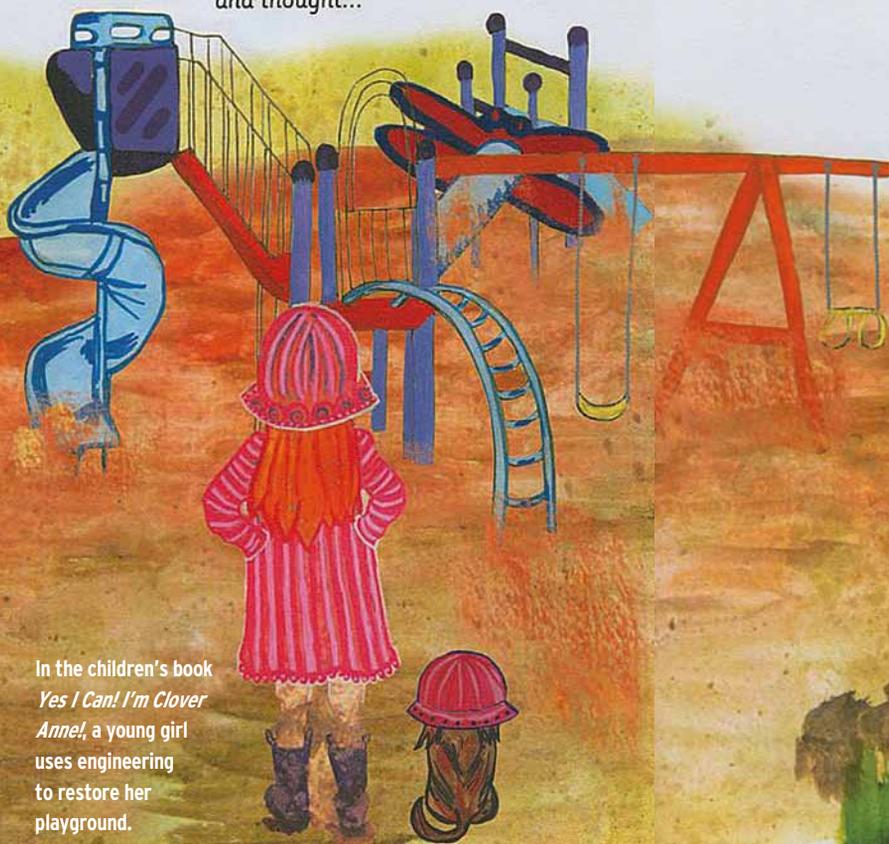
Cunningham recalls her own introduction to the field. Her high school guidance counselor noted her high math aptitude and told her that if she were male,

12%
of U.S.
engineers
are
women.

Source: National Science Foundation

So Clover Anne put on her pink striped raincoat with matching pink hat and purple boots, and outside she went. She stood in the rain, stared at the creek, and thought...

...and thought. Just when her feet were about to sink into the mud, she suddenly remembered another time she was in the same conundrum.



In the children's book *Yes I Can! I'm Clover Anne!*, a young girl uses engineering to restore her playground.

she would be well-suited for engineering. "My reaction was I want to do that," Cunningham says.

Cunningham went to Purdue University to study civil engineering. "I remember looking around and wondering, 'Where are all the girls?'"

Having flourished in her engineering career, Cunningham now has the resources and time to address that question.

For the past few years, she has talked about engineering at local grade schools. While those sessions give her a direct way to open students' eyes to the opportunities of an engineering career, she realized her reach was limited. Last spring, she concluded that the best way to



"Other professions, such as architecture, have figured out how to entice more women, but that hasn't happened in our industry."

CHERYL CUNNINGHAM
PCS ENGINEERS

bring her message to more girls was to write children's books.

Yes I Can! I'm Clover Anne! tells the story of a young girl who can't play in a new neighborhood playground because it has flooded after a rainstorm. Realizing that a nearby creek caused the flooding, she organizes all the other kids to redesign and rebuild the stream banks. In *I Can Find a Way! I'm Lucy Kay!*, a crying baby sister prompts a young girl to develop soundproofing.

To create the stories, Cunningham teamed with her sister Judy, who has a master's degree in early education. "I bring the passion for engineering," she says,

"and she brings the passion for children and children's books."

