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Council Gets Big Win With Expanded SEC Municipal Advisor Exemption

The Securities and Exchange Commission’s (SEC) new “municipal advisor” rule (highlighted in Legislative Action, p 4) reflects ACEC’s significant input and will help spare members onerous filing requirements.

The Dodd-Frank financial services reform law exempts engineers from registration with the SEC when they provide state and local governments with “engineering advice.” Providing additional financial advice relating to municipal securities and investment strategies would require registration.

But the “engineering advice” in the proposed rule from the SEC did not include services commonly provided by engineers, such as cash-flow modeling and feasibility studies.

The Council successfully convinced the SEC that its proposed rule would have subjected many engineering firms to unnecessary registration fees and unfair fiduciary responsibilities when providing common engineering consulting.

The final rule reflects the Council’s concerns, and includes cash flow and feasibility studies within the exemption. It goes into effect July 1, 2014.

This issue of Engineering Inc. also profiles the major roles played by ACEC Member Firms in the $5.25 billion Panama Canal Expansion project—one of the most ambitious engineering efforts in recent history. See page 14.

Also included in this issue is a report on how lower energy prices are fueling a surge in the industrial and manufacturing sectors (see page 8) and the debate surrounding one-step vs. two-step design-build. See page 20.
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Congress Agrees to End Shutdown and Raise Debt Ceiling; President Signed

The House and Senate passed legislation that reopened federal agencies through January 15, 2014, and extended government borrowing authority through February 7, 2014. President Obama signed the bill.

Since the shutdown began on October 1, ACEC—along with the U.S. Chamber of Commerce and other business organizations—lobbied Congress and the administration to agree on legislation to reopen the government and prevent a default on the government’s financial obligations. The Council mobilized its members to contact their lawmakers to avert the crisis.

The legislation is short-term, intended to give Congress and the administration additional time to agree on a long-term budget package.

“We expect more bruising fights ahead,” said ACEC President Dave Raymond, “and we are committed to aggressive advocacy for responsible solutions.”

Senate Attempts to Take Up ACEC-Backed Energy Efficiency Bill

Senate leaders are seeking an agreement on amendments that will facilitate consideration of S. 1392, the Energy Savings and Industrial Competitiveness Act of 2013, which would strengthen national model building codes to make new homes and commercial buildings more energy efficient. The legislation will train workers in energy efficient building technologies and create a Commercial Building Energy Efficiency Financing Initiative to attract private-sector investment in building efficiency upgrades and renovations.

The bill would also direct the Department of Energy (DOE) to work with private sector partners to encourage research, development and commercialization of innovative energy efficient technology. Language is included to reform DOE’s industrial efficiency programs, strengthening partnerships between DOE and private and academic sectors.

A number of amendments to the bill are expected, including approval of the Keystone XL Pipeline and proposed changes to LEED certification requirements, as well as unrelated amendments pertaining to the new health care law, which are currently delaying consideration of the bill.

Senate Committees Review Long-Term Transportation Funding Options

ACEC is working with key Senate committees to lay the groundwork for next year’s reauthorization of MAP-21, focusing on the need for long-term, sustainable funding.

In a hearing, leaders on the Senate Committee on Environment and Public Works stressed the importance of federal infrastructure investment to highlight the impending shortfall of revenue into the Highway Trust Fund after MAP-21 expires in September 2014. ACEC informed lawmakers in a statement that “absent congressional action, highway and transit obligations would be all but eliminated in 2015.” The projected cuts would have “a devastating impact on state and local transportation agencies and postpone critical projects to improve safety, reduce congestion and enhance mobility,” ACEC said.

The Council and other witnesses outlined various options to address the problem, including increasing and indexing gas and diesel taxes, switching to a percentage sales tax on fuel and transitioning to a vehicle-mile-traveled fee. A revenue solution could be included in the context of broader congressional negotiations over the budget, spending and tax reform.

The Surface Transportation Subcommittee of the Senate Committee on Commerce, Science and Transportation held a hearing to explore various legislative proposals to expand the use of public-private partnerships (P3s) in infrastructure development.

ACEC supports P3s and other financing mechanisms as a way to supplement, but not replace, traditional infrastructure program funding.

Committee Chairman Jay Rockefeller (D-W.V.) and Subcommittee Chairman Mark Warner (D-Va.) are leading proponents of a national infrastructure bank or similar financing entity designed to leverage private capital. These funds could advance state and regional projects that often cannot be undertaken under traditional funding due to their size, complexity and cost.

SEC Approves Final Municipal Advisor Registration Rule

The Securities and Exchange Commission (SEC) published its final municipal advisor registration rule, which broadens the engineering exemption in the law.

The Dodd-Frank financial services reform law requires firms and individuals that provide advice to municipalities on the issuance of municipal securities or other financial products to register with the agency. The law includes an exemption for engineering firms providing engineering advice, but the SEC initially interpreted the exemption so narrowly that many firms would have been required to register.

ACEC submitted comments and met with SEC officials to dem-
House Committee Passes ACEC-Backed Water Resources Legislation

The House Committee on Transportation and Infrastructure approved H.R. 3080, the Water Resources Reform and Development Act (WRRDA) in late September, authorizing new U.S. Army Corps of Engineers water projects and including major ACEC-backed reforms to expedite projects.

The approximately $10 billion measure authorizes 23 new water resource projects across the country; the costs are being offset by eliminating older, inactive projects.

The bill mandates increased spending from the Harbor Maintenance Trust Fund, which collects approximately $1.8 billion each year in user fees but uses only half that amount for its intended purpose of harbor maintenance and dredging projects.

WRRDA includes ACEC-supported reforms to streamline environmental reviews and accelerate project delivery, including a three-year time limit on feasibility studies and consolidation/elimination of some studies to improve efficiency. The bill tasks the Corps of Engineers with coordinating environmental reviews with multiple federal and state agencies and requires those reviews be done concurrently and under set deadlines. The legislation also authorizes state and local funding to expedite studies and permits.

WRRDA also creates a Water Infrastructure Public-Private Partnership Program that will enable nonfederal entities to manage up to 15 water resource projects across the country to evaluate cost-saving project delivery methods and other benefits.

A companion bill, S. 601, has already passed the Senate.

House Seeks Commitment On Tax Reform

As part of a longer-term budget and debt ceiling agreement, the House is pushing for language that specifies rules for enacting major tax reform legislation.

House Ways and Means Committee Chairman Dave Camp (R-Mich.) and Senate Finance Committee Chairman Max Baucus (D-Mont.) have spent months receiving input from stakeholders, including ACEC and employers, about their tax reform concerns. Both have committed to comprehensive tax reform that takes into account the concerns of C corporations and pass-through businesses, such as S corporations and partnerships. ACEC strongly supports a comprehensive path to simplifying the federal tax code.

The House supports tax reform instructions that require a top tax rate of 25 percent for businesses and individuals. One of the biggest points of debate is whether the legislation should be revenue-neutral or raise revenues. The House approach would direct Congress to consider legislation that only raises revenue through economic growth.

Despite some progress, completion of tax reform legislation remains uncertain. ACEC continues to work with lawmakers to ensure a balanced approach to reform going forward.

For More News

For weekly legislative news, visit ACEC’s Last Word online at www.acec.org.
ExactSource: When Exact Matters

ExactSource is a national leader in the delivery of talent solutions, software and organizational consulting to firms in the architectural and engineering sector. Born from 25 years of executive recruiting expertise, ExactSource was launched to meet the growing needs of clients in the A/E sector.

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“The sudden abundance of domestic natural gas is reverberating throughout the industrial sector,” says Hunt Davis, managing director in FMI’s Investment Banking Group. “Looking forward, prospects are extremely good.”

In the past year, numerous multinational corporations have announced or completed substantial domestic manufacturing facilities: Apple Computer shifted a production line from China to California; Whirlpool opened a new operation in Tennessee; Dow Chemical announced plans to build a plastics plant in Texas; and Royal Dutch Shell unveiled plans to build a chemicals facility near Pittsburgh.

Engineering firms are reaping the benefits in their book of business. “We’ve seen a substantial resurgence,” says Michael Avant, senior vice president for global manufacturing solutions at CH2M HILL. “Manufacturing projects that were delayed or were going overseas are now moving forward.”

Steady Growth

The industrial/manufacturing sector is broad and varied, encompassing entities such as refineries, power plants, equipment manufacturers, food and beverage facilities, furniture makers and data centers.

The sector has historically been volatile, reports FMI. In 2007, construction in the manufacturing sector jumped 24 percent, and up another 31 percent in 2008. Two years later, when the economy collapsed, construction in the manufacturing sector sank 29 percent (see Charts 1 and 2).

As the economy rebounds, the industrial sector has been one of the first to come back. Fueled by plummeting energy prices, it climbed more than 19 percent in 2012.

Looking ahead, FMI projects the sector will grow at a robust but steady pace, averaging 6 percent annually from 2013 through 2017.

