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Book of Giants

BY STEVE SPAULDING,
OF CONTRACTOR'S STAFF

Despite economic storm clouds, the nation's largest mechanical contractors have had another strong year, some posting record profits. See all the numbers—including breakdowns by region and type of work—in our annual feature.

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Photo by E.M. Duggan

A. O. Smith Announces Acquisition of Water-Right, Inc.

SPECIAL TO CONTRACTOR

MILWAUKEE, WI— Water technology company A. O. Smith Corporation (NYSE-AOS) today announced that it has acquired Water-Right, Inc., a Wisconsin-based water treatment company, for \$107 million in cash, subject to customary adjustments. The acquisition includes all Water-Right subsidiaries, real estate, and sister company Mineral-Right, Inc.

Family-owned Water-Right, Inc., based in Appleton, Wisconsin, is a water quality



solutions provider with a complete line of residential and commercial products and systems for a wide variety of applications, including solutions for problem well water. Water-Right products are sold under

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Hotel Zachary: Wrigleyville Hospitality

BY KELLY FALOON, OF CONTRACTOR'S STAFF

A location across from the friendly confines meant subtly incorporating baseball themes — as well as the ballpark's sustainable plumbing.

After the Chicago Cubs' historic World Series win in 2016, the area around iconic Wrigley Field, located in the city's north-side Lakeview/Wrigleyville neighborhood, underwent a transforma-

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Hotel Zachary & Wrigley Marquee

CONTRACTOR INFOCUS

Top 10 Giants YoY

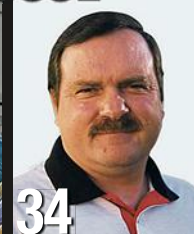
Our top Giants by percentage increase in revenue over 2018 numbers (includes only those companies reporting revenue for both years).

Company	Location	% Change over 2018
U.S. Engineering Company Holdings	Kansas City, MO	48.80%
Arden Building Co. LLC	Pawtucket, RI	48.71%
DE-CAL, Inc.	Warren, MI	44.73%
Hermanson Co. LLP	Kent, WA	44.35%
Harder Mechanical Contractors, Inc.	Portland, OR	43.49%
IMCOR - Interstate Mechanical Corp.	Phoenix, AZ	33.29%
AMPAM Parks Mechanical	Carson, CA	33.10%
Pan-Pacific Mechanical, Inc.	Fountain Valley, CA	32.91%
E.M. Duggan, Inc.	Canton, MA	30.50%
Dave Jones, Inc.	Madison, WI	28.42%
McKinstry Co.	Seattle, WA	24.55%

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PHCC Welcomes Mr. Rooter as a Franchisor Sponsorship Participant

Expanding its reach, influence and opportunities among plumbing contractors, the Plumbing-Heating-Cooling Contractors—National Association (PHCC) has welcomed Mr. Rooter Plumbing to its Franchisor Sponsorship program. The company, part of the Neighborly community, represents more than 230 business owners in the United States and Canada.

Through Mr. Rooter's participation, their franchise business owners will have ex-



panded opportunities to access a wide array of education and training programs, net-

► **Turn to PHCC, page 12**

Smith-Cooper to Merge With Anvil

COMMERCE, CA and EXETER, NH – Anvil International (“Anvil”), a global designer, manufacturer and provider of high-quality products that connect and support piping systems, and Smith-Cooper International (“SCI”), a global designer and provider of branded, high-quality pipes, valves, and fittings, today announced they have entered into a definitive agreement



to merge. The combined company will be majority owned by Tailwind Capital. Terms of the transaction were not disclosed.

The combined company will be a leading designer, manufacturer and provider of products that connect and support piping systems, with a portfolio of high-quality, global brands including AF-

► **Turn to Smith-Cooper, page 14**

ASPE to Develop New Standard on Hot Water System Temperature Maintenance

The American Society of Plumbing Engineers (ASPE) is seeking volunteers with a technical background in designing plumbing systems, specifically domestic water heating systems, to participate on Working Group 15 to develop a new American National Standard on system design methods used to regulate the temperature of



water exiting a fixture or appliance in domestic water distribution systems. Ideal candidates would be plumbing system designers/engineers, piping system experts, code authorities, and others knowledgeable in plumbing system design techniques.