Writing each book took about three months, and then Cunningham's niece, Jill VanMatre, a professional artist, provided illustrations. They self-published the books through Amazon's CreateSpace website and unveiled the first one at the ACEC 2014 Fall Conference.

"The goal is to get the books into kids' hands," Cunningham says. She has given readings at libraries and elementary schools, while Judy, who lives in Atlanta, set up several readings in her area to coincide with Engineers Week in February 2015.

Cunningham envisions writing a series of five *I Can Be an Engineer* books. For more information about *Yes I Can! I'm Clover Anne!* and *I Can Find a Way! I'm Lucy Kay!*, visit Amazon. ■

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

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SESSION HIGHLIGHTS

CEO Panel - Change and Innovation in the A/E Industry

Stephen Hickox

Chairman & CEO, CDM Smith

Eric Keen

Engineering President/Vice Chair, HDR

Tom Scarangelo

Chairman/CEO, Thornton Tomasetti

CEO Panel - People & Practices that Build Success

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The Business Case for Cybersecurity

There are two types of firms: those that have been hacked and those that will be hacked. Just because you don't hear about it in the news, don't assume that professional service firms are not targeted by hackers.

The 2014 NetDiligence® Cyber Claims Study found the professional services sector tied for the third most claims out of 13 different industry sectors. In addition, 23 percent of all claims came from firms with less than \$50 million in revenue. All engineering firms need to proactively address cybersecurity and the risks associated with online data.

Small firms are targeted more because they have fewer resources than large firms. Information that needs to be secure includes confidential project and client information as well as employees' personal information. There are costs associated with securing a firm's information, but the cost of not securing it could be higher.

If a data breach occurs, the firm will need to notify the entities whose information has been stolen. There could be credit and identity monitoring requirements as well as litigation. Federal and state requirements for notifying victims of a data breach are evolving and vary. The firm will also incur the cost of restoring its network after the data breach. Besides the direct monetary costs, the firm's reputation could take a hit from both its clients and employees.

Threats have both external and internal origins. External threats come from amateur hackers, often someone with a personal or political agenda, and cybercriminals who are looking to make money from selling the information. Internal threats can be either intentional or unintentional. According to the National Institute of Standards and Technology, internal threats account for 80 percent of security issues.

Most firms allow employees to access their firm's network from a

remote location using a virtual private network (VPN) on a personal computer. An emerging source of threats comes from "bring your own device" (BYOD) policies that are increasingly common. These devices include both smartphones and tablets. When the employee's computer at work is included, a 30-person firm can have as many as 120 devices (four times the number of employees) that are connecting to the Internet and its computer system. Each of these devices is capable of downloading malicious code and viruses that can easily be transferred to the employer's computer system.

As the number of mobile devices has grown, so has the number of apps and fake apps. According to a recent research paper by IT security company Trend Micro, "It has actually become quite common to see fake apps, which appear as real apps, come out shortly after legitimate mobile or PC versions come out." The paper found almost 900,000 fake apps, and 44 percent of them were detected as malware. An estimated 84 percent of all cyberattacks are happening at the application level.

Firms are beginning to add cyber insurance to help share the risk of their increased exposure to hackers and cybercriminals. Coverage includes:

- Liability arising out of unauthorized access to confidential third-party data.
- Costs to restore design firm's data and extra expenses while recovering from the breach.
- Web content that is alleged to include libel, slander and accidental public posting of private information as well as copyright or trademark infringement.
- Public relations assistance to protect the firm's reputation.

Some policies include risk management services, such as tools for breach prevention and recovery. It may also include forensics coverage and incident response services. The insurance carrier will contract with experts to assist the insured when a loss occurs. Cyber insurance can be purchased for as little as \$1,000 for \$1 million in coverage. An insurance broker can provide more specific information.

As the use of electronic devices and the reliance on electronic information is increasing, a firm's risk of being hacked or having its data breached is growing. Cybersecurity efforts need to be diligent to combat the efforts of hackers and cybercriminals.



Glen Mangold



Charles Kopplin

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

Charles Kopplin, P.E., FACEC, has more than 40 years of experience as a consulting engineer, including 14 years as the risk manager for an ENR Top 500 Design Firm. He can be reached at cw.kopplin@gmail.com.