Cost Advantage

It’s not just the immediate benefit of low energy prices that is attracting industrial investment; it’s the promise of low prices for the foreseeable future. According to the U.S. Energy Information Agency, proven domestic natural gas reserves are sufficient to supply the country at current consumption levels for more than a century (105 years, to be exact).

“Energy prices have an outsized effect on the industrial sector,” Avant says. “Projects are often put on hold because they don’t meet their cost of energy quotients.”

The fertilizer industry is a case in point. Even though the Midwest is one of the world’s largest consumers of fertilizer, manufacturers long found it cost-effective to produce fertilizer overseas and ship it to the United States. But the abundance of natural gas—a key raw material in nitrogen-based fertilizer—has changed the equation.

Last year, Egypt’s Orascom Construction Industries, one of the world’s largest fertilizer manufacturers, started construction of a $1.4 billion plant in Iowa, and Illinois-based CF Industries announced plans to double its investment in domestic production.

Two other factors are also driving more manufacturers to re-shore production. The disparity in wages has narrowed dramatically, while an increase in the use of robotics and automation has decreased labor costs.

The Wall Street Journal reports that U.S. manufacturing costs are 3 percent lower than Canada, 7 percent lower than the United Kingdom, 13 percent lower than Japan, and 18 percent lower than Germany. Research firm AlixPartners projects that within two years’ time, it will cost American companies the same to outsource production to China as it will to produce domestically.
Niche Markets
CH2M HILL’s Avant says “there are no laggards” in the industrial sector, but several niches stand out.

Kouhaila Hammer, CEO of Ghafari Associates in Dearborn, Mich., says automotive manufacturers are rapidly adding capacity. “We’re seeing a tremendous number of new facilities and a lot of refurbishment of existing plants,” she says.

“There’s a lot of activity in the Midwest and in the Southeast.”

Toyota is expanding operations at three of its U.S. facilities, and Ford announced earlier this year that it was shifting some production capacity from Spain to Ohio.

After several lean years, data center construction has rebounded and is expected to grow at an 8 percent clip year over year through 2017.

CH2M HILL is working on the Niobara Data Center Energy Park in Colorado, which aims to combine cheap energy prices and integrated design to lower capital and operational costs of the traditional data center model by nearly 50 percent.

Experts are also looking at liquid natural gas (LNG) as a potentially strong niche. The United States has long been an LNG importer with terminals designed to offload the product from ships. But that could soon change. The United States is slated to become a net LNG exporter by 2019—which is requiring the retooling of existing terminals or construction of new ones.

Challenges
The industrial/manufacturing sector offers numerous opportunities for engineering firms. It also poses its share of challenges.

“For firms used to the slower pace and relatively protected world of QBS, getting into this market requires a completely different mindset,” says Mick Morrissey, managing principal of Morrissey Goodale. “It’s like going from The Sound of Music to Saving Private Ryan.”

Hammer agrees. “It’s very fast-paced. We might get a call today for a project that starts tomorrow.” At the same time, she says, there has been a commoditizing of engineers.

Facing the “downward pressure on fees,” firms have to constantly upgrade their services and technologies.

Avant cautions that “staying abreast of technology is a huge challenge. It moves forward exponentially, and you can’t afford to lag behind. You have to stay on the cutting edge.”

That challenge is even more difficult, he says, because “we aren’t producing enough engineers. It’s a constant issue to get the talent we need.”

One way to get that talent, says Davis, is to acquire firms in the sector, but he adds that the brisk pace of the market makes that a challenge.

“We’re working with one company right now that has a letter of intent with a buyer,” he says. “Just while we’ve been in the due diligence process, the company’s business has doubled.”

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

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Since the ACEC Job Board’s inception in August of 2005, over 2,795 member firms have posted job openings and more than 27,000 job seekers have posted resumes. Find your next new hire at:

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There were 24,795 copies of Engineering Inc. published for September/October 2013 issue; the average for the preceding 12 months was 23,423. The paid/requested outside county mail subscriptions for the September/October 2013 issue were 22,682; the average for the preceding 12 months was 22,093. The other classes mailed through USPS for the September/October 2013 issue were 300; the average for the preceding 12 months was 262. Total distribution for the September/October 2013 issue was 22,682; the average for the preceding 12 months was 22,093. Copies of Engineering Inc. that were not distributed during the September/October 2013 issue (office use, leftovers) was 318. The percent paid/requested circulation for the September/October 2013 issue was 93%. The average percent paid/requested circulation for the preceding 12 months was 96%.
A company designing upscale hotels, malls and residences in three states faced an uncertain future after its designer died unexpectedly. Another business that tests the structural integrity of bridges struggled to cope with the loss of one of its pioneering engineers. And a third company was forced to close for an extended period when its director of operations was wounded and out of action for several months.

The untimely death or disability of a key person can devastate a business. In fact, disability is far more likely, considering a 35-year-old has a 1 in 2 chance of being out of work for three months or longer because of illness or injury before age 65.

That is why small businesses, including engineering and other technical firms, are increasingly realizing the value of key-person life and disability insurance. This is life or disability insurance with one main difference: The beneficiary is the employer, investors or creditors, and/or other entities that could face a loss because the business suffers. In fact, investors and lenders, including banks and the federal government, often require that a prospective business secure this or similar coverage.

If your business is a sole proprietorship, your personal life or disability insurance will help with your family’s financial situation if you die or can’t work for an extended period. Key-person insurance, however, is intended for businesses that rely on people who perform key functions.

Who Are Key Persons?
Key persons are thought to be founders, partners or executives. But a key person could be the information technology guru who keeps your network online, the traffic manager who fulfills jobs or the accountant who keeps the complicated books straight.

Insurance broker Marsh U.S. Consumer, a service of Seabury & Smith, Inc., defines a key person as anyone whose death or disability would:
• Create a void that could not be filled from current personnel
• Disrupt the normal operations of the organization
• Result in lost customers or profits
• Result in a loss of a specialized skill
• Halt or delay a sales campaign or special project
• Impair the organization’s credit standing or its ability to secure financing

• Require a financial obligation to be met by the business, such as a stock redemption, benefit payment or debt repayment
• Destabilize a business’ standing with its employees and vendors

Policy Basics
A key-person life policy pays benefits if the insured key person dies and benefits are paid tax-free. Key-person disability insurance pays if the key person is unable to work at his or her regular position because of an illness or injury. A business cannot take out key-person coverage without that individual’s consent.

Key-person life can be a term life or whole life policy. Term life policies carry lower premiums; whole life policies may have investment options and tax-free cash funds that can increase the value of the policy but cost more. Policies can cover individuals or multiple persons. (Note: Key Person Life through The ACEC BIT Program, administered by Marsh, is a term life policy that covers individuals only.)

How Much Coverage?
To figure how much coverage to secure, you need to make a rough calculation—how much in dollars the key person is worth to your business. This may be easy regarding a key salesperson, whose revenue numbers are charted. However, when dealing with a network guru or even an executive, it may be more difficult.

Remember to factor in the costs of recruiting the key person’s replacement, including expenses for interviewing and relocating, and diminished revenue while the replacement gets up to speed.

Acquiring a Key-Person Policy
Most key-person life and disability policies will require the prospective insured to submit to full medical underwriting, which may include a medical exam, blood testing and examination of health records. However, the plans newly available through The ACEC BIT Program waive this requirement, as well as extensive financial disclosure for key persons.

Protect Your Investment
Your employees are your most important assets. Be sure to protect against the consequences of losing them for an extended period of time—or longer—with key-person insurance.

For more information regarding Key Person Life or Key Person Lump Sum Disability through The ACEC BIT Program, please call 855-343-5601.

Jeff Connelly is a senior vice president of Marsh and broker for the ACEC Business Insurance Trust.
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Knowledge • Expertise • Relationships
Meet the 2013 ACEC Young Professionals of the Year

Each year, ACEC recognizes five outstanding new members of our profession with the “Young Professional of the Year” Award. These young engineers are employees of ACEC Member Firms who have already made significant contributions to the industry despite their young age. The winners were selected by the ACEC College of Fellows and recognized at the recent Fall Conference.

1 Ashley Vesperman, AECOM, Middleton, Wis.

As the deputy project manager for a bridge location study that will replace a 1,700-foot-long bridge over the environmentally sensitive Wisconsin River, Vesperman has chaired meetings with regulatory agencies and the public to discuss project issues. She champions the industry in her local community by volunteering at a middle school, helping students learn about science and engineering, and she’s served as a fund drive coordinator for the Washington State Department of Transportation, raising money for local charities. Ashley holds a bachelor’s degree in civil engineering from the University of Wisconsin-Madison.

2 Pamela Salas, Langan Engineering & Environmental Services, San Francisco

Salas is a dual citizen of the United States and Peru. Her engineering projects span the globe—including a Kaiser Permanente Medical Campus in Redwood City, Calif., the Hudson Park and Boulevard in New York City, and projects in Kuala Lumpur, Malaysia, and Higuerito, Honduras. She recently joined Langan’s growing site/civil practice in the Bay Area. Her projects include the redevelopment of the Port of Redwood City and a 17-story residential building. Salas is also involved with Engineers Without Borders and currently serves as the executive council secretary of the San Francisco chapter. She holds a bachelor’s degree in civil engineering from Santa Clara University.