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New Single-Family Home Sales



Source: National Association of Home Builders

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In Brief

Uponor North America

was recently honored with the Minnesota Real Estate Journal award in the Industrial/Manufacturing/Science category for the design and build-out of the company's new, 237,000-square-foot PEX pipe manufacturing facility in Hutchinson, Minn. More than 225 projects were nominated from across the state with honorees selected by a panel of judges.

Greenheck, a manufacturer of air movement, control and conditioning equipment, was recently named as one of Forbes' America's Best Midsize Employers. Employers are chosen based on results from an independent survey distributed to more than 50,000 U.S. based employees. Companies considered for this award were rated by nation-wide survey respondents on work-related topics.

OLFA North America has announced its "Build Diversity" program, intended to support individuals, organizations, classrooms and apprenticeship/training programs that demonstrate diversity and inclusion as a part of professional skill development. Qualified individuals or organizations can apply for the program on an annual basis to receive a gift of up to \$1,000 in cutting tools and solutions at no cost to support their efforts. Visit <https://olfa.com/> to learn more.

Dakota Supply Group (DSG) recently named Ryan Tracy, Wayne Trosen, Karl Wrobel and Roy Eskro as new Regional General Managers. This is a new leadership role at DSG, created to bring leadership closer to its markets, its employees and its customers. These Regional General Managers will be responsible for providing direct leadership for all branches in their respective regions, as well as the development of their regional management staff.

Taco Comfort Solutions has announced the naming of two new manufacturer's representative firms. R. F. MacDonald, based in Hayward, CA, is now the exclusive Taco representative for Northern California. The company president is Jim MacDonald. Southwest Sales Reps, with offices in Mesa, AZ and Las Vegas, NV, now serves Taco exclusively in Arizona and Southern Nevada. The firm was founded by Earl Brockert in 2002.

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- ▶ Want to know what is on the mind of Ed O'Connell, business coach and consultant?
- ▶ Want to know about how to get the flow rates right in hydronics from master trainer Steve Swanson?
- ▶ Want to know what the 14 characteristics are of a professional plumbing company? Matt Michel will tell you.

If so, our Industry Perspectives page is the place for you! Visit Industry Perspectives today at

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Want to converse with experts in the plumbing and hydronics industries? Then check out CONTRACTOR's Industry Perspectives, serving up thoughtful, conversational content from the industry experts you have gotten to know so well at www.Contractormag.com.



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Shapiro & Duncan Prefab Facility - A Beacon for Better Production

BY JOHN MESENBRINK OF CONTRACTOR'S STAFF

LANDOVER, MD. —Industry leading mechanical contractor Shapiro & Duncan is making waves with several projects and initiatives in its prefabrication facility that will enhance the company's capabilities, which includes multi-trade prefab work. Since 2002, Shapiro & Duncan has been involved in the prefabrication of piping assemblies with a 12,000-sq.-ft. leased facility in Beltsville, Md, but after realizing the company needed more space, in 2007, Shapiro & Duncan purchased a 52,000-sq.-ft. building in Landover to further its path to becoming an industry leader in prefab pipe assemblies.

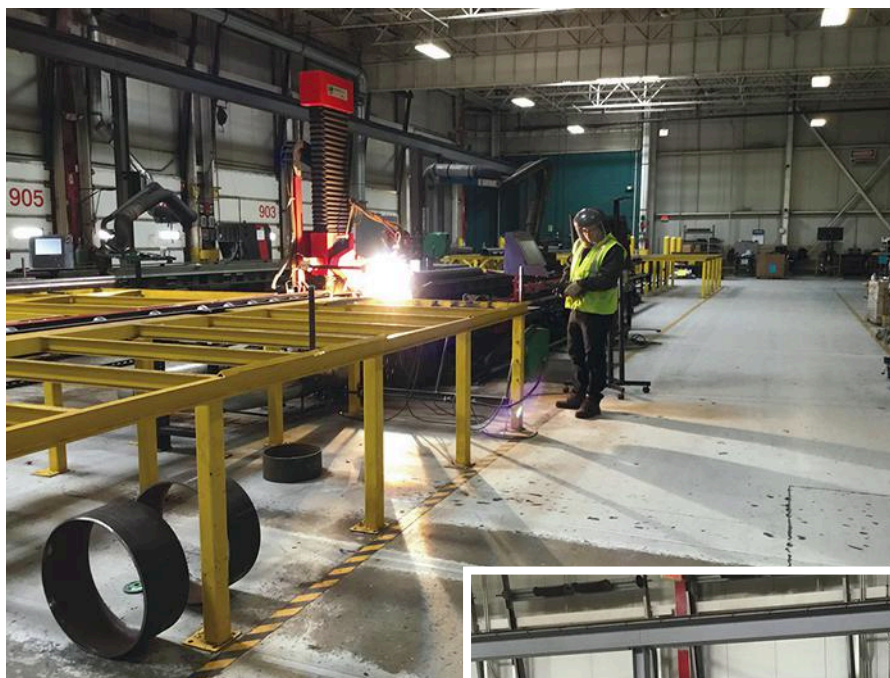
"The prefabrication facility gives us a clear advantage in the market through a high level of quality, minimized impact on jobsite and reduced jobsite storage and manpower clutter.