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Which Comes First—Growth or Infrastructure Investment? An Economic Chicken or Egg

For local, regional or national economies to grow requires investment in infrastructure—transportation, water, communications, energy, even housing. This is especially true today as cities compete to become hubs for innovation, models of community development, and providers of economic and social prosperity. Cities striving to attract businesses and citizens (read: taxpayers) must also meet rising expectations for mobility, services and connectivity. And yet, when growth is stagnant, funding for infrastructure is often first on the chopping block. So which comes first—growth or investment?

Transportation— Case in Point

Let's use a well-recognized infrastructure example to highlight the connection between infrastructure and economic growth—transportation. Beyond water and housing (the top priorities for infrastructure in any country), a solid transportation system (roads, highways, bridges, mixed modal transit) is critical to economic development, especially in developing countries. As we see today in many areas, it is difficult if not impossible to feed inhabitants in a city if food from agricultural areas cannot reach the consumers in the cities in a timely fashion to avoid spoilage. Without developed transportation systems, fuel, construction materials, medicine and all other commodities are often delayed due to the time it takes to move them over unpaved roads. Other basic infrastructure that relies on transportation and roads to construct, such as utility and telephone networks, cell towers and Internet services, may cause a region or country to fall behind the globalization process.

As cities grow and evolve, their infrastructure spending, focus and needs do as well. While the connection between infrastruc-

ture and economic growth remains, the priority of spending and what is required to keep that growth going changes. As economies mature, people are less concerned with the basic transport of goods than a focus on transportation that supports business opportunities and innovation. The shift moves from basic roads and highways to mass transit within urban areas, or easy connections to air, rail and sea for business continuity. Cities also rethink living configurations, green space and the environment and use these as drivers of transportation configuration.

This is a challenge facing many developed cities today. While lack of quality infrastructure can limit economic growth in developing countries because it doesn't exist, it can also limit growth in developed countries if it is not kept in good working order and repair.

The Virtuous Cycle of Infrastructure Investment and Growth

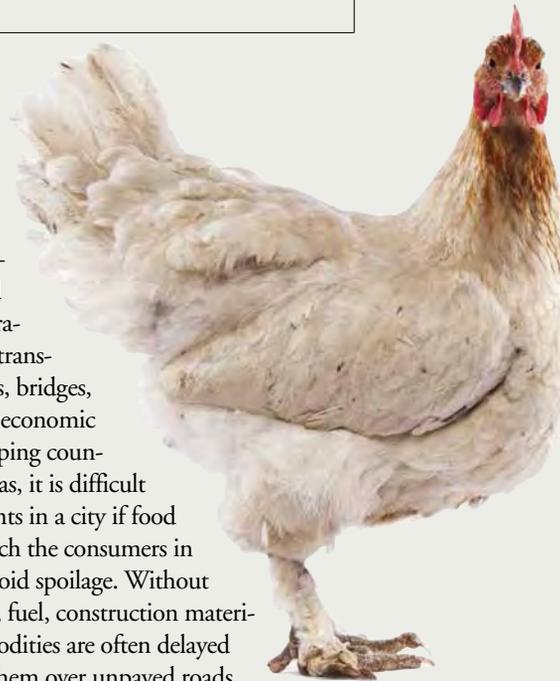
With the established connection between infrastructure and economic growth, how do we approach the planning, design and operations of it?

The first step is understanding the external drivers that are affecting the global infrastructure industries today. These include:

- Resiliency and recovery of infrastructure assets becoming more critical due to the rise of weather- and nature-related events
- Business shift from lowest life-cycle cost to highest life-cycle return
- Smart infrastructure (sensor data), crowdsourcing of asset issues/events, and the use of LIDAR and other reality-capture techniques to collect infrastructure asset data in near real time and assess their condition
- Technology that is breaking down barriers between disparate data sources (i.e., CAD/BIM and GIS) and providing access to real-time Big Data
- The cloud as a means to effectively filter and make sense of the Big Data

These trends are leading us to the understanding that in the global infrastructure market:

- Innovation is no longer optional in the planning, design and construction of infrastructure
- The fundamental methods of planning, design and construction are radically changing



Essential Elements

As noted in the recent industry report “Making the Grade, A National Six-Point Plan to Regain America’s Infrastructure Leadership,” for future success not only in the U.S. but also in other countries, we have to rethink the process by which we plan, design, build and finance infrastructure to bring it in line with the current environment that exists. Most notably:

- Embrace modern delivery methods and approaches that promote efficiency in project delivery and discourage unnecessary administrative and liability burdens on stakeholders
- Improve the utility and productivity of infrastructure—both new and old—by applying the latest in systems planning and integrated technologies

Modern delivery methods

Building Information Modeling (BIM) is the vehicle by which the business of planning, designing, building and managing the world’s infrastructure will be transformed to deliver higher productivity, quality and cost-effectiveness. In an era where waste and inefficiency are intolerable, policymakers are looking to expedite project delivery, reduce costs and ensure that every dollar is invested wisely.