3 Gheorghe Rosca Jr., HDR Engineering, Riverside, Calif.

In his brief four-year career, Rosca has worked on more than 10 bridge replacements and four double-tracking projects with construction values of $30 million to $100 million. As the client manager for the North County Transit District, he has managed a $12 million on-call contract and served as project manager on the Trestles Bridge replacement, an iconic railroad bridge at world-famous Trestles Beach. Through his involvement with the American Railway Engineering and Maintenance-of-Way Association, he works with railway professionals to develop design criteria for high-speed rail infrastructure in the United States and was recently inducted as president of the Railway Association of Southern California. Rosca holds a bachelor’s degree in civil engineering from Cal Poly Pomona and an MBA from the Keller Graduate School.

4 Ronald Manney, Langan Engineering & Environmental Services, Arlington, Va.

Manney has worked as a geotechnical engineer for high-profile engineering projects in 10 countries—all before the age of 30. While on-site in Saudi Arabia, he coordinated geotechnical investigations and provided recommendations for the proposed tallest building in the world, Kingdom Tower. Manney has also played a role in innovative foundation design solutions for U.S. embassies in Morocco, Brazil, Libya, Australia, Iraq, Mexico, Kyrgyzstan, Tajikistan and Zimbabwe. He oversaw the geotechnical investigation for the development of a new 12.5 million square-meter city in the United Arab Emirates in which he applied his experience in karst terrain. Manney holds a bachelor’s degree in civil and environmental engineering from Lafayette College and a master’s degree in civil engineering from the New Jersey Institute of Technology.

5 Aleece D’Onofrio, Fay Spofford & Thorndike, Burlington, Mass.

D’Onofrio has used her expertise in transportation design and management to keep the citizens of Massachusetts healthy and moving on streets and bike paths across the state. She has authored several articles on engineering topics and their impact on quality of life; is a member of the ACEC/Massachusetts Civil 3D Users Group, which assists MassDOT with issues related to technical standards; and has presented transportation and structural aspects of civil engineering to middle school girls to promote math- and science-related fields. She was selected to represent ACEC in the 2013 National Engineers Week “New Faces of Engineering” advertisement in USA Today. D’Onofrio has a bachelor’s degree in civil and environmental engineering from the University of Massachusetts Lowell.

Reaching the century mark isn’t easy – you have to be quality-driven, client-focused, and have a vision for the future. At 100 years, STV is looking ahead. As an employee-owned firm, our planners, architects, engineers and construction managers have a stake in the business, and are committed to quality performance. We provide personal attention and timely solutions, with an eye toward sustainability. And with more than 35 offices, we are a local firm with national resources.

When it comes to getting your project delivered right, choose the firm that has the drive and vision to be the best.
MODERN MARVEL

ACEC Member Firms Lead Historic Panama Canal Expansion
The STX Sun Rise, bound from Trieste, eased into Limon Bay. Spectators, including Panamanian President Ricardo Martinelli and a host of other dignitaries, cheered as the vessel entered the new access channel on the Atlantic side of the canal guided by a pair of tugs. Its cargo: four massive steel gates—each nearly 58 meters long, 30 meters tall, weighing in excess of 3,100 tons, or 6.2 million pounds.
The delivery in August of the first four of 16 gates for the Panama Canal’s third set of locks marked a milestone for the expansion project, one the world has been awaiting for more than 60 years. When it is finished in 2015, the massive $5.25 billion addition will have carved a third passage through the heart of the Western Hemisphere, one designed to ensure Panama remains the nexus of global shipping for decades to come.

Under way since 2007, the Third Set of Locks Design-Build Project has employed nearly 40,000 workers and commanded the expertise of engineering, design and construction firms from across the globe. The goal: to create a deeper, wider cut for larger post-Panamax container ships. Today’s vessels dwarf those in use when the canal first opened in 1914.

“The delivery of the gates was quite an emotional experience for us,” says Joe Cazares, program manager for CH2M HILL, which was brought in to assist in the management of the project alongside the Autoridad del Canal de Panamá (ACP), also known as the Panama Canal Authority. “It was symbolically really important. We were like, ‘Now that we have the gates, we can really get going.’ ”

But if the project to expand the 50-mile canal is monumental, the challenges facing the firms brought in to do the work were daunting.

**Deep History**
The move to expand the canal started in the late 1930s, as the United States sought a wider passage for warships moving between the Pacific and the Atlantic. The U.S. Army Corps of Engineers began excavation work for a third set of locks in 1939, but work halted two years later due to World War II. The canal remained unchanged for nearly seven decades, even as the global shipping industry expanded and container ships grew larger.

By the late 1990s, it was obvious the canal was on the verge of reaching capacity, says Ilya de Marotta, ACP’s executive vice president for engineering and program management. It was then the first studies were commissioned to gauge the feasibility of adding a third set of locks.

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**Canal Expansion By the Numbers**

- **COST:** $5.25 billion
- **EMPLOYEES:** 40,000
- **DIRT EXCAVATED:** 800 million cubic feet
- **CEMENT POURED:** 4.3 million cubic meters
- **LAND REFORESTED:** 626 hectares
- **SEEDLINGS REPLANTED:** 600,000+
- **MAXIMUM SIZE OF PANAMAX VESSELS:** 5,000 containers
- **MAXIMUM SIZE AFTER EXPANSION:** 13,000 containers

Source: Panama Canal Authority
Third Set of Locks

Expansion will add a third lane of traffic which will allow the transit of longer, wider ships.

The Expansion Program broke ground on September 3, 2007 and since then, multiple contracts have been awarded, the most important being the design and construction of the new set of locks which was awarded in August 2009.

Project Components

1. Deepening of the Pacific and Atlantic Canal entrances.
2. Widening and deepening of the Gatun Lake navigational channel, and deepening of Culebra Cut.
4. Raising of Gatun Lake maximum operational level.

Water-reutilization basins require less water than the current locks system, thus saving 60% of the water actually used.
The ACP conducted more than 120 studies over the next five years at a cost of some $40 million. When officials concluded that a new set of locks could meet the rigorous engineering, economic and environmental demands required of the busy canal, the question was put to a national referendum. In October 2006, the Panamanian people overwhelmingly approved the expansion program. Contracts were put out to bid the following May.

Two long hard years of negotiations followed, complicated in no small part by the global financial crisis that began in September 2008. In August 2007, Englewood, Colo.-based CH2M HILL was awarded a contract to work with ACP to coordinate the project’s partners, which included several ACEC Member Firms.

CH2M HILL is extremely proud to be assisting the Autoridad del Canal de Panamá in the expansion of this vital international trade route,” says Jacque Hinman, CH2M HILL’s International Division President and incoming CEO. “The canal is the pride of the Panamanian people and it is a distinct honor to be a member of this historical team delivering one of the largest and complex infrastructure construction projects in the world.”

Another Colorado-based firm, MWH Global, came on to serve as lead designers of the navigation locks, along with partners I.V. Groep and TetraTech. Winning that contract was especially gratifying, says MWH Chairman and CEO Alan Krause, given the firm’s long history with the Republic of Panama. Harza Engineering—the “H” in MWH—consulted on the original Corps of Engineers project back in the 1930s, he says.

URS Corp., headquartered in San Francisco, was asked to conceptualize the design of the Bóringuen Dams that separate the new waterway from the existing canal, and to provide engineering support during their construction. URS leveraged staff from Australia, New Zealand, the United States and Panama, working under the leadership of project manager Lelio Mejía, to participate in the expansion project.

Primary construction of the new locks would be performed by Grupo Unidos Por el Canal, a consortium of four firms—Spain’s Sacyr Vallehermoso, Impregilo from Italy, Belgium’s Jan De Nul Group, and Panamanian firm Constructora Urbana, S.A., or CUSA—that had never worked together before.

The expansion project brought together top engineering and design talent from virtually every continent. The gates were built in Italy; the valves were built in South Korea. The project employed design specialists in the United States, Argentina, Belgium, France and The Netherlands, and brought together top infrastructure specialists from Australia and New Zealand.

Really Big Dig
The Panama Canal Expansion entails almost a dozen large projects undertaken nearly simultaneously on both coasts of Panama and along the length of the waterway.

The Atlantic and Pacific entrances have been dredged to accommodate larger vessels with deeper drafts. A new 6.1-kilometer access channel is being excavated on the Pacific side to bypass Mirafloros Lake. Navigational channels at each entrance—the Culebra Cut and Gatun Lake—are being widened; the lake’s maximum operating level will be raised by nearly 16 inches. Four dams are being constructed to separate the new passage from the existing canal. Eight gates weighing as much as 3,700 tons apiece will be installed in each lock complex, alongside basins to recapture fresh water used to raise and lower passing vessels as they traverse each lock.

Along the way, project workers have been tasked with removing unexploded ammunition left behind by the U.S. military, preserving sensitive archaeological and paleontological artifacts and mitigating the impact of the project on Panama’s natural environment—all without interrupting ongoing canal operations.