We are making a huge upfront investment of intelligence in the planning, coordination and detailing of every project to ensure project success through offsite production; we are far more productive in our fab shop working in a safer controlled environment with the best tools and equipment," said Mark Drury, Vice President of Business Development, Shapiro & Duncan.

Last year, the company moved forward with multiple projects that will help Shapiro & Duncan, "work more efficiently to provide a better product for our client," added Drury.

The first project Shapiro & Duncan completed was the construction of a 4,800-sq.-ft. three-sided metal storage building, which is being used for storing finished prefab assemblies. "With racked shelving, we have doubled the area's storage capacity and added the benefit of the items being under roof," said Drury.

Inside the shop, another CNC Plasma Pipe Cutting and Profiling machine was added; this machine doubles the steel line capacity, as well as increasing the size of pipe to 48" and down to a 2" diameter pipe. The machine will cut and bevel straight, saddle, tee, multi-miter, lateral, multi-saddle, gusset slots, double miter, pipe to



The Plasma Pipe Cutting and Profiling machine in operation. Its addition has doubled the company's steel line capacity.

cone, bumpers and overlaps. Redoing its steel line, Shapiro & Duncan added an additional 150 feet of rail and another overhead crane, allowing for a well-supported assembly finishing area," said Drury.

The replacement of the 20-year-old, tar-and-gravel roof was the next priority and Shapiro & Duncan chose a white TPO roof system over two layers of insulation and hardboard. The additional insulation improves winter heat retention and the white surface reflects the sun's rays in the summer to keep the building cooler. While replacing the roof, four rooftop air handling units were replaced and four 25,000 cfm ventilation fans were added.

Skilled Trades

With the reconfiguration, the company added an area for S&D University—a program which provides instruction across a wide range of knowledge and skill sets—to set up a versatile training area where the best trainers conduct weekly skills enhancement boot camps for five to 10 tradesmen at a time. All employees are expected to

rework is eliminated," said Drury.

Additionally, the team stacked two sea containers and custom modified them to provide a multi-floor workspace for skills enhancement.

Committed to Sustainability

The final project of 2018—with the help of Aurora Energy, a commercial solar project developer—was the installation of a rooftop solar PV farm, which was a significant step for the Shapiro & Duncan's commitment to sustainability, and the prefab facility's goal of be self-sufficient in its electrical supply. Going from a primarily coal-fired electrical energy supply to a solar energy



A section of the fab shop has been set up as a boot camp to help develop specific industry skills in a controlled environment.

complete at least three hour per year of continuing education.

"At the fab shop we have set up an area as a boot camp where tradespeople will be brought in for a week or more of skills training specific to an identified need. This in-house instruction is provided by our own master tradespeople. Having the most highly skilled workforce is a distinct advantage—the production is more efficient, the quality is superior, execution is safer and

supply, "Having the right team is critical to the success of any venture, and our rooftop solar team was top notch. They were extremely knowledgeable of the product, the installation and the process," said Drury.