PPPs are being used at a record pace, because among other benefits, they incorporate greater accountability into the process. BIM for infrastructure can help close the funding gap by reducing costs and increasing potential sources of funding with more predictable ROI.

The entire process of developing, executing and managing infrastructure projects can be transformed—initial surveying and data collection, environmental review, public participation, design and documentation, bidding, construction, and operations and maintenance.

The model-centric approach enables planners, engineers and designers to explore and validate innovative design ideas and what-if scenarios with project investors. Before ground is broken, all parties have a better understanding of scheduling (4D) and cost (5D), environmental impacts are assessed and understood, and the public can visualize what the project will look like at various stages of completion.

Systems planning and integrated technologies

The key to integration at the actual planning, design, engineering, construction, operation and maintenance is to start by empowering planners to envision and model the data-informed city in an integrated framework of infrastructure systems.

With the intelligent technologies currently available, we have the capability to build infrastructure for lower carbon and greater sustainability and longevity. And as we think to the

future, advanced technologies working in harmony will enable us to push existing boundaries and drive further innovation.

Returning to the initial transportation example, roadways are a good illustration of how reimagining infrastructure leads to viewing infrastructure more broadly, as a framework of integrated systems, and how such a reimagining can better serve our cities and regions.

What will bring success is planning for this transition early on and having in place approaches and designs that can be repurposed, expanded and reconfigured by design, not as an afterthought.

Optimized infrastructure investments

It is not just transportation infrastructure that is in serious need of renewal and expansion but also the water and wastewater infrastructure. Combining technology with integrated planning will by nature help prioritize and optimize investments.

BIM helps solve the fundability challenge by improving communication and transparency. From an investor’s perspective, you’re showing a planning or design model that, with the power of cloud-based computing, allows for predictive analytics on numerous alternative designs. As a result, investors can be confident that the design is being optimized to reduce risk and predict ROI.

Conclusion

When weighing the supposed balancing act between infrastructure investment and economic growth, cities—and indeed countries as a whole—need to think and act beyond traditional design to achieve optimal outcomes across multiple categories of cost, benefit and risk associated with financial, sustainable and resilience value for money. By taking the BIM-based approach described above, we can start to understand our man-made infrastructure a bit better and in doing so help drive efficiency in creating infrastructure in all countries, balancing it against natural infrastructure.

Coupling infrastructure investments with a strategic use of 3D technology and BIM processes will not only provide investors and countries with a better understanding of the scope and complexity of the investment in sustainable infrastructure, but it will also enable them to route efficiency gains made from technology toward financing future projects and continuing the engine of economic growth.

Terry D. Bennett is on the Sustainable Infrastructure Advisory Board at Harvard’s Graduate School of Design and leads industry strategy for infrastructure at Autodesk. Bennett is also a member of the Urban Land Institute’s Public Development and Infrastructure Council, and charter member and Economics Council member of the Institute for Sustainable Infrastructure.

The Importance of Risk-Balanced Sub-Consultant Agreements

The engineering profession has become much more specialized over the last few decades, resulting in a significant increase in the number of firms needed to complete a project.

Projects now involve a multitude of engineering disciplines under the direction of a lead firm directly engaged by the project owner. Since the lead firm is typically larger and more financially stable than the sub-consultants, owners often require the lead firm to carry a higher level of insurance (in case the project fails to meet production or quality targets) as well as unfavorable indemnification provisions, extensive guarantees, and heavy liquidated damages penalties.



Paul Navarro

Lead firms often seek to mitigate accepted contractual liabilities by transferring these risks to the supporting cast of sub-consultants through sub-consultant agreements.