“When you walk it and see it, the logistics are daunting, and not just here in Panama,” says de Marotta. “The gates are being built by Cimolai in Italy. The valves come from Hyundai in South Korea. We’ve got design offices in Chicago, Argentina, and the Netherlands—and physical models being built in Belgium and France. Coordinating all of these things to ensure they work in sync is one of the biggest challenges we face.”

Besides overseeing roughly 35 contracts with major construction and design partners, the canal’s project managers were also faced with bridging multiple cultural divides.

“One of the biggest initial challenges
was cultural,” notes CH2M HILL’s Cazares. “We had the culture of ACP, the U.S. companies, the Spanish, the Italians, and the Panamanians. In some meetings there were six or seven languages spoken. There were times when I thought I was working at the U.N.”

Getting all the partners on the same page was also difficult at first, de Marotta adds. The contractor began pouring concrete six months later than the original scheduled date, delaying the forecasted completion date of the project—the 100th anniversary of the canal’s opening—by six months.

URS, in concert with ACP, worked through a number of issues, including how to address active faults in the area, says Pedro Zuloaga, vice president and Latin America manager for URS.

When designing the Borinquen Dams on the Pacific side, URS accounted for the faults and developed seismic criteria. Together with ACP, the firm is now integrating a foundation treatment program to address specific fault conditions and implementing procedures to test for proper construction.

“Another issue was the very limited dry season,” Zuloaga adds. “Panama has a tropical climate, so the construction season under dry conditions lasts around four months. The large amount of precipitation limits the amount of construction you can perform and how you phase the work.”

One of the key engineering challenges was minimizing the fresh water loss that occurs when raising and lowering vessels inside the locks, says MWH’s Krause.

“We’ve been very creative at using topography and gravity to fill and empty the locks to preserve around 60 percent of the freshwater,” he says. “People think of Panama as having lots of water, but it can have drought conditions. Water preservation is really important there.”

For a project that affects so much formerly untouched terrain, being a careful steward of the environment is a fundamental requirement. Thanks to an expansive environmental program, native wildlife species have been relocated and more than 600,000 trees replanted in nine zones spread throughout Panama.

“We’re very proud of how the project has managed the environment,” says Krause. “Lake Gatun is perhaps one of the most pristine areas in the world—the Smithsonian has a research lab in the middle of it. There are birds, fish, flora and fauna you won’t find anywhere else in the world. The ACP has done a wonderful job of protecting that.”

**Ship Shape**

As this article was going to press, the canal expansion was roughly 65 percent complete and on target to fully open in 2015. Most of the labor-intensive infrastructure work is done, says Cazares.

“In a project like this, the civil work is the easy part,” he says. “The harder parts are installing the mechanical and electrical, the instrumentation and the controls. We’ve finished building the body; now we’re ready to input the brain and make everything functional.”

When completed, the project will have effectively doubled the canal’s capacity for commercial traffic. The third set of locks will be able to handle ships up to two and a half times larger than the old locks, presenting new trade opportunities from the Atlantic to the Pacific.

“When the Panama Canal is done, it will change how big ships move around the world,” says Krause. “It’s already having impacts on major port facilities in the United States and in Europe. This has been a world-class project with some world-class partners.”

Dan Tynan is a freelance writer based in Wilmington, N.C.
One-Step vs. Two-Step?

The debate over today’s design-build processes

By Samuel Greengard

Designing and building complex projects has never been a simple proposition. But in recent years, a growing number of federal agencies and other government organizations have turned to emerging design-build (D-B) techniques in an attempt to improve and streamline that process.

Many project owners, including federal agencies, believe that assigning a single design-build contractor to oversee a project increases the likelihood that the project will be completed on time and on budget. Most stakeholders agree that a D-B process should only be used when final project outcomes are known and minimal changes anticipated.
“Over the years, it has worked reasonably well,” says John O. Woods Jr., principal at Woods Peacock Engineering Consultants, Inc., in Alexandria, Va., a 16-person firm that specializes in structural engineering designs for federal government projects.

Some federal agencies use a single-step design-build model that awards contracts to the lowest bidder based on a combination of price and technical expertise. This single-step process includes the use of a Request for Proposal (RFP). Interested firms respond to the RFP with a proposal, and the project owner or agency employs what’s commonly called a “best value” selection to pick the contractor with the best price and technical merits. Too often, however, the “best value” is based on construction costs for the project, without adequate consideration of total ownership costs (O&M) for its entire life, in addition to factors such as performance, resilience and sustainability.

Design professionals and related associations, including ACEC, AGC and the Design-Build Institute of America (DBIA), favor a more discerning two-step process that evaluates design firms first on their qualifications through a Request for Qualifications or RFQ, and second via a separate process that creates a short list of the five most qualified firms to be evaluated based on price and the technical merits of their proposals submitted in that step.

Proponents of the single-phase method say the approach is easier to use and provides cost savings for project owners. Those in favor of the two-phase process say the one-step method places undue pressure on bidding firms to reduce costs, burdens all involved with preparation and review of many proposals, increases the potential for wasted efforts (especially for non-prime team members and small firms), and could potentially yield lower-quality results.

“It is not in anyone’s long-term benefit to use single-step design-build procurement. In the end, it winds up being nothing more than a price-only competition for the award of both the engineering and construction of a project.”

JAMES BLAKE
JOHNSON, MIRIMIRAN & THOMPSON

“Many companies with excellent credentials won’t engage in the one-step process. It’s not worth the time, expense and the risk of not being chosen.”

JOAN FREITAG
HANSON PROFESSIONAL SERVICES

Whether firms must use a one- or two-step design-build process. The Federal Acquisition Regulations (FAR) does include a description of the two-step D-B process in subsection 36.3.

“It’s important to not confuse a well-executed QBS process with the single-step, turnkey approach that many federal agencies are now using,” explains Lisa Washington, DBIA executive director and CEO. “Unfortunately, the approach seemed like a good idea at the time, but it’s something that needs to be addressed.”

Many practitioners say the one-step D-B process is not suitable for increasingly complex design projects, many of which require enormous upfront work and costs. Woods notes that 35 percent to 50 percent of the total design costs associated with a project are incurred up front in the proposal phase—with no guarantee of any fee or being selected for the project. What’s more, he says, the desire to procure projects could lead some firms to submit artificially low bids that result in more contingencies and a greater risk of error or negligence.

The more complex the project, and/or stringent the budget or schedule restrictions, the more work must be performed by designers in order to submit credible and competitive proposals. For one-step procurements, this is done without knowing the full strength of the team relative to other offerors. This greatly increases the risk of not winning the contract and wasting time, resources and opportunities to pursue other work. Additionally, the more complex or ill-defined the project, the more chance for changes prior to proposal submission or selection.

These costs and risk factors impact all firms, but are especially damaging to small firms with limited resources. By contrast, a two-step...
Government buyers have recently begun to use the term “Lowest Price Technically Acceptable (LPTA)” to address their approach to D-B projects. The idea is to create a minimum standard for firm selection. Unfortunately, “Nobody has looked into what the words ‘technically acceptable’ mean and how this translates into the value of services rendered,” Washington says. “It can easily wind up being another way of getting the lowest possible price with the appearance that some set of standards are in place.”

**Designs on Excellence**

A desire to move projects along and manage costs is at the heart of the single-step approach. But Blake says federal buyers sometimes “don’t fully appreciate the process and what professional services procurement is supposed to be all about.”

He says he constantly runs into government officials who don’t understand the Brooks Act and aren’t aware of the issues surrounding D-B projects.

A growing number of firms have attempted to address these issues on their own. Woods Peacock, for instance, refuses to bid on federal projects that take a one-step D-B approach. “We won’t even talk to the contractor because we know it’s not a productive or profitable way to run the firm,” says Woods. “It ultimately comes down to a gamble and spending time doing work that frequently doesn’t lead to any revenue.”

Freitag and Blake say their firms have adopted a similar stance.

The industry is also attempting to inform and educate federal agency officials about the benefits of the two-step process. Working together, a coalition that includes ACEC, AIA, DBIA and AGC, discusses D-B with key government stakeholders.

“The challenge,” Washington says, “is that the structure of these organizations makes it difficult to communicate with leaders consistently. People constantly change and some are more receptive than others to the message.”

One agency that understands the benefits of the two-step process is the U.S. Army Corps of Engineers. The Corps met with ACEC, DBIA and other industry representatives before it issued internal guidance that limits the use of the one-step process to military construction projects that require no design submittal in response to the RFP. All civilian projects must use the two-step process. In some cases, the Corps has begun to pay stipends to firms that aren’t selected as part of its one-step bidding processes.

The Federal Highway Administration and General Services Administration have also turned to two-step selection processes for certain types of projects. “A single-phase approach makes sense only for relatively small projects that don’t require significant design expertise,” says Freitag, chair of ACEC’s Federal Agencies and Procurement Advocacy Committee.