Indemnification

One of the more potentially penalizing requirements common in sub-consultant agreements is the indemnification clause. For example, a recent contract entered into by a geotechnical sub-consultant contained the following language:

“The Consultant(s) shall indemnify and save harmless the Department of Transportation, The Administration, their Officers, agents, and employees from and against all claims, suits, judgments, expenses, actions, damages and costs of every name and description arising out of or resulting from errors, omissions, negligent acts, negligent performance or nonperformance of the services of the Consultant or those of his subcontractors, agents or employees under this Contract.”

By accepting this clause, the sub-consultant is indemnifying the project owner’s attorney, lender, and others who are not directly part of the project owner entity. Most insurance policies contain language that would render acceptance of this liability uninsurable, making the sub-consultant firm responsible for any damages resulting from a claim filed by an agent and possibly even a third party.

Schedule

Another prime contract requirement regularly imposed on sub-consultants includes strict language regarding project schedules, which can be burdensome and lead to the sub-consultant being liable for

damage penalties should the project be delayed—even when such delays occur through no fault of the sub-consultant. A recent assignment by a prime consultant to a sub-consultant contained the following language:

“Time of Essence: Time shall be deemed to be material and stated time limits are of the essence of this AGREEMENT. The SERVICES for the PROJECT shall be completely performed by the SUBCONSULTANT on or before the day that (name deleted) may direct.”

The language here gives the prime firm excessive authority over the timeline for the sub-consultant to perform its services. A more acceptable schedule clause should contain specific language acceptable to both parties, such as:

“TIME: SUBCONSULTANT recognizes that the services of PRIME and others involved in the Project are dependent upon the timely performance of the SUBCONSULTANT’S services. SUBCONSULTANT shall perform such services in the same character, timing and sequence as PRIME and is required to perform services per the Prime Agreement and in accordance with SUBCONSULTANT’S proposal to PRIME.”

Payment

Terms of payment clauses in sub-consultant agreements can also be problematic, such as the “paid-when-paid” contract language in the section below, which is becoming prevalent in the industry and can extend a sub-consultant’s payment cycle.

“PAYMENTS: Consultant shall bill OWNER monthly on account of SUBCONSULTANT’S services and expenses and shall pay SUBCONSULTANT within fourteen days of the time CONSULTANT receives payment from OWNER on account thereof. Payment to SUBCONSULTANT is contingent on CONSULTANT’S receipt of same from OWNER.”

In smaller firms, paid-when-paid language can result in cash flow problems or increased costs due to interest incurred from drawing on existing lines of credit.

Since there is no such thing as a perfect project, it follows that there is no perfect contract. For this reason, sub-consultant firms that want to avoid potentially catastrophic claims would be wise to pay close attention to the project scope, project owner, prime firm requirements and the other fine-print language in both the prime agreement as well as the sub-consultant agreement.

Paul J. Navarro is president and CEO of Navarro & Wright Consulting Engineers, Inc., in New Cumberland, Pa. He also is a member of ACEC’s Land Development Coalition Executive Committee.

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Drones Not Yet on Engineering Industry's Radar

Unmanned aerial vehicles (UAVs), commonly known as drones, potentially have numerous applications, from newsgathering to pizza delivery. Engineers, however, are not that excited about them, according to results from the latest ACEC *Engineering Business Index* (EBI).

Only 15 percent of Member Firm leaders plan to incorporate UAVs into their operations over the next year, compared to nearly 70 percent who see no need for UAVs at this time.

Concerns over the practicality of UAVs in the engineering practice, along with uncertain federal guidelines, were most often mentioned in respondent comments.

"I think the potential is a little overstated at this point," said one respondent. "We are using static installed remote cameras for inspection and ground-based mobile LiDAR for survey, which both work very well. Not sure we need drones for improved efficiency."

For the complete EBI summary, visit www.acec.org/publications/engineering-business-index.

ACEC HR, IT and Finance Forums To Meet in New Orleans

ACEC forum workshops help members make sense of current concerns and emerging trends impacting the A/E workplace. Featuring two days of peer-to-

peer information sharing, problem solving and networking, they allow members (HR, IT and finance firm leaders and directors) to examine common problems, benchmark processes, share experiences and network with their peers in an informal, roundtable format. They also have active online communities.

The next in-person forum meetings will be held September 28 and 29 at the Royal Sonesta Hotel in New Orleans. Visit www.acec.org/councils for more information and to register.