Change requires ongoing dialogue—and a continual focus on education. “There will always be contractors and firms that submit lowball bids or attempt to go the one-step route,” Blake says. “But if the A/E/C industry stands together and government officials understand that a two-step process unlocks the greatest value from the design-build process, everyone will benefit. We will see fewer contingencies and a lower margin for error. Most importantly, the quality of work performed for projects will be at the highest level possible.”

Samuel Greengard is a business and technology writer based in West Linn, Ore.
ACEC Coalitions monitor the effects of new technologies on business and client relations

By Stacy Collett
When it comes to technology, engineers love their toys. Over the last few years, those toys have grown more numerous and sophisticated. These innovations, from advanced sensors used to monitor vibrations in bridges to 3D scanning and advanced geospatial services, allow engineers to do their jobs more quickly, efficiently and in significantly greater detail. But emerging technologies are not without challenges.

Leaders of ACEC’s six professional coalitions reflected on the sea of change brought on by new technologies, the headaches that often accompany them, and the threat of commoditizing the industry.

**Game Changers**
Some firms are developing new technologies that promise to change the scope of their business while also helping to address the larger industry issue of doing more with less.

At Pennoni Associates, Inc., what began as a sensor-monitoring project for one client several years ago has grown into an intelligent infrastructure systems division within the Philadelphia-based firm, which specializes in monitoring the structural health of bridges. “We believe we’re out in front on this,” says Anthony Bartolomeo, DPC Chair and Pennoni president and CEO. “It’s somewhat of a game-changer for us in the area of transportation.”

Attaching sensors to a bridge to monitor vibration is nothing new, but technology is now available to perform data analytics and convert data into knowledge. The technology helped one bridge owner determine that what looked like a $2 million repair project could be fixed safely with a $200,000 solution. “It’s reducing the uncertainty of risk associated with your decision,” Bartolomeo says. Those savings can go toward repairs on other bridges. “There are not enough resources to do everything we need to do. If we can be creative with technology applications and help you be able to do more with the limited resources available, the needle moves in the right direction.”

New technologies are revolutionizing how geospatial firms perform and conduct business. Firms once used tape measures to determine the distance between points A and B. “Now, we’re bouncing signals off satellites 12,000 miles away...”
and measuring A to B in seconds,” says Ken Brown, COPS chair and director of geospatial services at Georgia-based Columbia Engineering. 3D scanning is perhaps the specialty’s most transformative technology. Brown says. “It’s being built into units that are smaller, more manageable, user friendly and compact.” With a 3D scan of a bridge, for instance, “you might get a half-million data points. When you use the older technology, you might get 50 data points,” Brown says. More data points allow engineers to offer more conceptual options to clients and in a more robust format, giving clients a better understanding of projects and enabling firms to flex the full might of their capabilities.

Today about 25 percent of surveyor firms use 3D scanning, but experts predict that number will grow as costs come down and as firms face increased pressure to offer the technology to clients. “The client has much more potential to move on if you can’t provide the solution and somebody else can,” Brown says. “From a provider perspective, it’s showing clients what you can do to save time and get a more effective result.”

In the structural engineering field, firms are adopting tools such as Autodesk Revit, a Building Information Modeling software application that features tools for collaborating with architects and builders, for many of the same reasons. BKBM Engineers, Inc., in Minneapolis adopted Revit before the recession. Then it set it aside, until recently when the market improved. “If you don’t keep up with the Joneses, you’re going to fall behind. Some things you have to do just to remain a player,” says Andrew Rauch, CASE chair and BKBM secretary, treasurer and director of quality assurance.

The technology opens the door to a number of potential benefits, he adds, including cost and time savings. “But that time savings has to be able to offset the software costs, which are substantial every year,” he says. “For us, time is money.” Another challenge: adapting the business workflow to the technology and “trying to streamline what we’re doing by eliminating manual and paper steps in the process,” Rauch says.

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Contrary to popular belief, DeSantiago says BIM has not reduced the amount of time it takes to create a drawing. The true benefit comes from the fact that the information contained in the models helps firms achieve their goals. But the efficiency part is coming. “We’re not quite at nirvana yet, where we can just push the button and it does full calculations” with data from all parties involved, “but we’re approaching that,” he says.

Skills Grab
New technologies often come with a learning curve while staff gets up to speed on the new capabilities. In many cases, firms
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rely on younger engineers to bring this knowledge in house.

“We find the younger staff members that we hire are really technically savvy and they bring a lot to the table just with their level of sophistication with the programs that we have,” says Mike Snyder, LDC chair and senior vice president of Dewberry in Lanham, Md. Some 25 percent of Dewberry’s 100-person staff has been with the firm for four years or less, he adds. “In the past, we would have teams of five or six people. Now some of my offices have teams of two”—and that’s partly because of the multidimensional tech skills that new engineers bring. “They’re able to put together a complete set of documents” that in the past required specialists, he explains.

Though he says the firm has not seen a dramatic change in the amount of time or money it takes to complete its projects. “We expected there would’ve been a greater savings in cost, but the accuracy is better and the documents prepared are dramatically better,” Snyder explains.

Taking Care of Business

On the business side, coalition leaders say technology has enabled smaller firms to do more with less.

“What you can do now with client tracking, invoice tracking and receivables and payables in-house is significantly better than what it was five years ago,” says Matthew Murello, SFC chair and president of Lewis S. Goodfriend & Associates in Whippany, N.J. “But I don’t think technology is where it could be—yet. I’m still looking for a really good, streamlined client maintenance software that could be used for small firms.”

in the past required specialists, he explains.

The Client Experience

Communication tools such as smartphones, texting, email and video conferencing have enabled firms to decrease client response times and improve contact with clients and prospective clients, while in some cases reducing costs. But the technology has also put new pressure on firms, forcing owners and other leaders to redouble their efforts to maintain close relationships.

“It’s virtually impossible to unplug,” Murello says. “Clients have an expectation of immediate response because we’re all glued to our smartphones, and with email you have to respond immediately. Today, the fear is if you don’t, the client deems you as unresponsive and moves on to another consultant. That’s every business owner’s nightmare.”

Bartolomeo rarely gets phone calls at his office these days. Most clients prefer email or texts. “A lot of the personal relationship development occurs with either face-to-face or phone discussions, and that’s becoming less and less frequent,” he says. “People’s time is guarded so much because they see how productive their time can be with these communication tools.”

Commoditization

With advances in technology comes the fear that professional services will eventually be commoditized. But it isn’t all bad. “Now anyone can go out and buy a noise instrument for $250 and get pretty accurate noise measurements,” says Murello. But he adds, “I’ve found that’s starting to loop back around. Clients are saying, ‘What happens if this land-use case has to go to court—and they didn’t use a professional engineer?’ That’s a selling point for us—to be able to provide that experience.”

Brown doesn’t see commoditization as a threat to his business. “GPS has gotten itself in the mainstream” in cars, smartphones and airplanes, for instance, “but it really hasn’t taken away any of our business. It’s up to the industry to try and fight that off and not let it become a commodity” by adding industry-specific value to the technology.

“If you permit us to make the effort to do what we do best, we can save you more money than you spend on our fee,” Rauch tells prospective clients. “But that’s an ongoing education.”

Too Much of a Good Thing?

But wait a second. Is there such a thing as technology that’s too good? In some cases, clients want highly detailed 3D drawings that they really don’t need, DeSantiago says. “They know this new technology is out there and there’s a question of what do they do with it and what they demand from their design team.” Often, firms end up taking a financial bath on overly detailed projects when “most bids are based on 2D drawings,” he says.

That’s why firms need to help clients understand the benefits of these technologies and what tools and services are best equipped to meet their specific needs.

For more information about ACEC Coalitions, visit www.acec.org/coalitions.

Stacy Collett is a business and technology writer based in Chicago.
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The growing importance of effective project collaboration software for engineers.

Effective collaboration is critical in design and modeling projects, and project collaboration software is becoming a must-have asset for engineering firms.
“One of the biggest reasons why firms need collaboration software is the speed at which engineering design projects have to be executed,” says Brian LaMee, senior director of product marketing at Deltek Inc., a Herndon, Va.-based provider of enterprise software and information solutions for professional services firms.

Collaboration software enables team members to work on different project files at the same time.

“The days of people mailing diagrams back and forth or describing them over the phone should be over,” LaMee says. Even the process of emailing files back and forth can take too long, considering how long it can take to download large files.

Another factor driving the adoption of collaboration software—available through a range of vendors, including Autodesk, Bentley Systems and Microsoft—is the growing number of hands that touch each project.

“There’s [generally] more risk involved with these projects because they are happening faster and they’re really expensive, so before someone makes a decision, firms want to get buy-in or approval from different people,” LaMee says. “You might have an engineer in the United States, an engineer in China and the project lead in Saudi Arabia, and they all need to work on the project.”

One of the biggest benefits of collaboration software is that team members can work together without having to travel to a particular office or project site, thus saving firms money on travel expenses.

The technology can also improve efficiencies and reduce the number of errors in the design process. For example, firms can eliminate the problem of engineers in remote locations working from and making changes to older versions of the same diagram, while others on the team are working with newer versions.

While Deltek doesn’t track the use of collaboration software at engineering firms, LaMee says there’s strong anecdotal evidence that more firms are looking at and deploying these solutions.

One reason is that more firms can afford the applications, LaMee says, adding that they are becoming easier to implement and less of a burden on information technology staff. Costs have also come down, thanks to the emergence of the cloud as a storage and delivery mechanism, which reduces the need for out-of-the-box products.

The Right Solution

When it comes to selecting a software vendor, firms should consider a host of factors, including experience and longevity in the market and whether the service provides access to a support team, says Chad Schafer, senior product manager at Info Tech, Inc., a construction software and consulting services firm in Gainesville, Fla.

When selecting project collaboration software, don’t try to do too much, Schafer says. “There is an 80-20 rule here. Address your main business pain points—the 80—and keep the ‘nice to have’—the 20—in a separate category,” he says. “Next, commit to your selection and take the appropriate steps for change and transition management with users. Is a phased approach the best idea? Should you run a pilot? Can you develop an internal communications plan to ease the transition? These factors are just as important as the right tool.”

Engineering firms that are using collaboration software say they’re already seeing benefits.

“Project collaboration software helps engineers get the job done more quickly, accurately and cost-effectively,” says Eric Davis, IT manager at Paulus Sokolowski & Sartor (PS&S) in Warren, N.J. The software provides project team members with the tools they need to quickly find information, easily communicate and work together to complete project objectives on time and on budget, he says.

In June 2012, PS&S began using project collaboration software from Newforma, Inc., resulting in improved email management. Users can now file project-related emails in two seconds rather than two minutes. The software also provides a comprehensive search function, so all project data is indexed and can return fast comprehensive searches across multiple document types.

A collaboration portal provides internal and external team members with access to relevant project data, such as file transfers, tasks, meeting minutes and schedules. Project management is improved, too. Meeting minutes, action items and project timelines are all tracked.

PS&S has received positive feedback from clients on the software’s ease of use and the visibility of project information, Davis says.

In the future, the software will enable engineers to upload notes, photos and voice memos directly from the field, link building elements to project information and extend access to shared project models via the portal.

“Overall, through the use of Newforma, we hope to strengthen the project team and the entire project delivery process,” Davis says. “Improved information management and communication should lead to increased profitability and reduced risk.”
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Not Without Challenges

But the implantation of collaboration software is not without its pain points. “As with many technology projects, the installation of the technology is the easy part, but the integration is much more difficult,” PS&S’s Davis says. “Because collaboration software affects team members’ individual workflows, it is vital that your process planning is done ahead of time. End users must see and understand the improvements the software will provide. If your team does not believe in the project collaboration software, they won’t use it.”

To ensure successful integration, PS&S established clearly defined goals; mapped out our business processes to ensure proper integration; selected a pilot group of users and solicited feedback; and continues to communicate new processes and workflows to the staff and solicit feedback from users. It also provides ongoing training.

Another firm, Crawford, Murphy & Tilly, Inc. (CMT), in Springfield, Ill., also benefits from collaboration software.

“Teamwork among project participants is fundamental to project success. Collaboration software brings improved tools to project teams,” says Brian Welker, vice president and director of IT. “Additionally, it provides the opportunity to align internal and external resources.”

CMT uses Bentley ProjectWise, Microsoft SharePoint and Lync and MoveIT FTP from Ipswitch, Inc., to improve collaboration on projects.

“We no longer have to rely on FTP, e-mail, mail or other means of file transfer for data and information to be shared among the team.”

BRIAN WELKER
CRAWFORD, MURPHY & TILLY, INC.

How to Get the Most Out of Project Collaboration Software

• Get buy-in from senior executives to help set goals for software implementation.

• Use external resources and expertise, if needed, to build a strong foundation and provide training for users.

• Make sure the software is easy to use. Many firms underestimate this, focusing more on features. If engineers and other users find the software difficult to work with, they are far less likely to want to use it.

• Based on the firm’s existing infrastructure and budget, determine whether it makes more sense to purchase a traditional software product or opt for a cloud-based offering.

• If opting for cloud-based collaboration software, have a clear understanding of how users, including external business partners, can securely gain access to the software. Identify possible upgrades that might be needed, Welker says.

More firms are likely to deploy collaboration software as cloud computing becomes a viable option for running the technology.

“Because of the cloud, you don’t have to be a large firm to adopt this; a 10-person firm can afford to do it now,” LaMee explains. Without the cloud, to do a large software implementation a firm would need the infrastructure to support such an application, including the servers to accommodate the project-related data.

With cloud-based collaboration software, “there are no servers to put in,” LaMee explains. “Also, with the cloud it’s faster to implement. The cloud is able to scale and take advantage of infrastructure that many firms can’t do” on their own.

“Moving forward, our IT team is closely monitoring opportunities to further use the cloud,” Welker says. “The scalability of the cloud, failover protection provided and ease of access for multiple locations and devices makes the cloud extremely beneficial for collaboration software.”

Bob Violino is a business and technology writer based in Massapequa Park, N.Y.
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New York City is a big, busy place. And its water needs are on par with what one might expect from the Empire State. The city not only faces water quality issues during major storm events, but its infrastructure also has to deliver more than 1 billion gallons of drinking water a day to more than 9 million people.

The city turned to local firm Hazen and Sawyer to develop a state-of-the-art tool to support operation and management of its complex 19-reservoir supply system.

The firm began developing, testing and deploying the software for its Operations Support Tool (OST) and its associated computer hardware for the New York City Department of Environmental Protection (NYCDEP) in November 2009. Grantley Pyke, senior associate with Hazen and Sawyer, says the custom OST uses near-real-time data, hydrologic forecasting and predictive modeling to guide reservoir system operations, identify future water stress conditions and take preventive action to maintain supply reliability, water quality, environmental releases and spill mitigation performance.

“OST relies on state-of-the-art streamflow forecasts from the National Weather Service to quantify the range of reservoir inflows for an operational horizon that extends from the current day out for roughly one year. The forecasts have a higher degree of skill over the short term and gradually transition to historical flows over the course of several months,” he explains. Each forecast is input into the model, which then simulates operation of the city’s reservoir system. When stress conditions are detected, operators run simulations to test the performance of alternative operating decisions.

“Simulations are conducted on a daily basis to enable adaptive management of the system as hydrologic conditions change,” Pyke says.

The original plan allowed three years for development, deployment and testing of the system. Soon after work began, the client sought to accelerate that timeline, calling for an operational system that could be deployed in less than one year. “NYCDEP wanted to take advantage of the guidance provided by OST early on, so we developed an interim forecast methodology and deployed an operational system within eight months,” Pyke explains.

The firm has delivered interim versions that progressively add functionality. The system is scheduled for completion in November.

NYCDEP uses OST daily to assess drought risk and take measurements intended to mitigate low water storage conditions, such as modifying diversions or releases from individual reservoirs, or bringing pump stations online to balance the system. “NYCDEP also uses the system extensively for longer-term planning scenarios, such as taking major system components offline, evaluating climate change impacts on supply and water quality, and developing operating rules that balance tradeoffs between supply, quality, cost and environmental performance,” Pyke says.
The year was 2009. The City of Lancaster in California needed development to boost economic growth in the region. But water shortages caused by recent droughts and cutbacks on water deliveries by the State Water Project into Southern California, combined with a moratorium on new water connections by the Los Angeles County Waterworks District (LACWD), severely limited its ability to approve real estate development projects and thereby increases to its tax base.

The city had to do something. So it turned to California-based Psomas to design The Development Offsets of Water Demand Policy. “Even though the City of Lancaster implemented numerous programs to assist residents in conserving water and has developed alternative water sources, such as using recycled water, it still wanted a means by which a residential or commercial developer could offset existing water use and create the capacity for a new water connection,” explains David Martin, senior project manager at the firm.

The policy allows prospective developers to obtain water service by retrofitting other properties in the city with water-conserving systems. “By conserving water elsewhere, a developer’s project would have a ‘net-zero’ impact on the city’s water supply, and would therefore be eligible for a new water connection,” says Jeremy Johnson, Psomas project engineer.

The firm’s initial challenge was to define the mechanisms that would quantify water savings and to identify how to achieve those savings under the policy. “We recommended three programs for inclusion in the policy, including high-efficiency fixture retrofits, landscaping and irrigation system retrofits and a recycled water replacement program,” Martin says. While the water savings from physical plumbing fixture replacements was easily quantified, landscape and irrigation improvement savings had to take into account the arid Southern California climate.

The firm researched similar policies adopted in other agencies to account for climate issues. “Replacing potable water with recycled water for irrigation was not enough, so we adopted a way for developers to offer landscape water use savings and landscape improvements, such as the use of drought-tolerant species or using artificial turf to replace lawns,” Johnson says.

“The biggest challenge remaining is developing a way to legally lock in the water savings achieved by any of the options offered in the policy and enabling those savings to be assigned to a developer for a new water connection,” Martin says. The city is negotiating with LACWD to implement the policy citywide and to ensure that the development offsets agreed upon are committed in perpetuity. In the meantime, LACWD is implementing the policy on a case-by-case basis.