CASE National Practice Guideline On Project and Business Risk

The CASE National Practice Guideline on project and business risk is now available.

This guideline is intended to help structural engineering companies manage the risks associated with projects and business practices. Organized in two sections—Project Risk Management and Business Practices Risk Management—the guide provides valuable tools and insights to help structural engineers mitigate the risks faced in daily practice.

To download the guideline, visit www.acec.org/case/getting-involved/guidelines-committee, and click the "National Practice Guideline on Project and Business Risk" link.

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* ATRI, Cost of Congestion to the Trucking Industry, 2014 • † TRIP, Bumpy Roads Ahead, 2012 • ‡ TTI, Urban Mobility Report, 2012



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

Members in the News

On The Move

Fargo, N.D.-based **Ulteig** named **Doug Jaeger** CEO. Jaeger succeeds **Eric Michel**, who will step down from the board but remain a company adviser. Jaeger will be based in St. Paul, Minn.

Golder Associates appointed **Hisham Mahmoud** president and CEO. He previously served as president of the infrastructure group at SNC-Lavalin and is based in Atlanta.

CHA, formerly Clough Harbor & Associates, named **Michael Carroll** president and CEO. Carroll succeeds **Raymond L. Rudolph**, who was appointed executive chairman. Carroll previously served as executive vice president of AECOM and as CEO of ARCADIS in the U.K.

HNTB named **Thomas O'Grady** corporate president. He previously served as the firm's central division president and is based at the firm's headquarters in Kansas City, Mo.

Tata & Howard, Inc., appointed **Kenneth M. Fischer** CFO/treasurer. He previously served as president/CEO, COO and CFO of several mid-cap companies. Fischer is based at the firm's corporate headquarters in Marlborough, Mass.

Towill appointed **Aaron Bagger** CFO. He previously served as operations manager for Capital Engineering Consultants and is based in Concord, Calif.

Chicago-based **CTLGroup** announced the following appointments: **Timothy Tonyan** was named COO; **Paul Haglund** was named CFO; and **Richard Kaczowski** was appointed vice president and group manager.

Nashville-based **Gresham, Smith and Partners** named **Mark Henderson** executive vice president of healthcare. He previously served as senior vice president and healthcare market leader for AECOM.

AECOM appointed **Christopher O. Ward** senior vice president, chief executive of its metro New York business. He previously served as executive vice president for major projects at Dragados USA.

Pasadena, Calif.-based **Parsons** appointed **William C. "Bill" Bodie** executive vice president of its Middle East Africa (MEA) region. **Jaafar Hillawi** has joined the firm as senior vice president and managing director of environment and infrastructure for the MEA region. He is based in Dubai.

Donald D. Graul was appointed president of **Parsons Construction Group**, overseeing infrastructure construction throughout North America, succeeding **Garry Higdem**, who is retiring. **David A. Carlson** has joined the firm as vice president, environment and infrastructure. He is based in Boston.

Long Beach, Calif.-based **Moffatt & Nichol** appointed **Sam Mansour** vice president of rail and transit for the firm's Western Region.

Louis Berger appointed **Philip Bourne** to its Middle East and North Africa team as vice president and managing director for the company's Kingdom of Saudi Arabia business operations. He is based in Riyadh.

Nashville-based **Barge Waggoner Sumner & Cannon, Inc.**, appointed five new vice presidents: **Charlie Smith** is the Nashville civil group leader; **Nelson Elam** is office manager of the Tri-Cities office in Kingsport, Tenn.; **Jason Lowe** is office manager in Huntsville, Ala.; **Mike Abt** is manager of project services for the industrial and building services business unit and based in Nashville; and **Casey Tyree** is the Knoxville civil group leader.



Doug Jaeger



Hisham Mahmoud



Michael Carroll



Thomas O'Grady



Kenneth M. Fischer



Aaron Bagger



Timothy Tonyan



Paul Haglund



Richard Kaczowski



Mark Henderson



Christopher O. Ward



William Bodie

Welcome New Member Firms

ACEC/California

F3 & Associates, Inc., Benicia
IDS Group, Inc., Irvine
iWalk, Inc., Bakersfield

ACEC/Colorado

Cirque Civil, Inc., Edwards
CORE Consultants, Inc., Littleton
Fortis Structural, LLC, Denver
Goodbee & Associates, Inc., Centennial
JeHN Engineering, Arvada
MB BIM Solutions, Denver
Pie Consulting & Engineering, Arvada
Providence Infrastructure Consultants, Inc., Centennial
Roscoe Postle Associates USA, Ltd., Lakewood
Sterling Design Associates, Littleton

ACEC/Florida

Cornelison Engineering & Design, Inc., Zephyrhills
Engineering Express, Deerfield Beach
High Power Development, Tampa
Jordan & Associates Consulting, Inc., Orlando
Josephson Engineering Consultants, LLC, Tampa
Metco Services Southeast, LLC, Fort Lauderdale
Pinnacle Consulting Enterprises, Inc., Miami
Protean Design Group, Inc., Orlando

ACEC/Illinois

Sanchez & Associates, P.C., Chicago

ACEC/Indiana

7NT Engineering, LLC, Indianapolis

ACEC/Louisiana

Eustis Engineering Services, Metairie

ACEC/Minnesota

Williams Building Systems Engineering, P.C., Golden Valley

ACEC/Mississippi

M & W and Associates, Pascagoula

ACEC/Missouri

Waters Engineering, Inc., Sikeston

ACEC/New York

AKRF, Inc., New York, N.Y.
JED Engineering, P.C., Valley Stream
MAKS Consultant Corp., Brooklyn

ACEC/North Carolina

SDG Engineering, Inc., Bostic

ACEC/Oregon

Nemariam Engineers & Associates, LLC, Portland

ACEC/Tennessee

Lukens Engineering Consultants, LLC, Brentwood

ACEC/Texas

Amani Engineering, Inc., Houston
ATSER LP, Houston

ACEC/Washington

ICHTHYS Engineering, PLLC, Vancouver

ACEC/Wisconsin

Precast Engineering Company, Inc., Brookfield



Jaafar Hillawi



Donald D. Graul



David A. Carlson

Calendar of Events

JULY

- 8** Deal Makers and Deal Breakers (webinar)
- 9-11** ACEC Deep South Convention & Exhibitor Trade Show, Destin, Fla.
- 9** How to Win a Pitch: The Fundamentals That Will Distinguish You From Your Competition on the Short-List (webinar)
- 14** Superstar Project Managers Make Money: Set Yourself Up On Day One (webinar)
- 16** The BackPocket! Business Plan—Outrageously Simple Business Planning for Extraordinary Business Results (webinar)
- 28** Smart Buildings/Smart Cities and the Opportunities for Engineers (webinar)
- 29** Using an Executive Scorecard to Improve Results (webinar)

AUGUST

- 4** Cumulative Impacts and Inefficiencies: The Effects of Changes on Unchanged Work (webinar)
- 11** May I Talk to You About Video?—How to Super Charge A/E Social Media (webinar)
- 12** Data Breaches—Why Engineering Firms Are at Risk (webinar)
- 13** Avoid the Leadership Pitfalls of Over-Thinking (webinar)
- 19** The One Hour Proposal: How to Spend Less Time on Proposals and More Time on Your Business (webinar)
- 25** Creating a Financially Intelligent Culture Through Open Book Management (webinar)
- 27** Emerging Technologies for Engineers (webinar)

SEPTEMBER

- 1** Organizing with Outlook 2013 for Busy People (webinar)
- 3** Developing Effective M&A Strategies—Improving Your Odds (webinar)
- 9** Liability IQ and Review (webinar)
- 23** Using Metrics to Identify Barriers to Success (webinar)
- 24** Ownership Transition 2.0 (webinar)

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.

Private Equity Interest Growing In the Consulting Engineering Industry

In late May, ACEC Member Firm CH2M announced that it agreed to partner with an affiliate of Apollo Global Management, one of the world's largest private equity firms, in a deal that values the global engineering and project delivery firm at roughly \$2 billion, according to the *Wall Street Journal*. Apollo will invest \$300 million in a preferred-equity stake in CH2M, intended to add financial strength and spur further growth.

Private equity's interest in the engineering industry appears to be heating up. The combination of retiring baby boomers (necessitating ownership and leadership transition among industry firms) with our nation's ever-increasing critical infrastructure needs have created an environment where even private equity's largest players have taken an interest in the engineering space. We've seen a number of private equity firms invest in industry firms in recent years, including:

- Blue Point Capital Partners, which sold its interest in

architectural firm Callison to ACEC Member Firm ARCADIS last year.