David Martin
Jeremy Johnson

Water Demand Policy Spurs Economic Development

The Development Offsets of Water Demand Policy created by Psomas for the City of Lancaster in California (above). A water resources project in Los Angeles County (left).
PROJECT:
Hale Reservoir,
Cross Creek Park,
Fountain, Colo.

FIRM:
Applegate Group,
Inc., Denver

Owned by the Cross Creek Metropolitan Water District (CCMD), the Hale Reservoir has historically served as flood control for Cross Creek Park. At 13.5 feet high, the existing reservoir, including the embankment dam that borders it, serves a very functional purpose. It also sits in a residential area, which prompted the CCMD to consider ways to improve the reservoir’s functionality while boosting its community appeal. The result was a complete redesign of the existing reservoir that includes a 99-acre foot of volume reservoir, 11 acres of soccer fields, improved flood control, the elimination of potential breaches and access to other recreational activities, such as fishing, bird watching and hiking.

Applegate Group, Inc., of Denver was tapped to lead the organization’s water supply and conservation efforts. The firm began work in May 2013, starting with its design of a new 13.5-foot-high, 800-foot-long earth-fill dam and its components. Steven Smith, senior water resource engineer, says construction is scheduled for completion in the summer of 2014. “In designing the larger 99-acre foot of volume reservoir, we needed to minimize evaporation, even while increasing storage volume, which is especially important in an area where sun and heat are consistently present,” he explains. To achieve that goal, the company is designing the reservoir to access the groundwater table. The design includes a pump that will provide the non-potable water supply for irrigation. “Without access to the groundwater table, the new reservoir would be dry without sufficient rain,” Smith says.

But that wasn’t the only challenge Applegate faced. The dam also had to be designed to minimize loss of life and property in case of a catastrophic event—a tall but essential order in a suburban area that includes a nearby daycare facility.

For the dam hazard classification, the firm bypassed traditional one-dimensional hydraulic modeling software for a two-dimensional model. “Two-dimensional models provide more detail and an improved understanding of water flow in the unlikely event of a catastrophic breach,” explains Smith. “Working in close coordination with state dam safety regulators, we have been able to use the software to model topography and determine the effect of any number of potential water events, including possible flow depth and velocity.”

Though engineers knew a depth of 10 feet would be enough to maintain water quality in the reservoir, the firm did not know at first how deep underground the water table was located. “By collecting water level data and incorporating the information into the design, we could meet the 10-foot minimum depth requirement, as well as account for other seasonal water level fluctuations, and provide the client with a project that reduces potable water demands while also providing flood control and recreational benefits,” says Smith.

The upgraded Hale Reservoir in Colorado’s Cross Creek Park.

Reservoir Gets An Upgrade in Looks and Function
or years, drought has been a problem for the City of North Port in Florida, especially during the dry season.

To improve its ability to provide water to residents, in 2009 the city reached out to North Carolina-based McKim & Creed. The firm was contracted to design a reverse osmosis water treatment plant to help solve the water quality challenges caused during dry periods by elevated concentrations of total dissolved solids, such as sulfate and other minerals, in the source water supply of Myakkahatchee Creek. “The levels of these constituents have historically resulted in the inability of the city to operate the surface water treatment plant during these dry periods, reducing annual finished water production from this facility and forcing the city to purchase water from the regional authority during drought periods,” says Street Lee, senior vice president for the firm.

An adjunct reverse osmosis water treatment plant added to the existing surface water treatment plant facility would enable the city to meet its goal of drought-proofing its water supply by producing 1.5 million gallons a day of its own clean, highly treated groundwater, as well as blending with water treated in the existing treatment plant to produce an annual average of 3.95 million gallons of finished water per day, and at least 3.15 million gallons per day during periods of extended drought. “In addition to designing the new reverse osmosis system components, the project included upgrades to the existing surface water plant, a new operations room and control center, a new building to house equipment and electrical systems and six new intermediate aquifer supply wells to make the facility resistant to fluctuations caused by seasonal conditions,” explains Phil Locke, project manager for the firm.

The firm drilled wells instead of using riverbank filtration, which meant updating the city’s existing water use permit. “The Southwest Florida Water Management District has a conservative policy toward permitting new groundwater sources for use,” says Lee. To ensure that the project could go forward, McKim & Creed worked closely with the agency to illustrate various operational scenarios and to demonstrate how the new groundwater wells would work.

Complicating matters, the firm also had to ensure that the city’s existing water treatment plant would continue to operate during all phases of construction. Recalls Locke, “We worked with city staff to identify the systems and components that could be temporarily taken offline during construction without disrupting water production, and we developed design and construction phasing schedules to minimize any impacts.”

The new reverse osmosis treatment plant went into operation in April. The two plants, co-located in the same facility, can work separately or in conjunction. This integration enables North Port to diversify its resources, improve reliability and ensure a sustainable and high-quality drinking water supply for residents and customers year round.
Recent years have been challenging for the A/E industry, from a sluggish economy, to rapidly changing markets and project delivery systems, to an increase in alternative funding and project business models, including Public-Private Partnerships and Integrated Project Delivery.

The takeaway is that firms should expect change and work harder and smarter toward greater marketplace agility and leadership. This means altering the way firm leaders think about—and respond to—the change. Innovation is a modern must, as is strategic thinking. Success requires leaders to recognize a complicated series of interconnected systems; nothing operates in a vacuum. “Most people think of the future as the ends and the present as the means, whereas, in fact, the present is the ends and the future the means,” writes Linda Gioja, Mark Millemann and Richard T. Pascale in *Surfing the Edge of Chaos*.

To better prepare industry executives and managers to meet today’s challenges, ACEC offers the Senior Executives Institute (SEI), an 18-month leadership development program designed to enhance industry professionals’ interactions, increase communications and spur innovation. Since 1995, SEI has helped unleash powerful leadership and personal mastery in nearly 400 executives. With an SEI class beginning each fall, your firm has ample opportunity to reap the benefits of SEI by enrolling your up-and-coming or current executive leaders.

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**ACEC Coalition Best-Sellers**

ACEC’s Professional Communities—coalitions and forums—provide destinations for professionals from across the A/E/C spectrum to seek resources for information-sharing, best practices and networking. These communities offer professionals access to information and products pertaining to their area(s) of specialty. Recent best-sellers from ACEC coalitions include:

**CAMEE - 5-1: Quality Assurance/Quality Control Guidelines**
The goals of a QA/QC program include improving the quality of the designs and documents, eliminating errors and omissions, and reducing unnecessary costs. A QA/QC program has a formal review process that covers all documents prior to issuance, as well as lessons learned and standards so that everyone is doing the same thing.

**CASE Toolkit 2-3: Employee Evaluations**
This tool assists the structural engineering office in the task of evaluating employee performance. The evaluations provide a method to assess employee performance and serve as an integral part of the company’s risk management program.

**COPS Baseline 5-2: Health and Safety Manual**
Jobsite safety and the prevention of occupational injuries is a priority focus for the Council of Professional Surveyors (COPS). The recently updated *COPS Health, Safety & Training Manual* provides a basic overview of fundamental field safety procedures. The manual includes sample forms and Tailgate Safety Topics for you to use and/or customize to the needs of your organization. Remember to always work smart and work safe.

**LDC 2B-10: Project Close-Out Review**
If you want your project(s) to flow, you first have to increase your team’s effectiveness. Accurate recording and storing of project records will minimize the effort and redundancy of document retrieval in the future—in addition to serving as a final check of project documents.

**Updated EJCDC Contract Documents**
The Engineers Joint Contract Documents Committee (EJCDC) construction series of contract documents underwent significant changes in the last revision and are intended to help avoid conflicts that can ruin a project and may lead to liability. The authors are practicing engineers with input from contractors and other interested parties who know that contracts have to be fair to all and that each party should respect the other’s expertise.

EJCDC is composed of more than 100 industry practitioners. The three member organizations—ACEC, NSPE and ASCE—each have appointed delegates and a number of observers.

EJCDC documents have been used in the A/E/C industry for nearly 40 years and have achieved national recognition and acceptance. They are available at www.acec.org/bookstore. For more on ACEC’s professional Coalitions, see page 24.
AECOM is a global provider of professional technical and management support services to a broad range of markets, with revenues in excess of $8 billion. Our approximately 45,000 employees — including architects, engineers, designers, planners, scientists as well as management and construction services professionals — deliver visionary solutions to the challenges facing our clients in more than 140 countries.
Members in the News

On The Move

Jacqueline Hinman was appointed CEO of Englewood, Colo.-based CH2M HILL, effective Jan. 1, 2014. She succeeds Lee McIntire, who is stepping down as CEO, but who will continue to serve as chairman.