- CIVC Partners, which invested in energy-focused EN Engineering in 2012.

Private equity firms typically raise a pool of capital, often from outside investors such as endowments and public pension funds, and then invest that capital in operating companies. Typically, that capital is invested through a leveraged buyout, a recapitalization or in the form of growth capital. These types of investments can allow industry firms to fuel growth initiatives and cash out firm owners and principals on the path to retirement. Private equity firms typically aim to grow their operating companies, as well as make operational improvements, and realize their investments through an "exit"—a merger or acquisition involving another engineering firm, a sale or recapitalization involving another private equity company, or for the largest deals, an initial public offering.

Depending on individual

goals and objectives, private equity could provide a strong and viable tool for ownership transition among many industry firms. Engineering firm owners who are moving toward retirement may want to consider private equity as one of many options to achieve their personal and firm transition goals.

Recent ACEC Deal-Makers May 2015

ACEC Member **PRIME AE Group** (Owings Mills, Md.) acquired **John M. McDonald Engineering** (Schenectady, N.Y.).

ACEC Member **Volkert** (Mobile, Ala.) acquired the Construction Engineering Inspection division of ACEC Member **Rodriguez Transportation Group** (Austin, Texas).

ACEC Member **Pennoni Associates** (Philadelphia, Pa.) acquired **Philip Post & Associates** (Chapel Hill, N.C.), a civil engineering and land surveying firm providing land planning, site design water/wastewater and construction inspection services.

ACEC Member **Collins Engineers** (Chicago, Ill.) acquired **Civil Squared Engineering** (Las Vegas, Nev.), a provider of site civil, drainage, and traffic and transportation engineering services.

ACEC Member **TRC Companies** (Lowell, Mass.) acquired distribution engineering and design firm **X-Line, Inc.** (Villa Rica, Ga.).

Ebersole Structural Engineers (Cleveland, Ohio) joined ACEC Member **GPD Group** (Akron, Ohio).

April 2015

Steven M. Adkins Land Surveying (Laurel, Del.) joined ACEC Member **George, Miles & Buhr** (Salisbury, Md.).

Project management and training firm **Metier Holdings AS** (Oslo, Norway) joined ACEC Member **RPS Group** (Abingdon, UK).

ACEC Member **Tetra Tech** (Pasadena, Calif.) signed a definitive agreement to acquire **Cornerstone Environmental Group** (Middletown, N.Y.), an environmental engineering and consulting firm focused on U.S. solid waste markets.

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

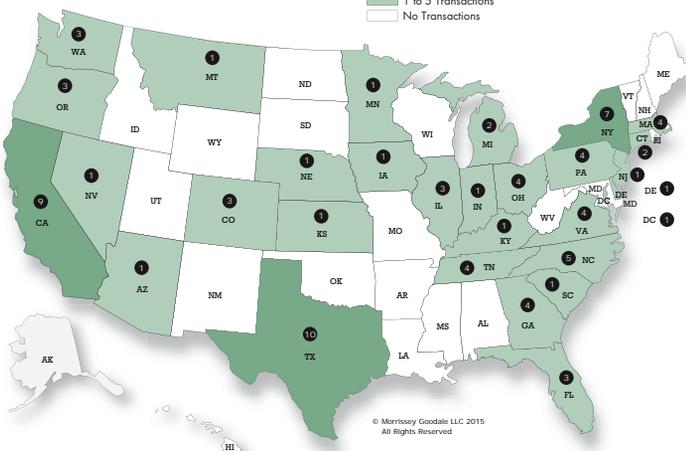
Watch the M&A Takeaway video that accompanies this article, presented by Mick Morrissey, at www.morrisseygoodale.com/ACECMergers/JulyAugust2015.



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

2015 REPORTED M&A ACTIVITY Firm Sales by State through June 1, 2015

States by Total Activity:	US vs Int'l Sellers:
21 or more Transactions	Total US Sellers 98
16 to 20 Transactions	Total Int'l Sellers 39
11 to 15 Transactions	US Sellers to Int'l Firms 4
6 to 10 Transactions	Int'l Sellers to US Firms 6
1 to 5 Transactions	
No Transactions	



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