HNTB Corporation Executive Vice President Ed McSpedon was named CEO of the firm’s HNTB Advantage business unit. He is based in the firm’s Los Angeles office. Robert J. Slimp was promoted to CEO of HNTB Infrastructure and is based in Atlanta. Steven McElligott and Michael Inabinet were named presidents of the Northeast and Southeast divisions, respectively. McElligott is based in the Boston office, while Inabinet is based in the Arlington, Va., office.

Barney Martin was appointed CEO of Modjeski and Masters in Mechanicsburg, Pa., succeeding John Kulicki, who will continue as chairman. Martin has served as president since 2007.

Garry Higdem was appointed president of Parsons Construction Group (PCG), where he will manage its North American infrastructure construction business. He will be based in Denver.

Jan Egil Braendeland rejoined Houston-based KBR as president of its oil and gas business unit. He is based in London. Ivor Harrington was appointed group president of gas monetization and is based in Houston; Mitch Dauzat was promoted to group president of services and is based in Houston; and Karl Roberts was promoted to the newly created position of chief business development officer and is based in Houston.

Hisham Mahmoud, former AMEC group president of growth regions, will be joining SNC-Lavalin Inc., as group president of infrastructure in early 2014. In this newly created position, Mahmoud will oversee all global infrastructure and related businesses, including transportation and operations and maintenance.

Kenneth R. Johnston was named chief administrative officer at GZA Environmental, Inc. He will be based at the firm’s headquarters in Norwood, Mass.

Ryan McLean was appointed chief development officer at Psomas. He is based in the firm’s Santa Ana, Calif., office.

William Brickey joined Olathe, Kan.-based Terracon as senior vice president. Brickey will be based in Terracon’s Phoenix office.

Marco Aleta was appointed senior vice president and water sector lead for AMEC’s environment and infrastructure business in the Americas. Aleta is based in AMEC’s Denver office.

Miroslav Kurka was appointed water resources vice president of Madison, Wis.-based Mead & Hunt. Kurka will be based in Tulsa, Okla.

Jeffrey Callow was promoted to vice president in the New York City office of Thornton Tomasetti. Callow, who joined the firm in 2001, was named one of Engineering News-Record magazine’s Top 20 Under 40 professionals for the New York region.

Stephen A. McEvoy joined Camp Hill, Pa.-based Gannett Fleming as a vice president and director of railroad and transit operational design. McEvoy will be based in the firm’s Valley Forge, Pa., office.
Welcome New Member Firms

ACEC/Arizona
Environmental Engineering Consultants, Inc., Phoenix
Jordan Engineering Group, LLC, Phoenix
ACEC/California
LGC Geotechnical, Inc., San Clemente
Pittman Engineering, Inc., Roseville
Salas O’Brien, LLC, San Jose
ACEC/Colorado
Manhard Consulting, Centennial
Martino and Luth, Inc., Denver
ACEC/Hawaii
AMEL Technologies, Honolulu
Iwamoto & Associates, LLC, Aiea
ACEC/Illinois
Arc Design Resources, Loves Park
GSG Consultants, Inc., Chicago
ACEC/Kansas
Earles Engineering & Inspection, Inc., Salina
ACEC/Kentucky
CMW, Inc., Lexington
Hagerty Consulting, Prospect
Landmark Engineering, Inc., Bowling Green
Paradigm Engineers & Constructors, PLLC, Louisville
Slesser Engineering, Inc., Paducah
ACEC/Maine
W.H. Demmons, Inc., Portland
ACEC/Metro Washington
SSA Engineering, Bethesda, MD
ACEC/Michigan
Cari Walker, Inc., Kalamazoo
ACEC/Mississippi
CIVITech, Inc., Jackson
Laird + Smithers, Inc., Jackson
SOL Engineering Services, LLC, Jackson
ACEC/North Carolina
Shield Engineering, Inc., Charlotte
ACEC/Oklahoma
Hinderliter Geotechnical Engineering, LLC, Oklahoma City
Thunderhead Testing, LLC, Tulsa
ACEC/Oregon
E-PUR, LLC, Portland
K35 Resources LLC, Portland
ACEC/South Carolina
Red Oak Engineering, LLC, Easley
ACEC/Texas
Branch Energy Services, LLC, The Woodlands
Geoscience Engineering & Testing, Inc., Houston
Open Range Engineering Services, PLLC, Pampa
Thalia Engineering Studio, Houston
ACEC/Washington
Beacon Engineers Inc., Bothell
Summit Building Engineering, Vancouver

Calendar of Events

NOVEMBER

6  Beware the Risks Posed by Non-Standard Construction Contract Documents (webinar)
12  Writing and Editing for Readable Proposals (webinar)
13  Negotiate With Confidence: Field-Tested Ways to Get the Value You Deserve (webinar)
18  Mysteries of the FAR Revealed: Using the AASHTO Audit Guide: Course One, Watertown, Mass.
19  Reducing Overall Construction Costs Through Risk Assessments and Management (webinar)
20  How to Give and Receive Effective Feedback Improving Your Mental Flexibility or Change Your Thinking About the Way You Think (webinar)

DECEMBER

3  Trends in the Merger and Acquisition Market for Design Firms (webinar)
4  Proposals That Win (webinar)
10  Critical Business Development Skills: Emotional Intelligence (webinar)

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Additional information on all ACEC activities available at www.acec.org.
It has been an active year for mergers and acquisitions (M&A) in the engineering industry. Several surprising trends have made 2013 different from years past. Here are five developments that no one expected:

1. **Not your usual suspects.** So far in 2013, the most active buyers in the engineering industry are not the firms you might expect. TRC Companies (Lowell, Mass.) has been the most active firm to this point in 2013, closing four acquisitions. Other active buyers include Terracon Consultants (Olathe, Kan.), Bowman Consulting (Chantilly, Va.) and NV5 (Hollywood, Fla.). Each have closed three deals thus far. Perennial dealmakers Stantec (Edmonton, Canada), HDR (Omaha, Neb.) and Mott MacDonald (Surrey, Canada), HDR (Omaha, Neb.) has closed two deals this year. One of them was the firm’s mega acquisition of Sinclair Knight Merz (Melbourne, Australia).

2. **Publicly traded buyers are slowing down.** Publicly traded buyers seem to have lost their deal-making steam or have shifted their strategies in 2013. Thus far in 2013, we’ve tracked just two deals each in for Tetra Tech (Pasadena, Calif.) and ARCADIS (Amsterdam, Netherlands) and only one deal each for AECOM (Los Angeles), Fugro (Leidschendam, Netherlands) and Cardno Group (Brisbane, Australia). Jacobs Engineering (Pasadena, Calif.) has closed two deals this year. One of them was the firm’smega acquisition of Sinclair Knight Merz (Melbourne, Australia).

3. **What happens in the South stays in the South.** Despite many buyers seeking to acquire their way into the energy-rich economies of Texas and Louisiana, a majority of 2013 A/E deals have been driven by consolidation within the region. Of the 13 year-to-date firm sales in Texas and Louisiana, seven have gone to a buyer also based in one of those states. Two notable deals in the region include ACEC Member Firm LJA Engineering’s (Houston) acquisition of water resources specialist Grounds Anderson (Houston) and ACEC Member Firm Raba Kistner’s (San Antonio) acquisition of program management firm Project Control of Texas (San Antonio).

4. **The Midwest is hot.** The Midwest has been a hotbed of deal activity in 2013. We’ve tracked 27 deals involving a Midwest-based seller and 44 deals involving a Midwest-based buyer. By contrast, we tracked 30 sellers and 45 buyers in the region for all of 2012. Missouri and Minnesota have been particularly active for sellers, with six firm sales each. Ohio leads among acquirers with 10 buyers thus far.

5. **Surveying and mapping services remain on buyers’ shortlist.** So far in 2013, we’ve tracked 17 deals in which the seller offered surveying, mapping or geospatial services versus 20 such deals for all of 2012. In one significant mapping deal, Aero-Metric (Sheboygan, Wis.) acquired two firms—Photo Science (Lexington, Ky.) and Watershed Sciences (Portland, Ore.)—to form Quantum Spatial. In another example, ACEC Member Firm KCI Technologies (Sparks, Md.) acquired specialty surveying firm Summerall Land Surveying (Annapolis, Md.).

Recent ACEC Deal-Makers

In September, ACEC Member Firm Jacobs Engineering (Pasadena, Calif.) entered into a merger agreement with 6,500-person consulting, engineering and project delivery firm Sinclair Knight Merz (Melbourne, Australia). The deal is worth approximately $1.2 billion.

In August, ACEC Member Firm S. W. Cole Engineering (Bangor, Maine) acquired Summit CMT, a construction materials testing subsidiary, from engineering, sciences and surveying firm CES (Brewer, Maine).

And in July, ACEC Member Firm Michael Baker Corporation (Moon Township, Pa.) entered into a definitive merger agreement to be acquired by Integrated Mission Solutions (Alexandria, Va.), a provider of mission critical services and solutions to federal agencies and an affiliate of private investment firm D.C. Capital Partners.

To view the most up-to-date and “live” versions of the M&A heat maps accompanying this article 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/NovDec2013.

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 office, can be reached at nchurman@morrisseygoodale.com.
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