The 925 SunPower solar modules on a Panel Claw support system complete a 302 kW production capacity, which, over the course of a year, will provide power in excess of current consump-

➤ **Turn to Shapiro & Duncan, page 50**

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A. O. Smith Acquires Water-Right

► **Continued from page 1**

the Evolve®, WaterCare®, Sanitizer Series®, Impression Series® and CustomCare® product brands. In addition to its advanced and innovative product solutions, Water-Right also has a retail facility, Water-Right Ser-

vices, and a state-certified lab, Clean Water Testing LLC™, specializing in water analytical services.

"The acquisition of Water-Right squarely supports A. O. Smith's growth trajectory in water treatment and enables A. O. Smith to expand

beyond its strong presence in the direct-to-consumer and retail spaces with Water-Right's capabilities in the wholesale and independent water quality dealer channels," said Kevin J. Wheeler, president and chief executive officer. "With its exceptional

market knowledge, established relationships and array of training programs, Water-Right is the ideal fit as the newest member of the A. O. Smith family. It is an innovative, family-run and Wisconsin-based company that takes great pride in addressing customers' problem water needs with the highest level of care."

"We're honored and excited that the business founded and nurtured by my father and expanded by my brothers and me is finding a long-term future home with A. O. Smith, an innovative and global leader in water technology," noted Kurt Gruett, Water-Right president. "We're confident that A. O. Smith – with its global capabilities and manufacturing expertise – will be able to take

Kurt, Guy, and Greg Gruett will continue to lead.

Water-Right and its family of products to the next level."

Kurt Gruett, Guy Gruett and Greg Gruett will continue to lead the Water-Right businesses, while father and founder Glenn Gruett will continue to provide insight and business counsel. The Water-Right offices will remain based in Appleton, Wisconsin, and Mineral-Right will remain in Phillipsburg, Kansas.

Water-Right employs approximately 90 employees with annual sales of approximately \$60 million. On April 30, 2019, A. O. Smith plans to release its first quarter 2019 results, including the financial impact of this transaction, which is expected to be minimal in 2019 due to purchase accounting and one-time costs. **C**

[Editor's Note: This release contains statements that the company believes are "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. All forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those anticipated as of the date of this release.]



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Hotel Zachary: Wrigleyville Hospitality

► **Continued from page 1**

tion. A new year-round entertainment venue was built outside the ballpark's west gate, previously a parking lot, by the Cubs' owners, the Ricketts family. Gallagher Way, originally called The Park at Wrigley, appeals to more than just baseball fans, offering restaurants, outdoor movies, a farmer's market, music and other family events.

Across Clark St. is the new 238,000-sq.-ft., seven-story Hotel Zachary, a Marriott property designed by VOA Associates/Stantec with 153 guest rooms and 20 suites, retail space and various dining establishments along Clark Ave. The boutique hotel opened last year and is inspired by Zachary Taylor Davis, the architect of Wrigley Field (as well as the old Comiskey Park of the Chicago White Sox). Hickory Street Capital is the Ricketts family-owned development company behind the project.

Walsh Construction, the general contractor on the project, hired design-build subcontractor Adamson Plumbing Contractors to design and install the plumbing systems in the hotel and restaurant spaces, as well as side utilities (bringing in water and sewer lines from the street). The 35-year-old commercial plumbing firm is located in suburban Addison, Ill., and co-owned by Doug Withington, a LEED Accredited Professional, and Chris Eisenhower.

While Eisenhower grew up in his family's plumbing business, Eisenhower Plumbing, Withington entered the industry nearly two decades ago after a career in marketing and management consulting. "I had young kids at home and the travel was extensive," Withington recalls.

He started at Adamson Plumbing Contractors (the former Thomas P. Adamson Jr. & Associates) as an assistant project manager; his organizational skills honed in the corporate world were a natural asset for project management. He worked his way up to positions of more responsibility until he and Eisenhower bought out Tom Adamson Jr. in 2014.

Withington handles office operations and Eisenhower manages field

operations. The company has an office staff of five and 60 plumbing technicians who primarily work on new construction or major renovation projects in the commercial/institutional/multi-family/hospitality sectors.

Lessons Learned

However, the biggest challenge for the crew was the hotel's ground level. Because Hotel Zachary is across from Wrigley Field, the retail and restaurant spaces were very important. However,

'We didn't know what was going in until the project was rolling... We had to adjust our system to facilitate their build out.'



Sloan Zachary Hotel baseball themed restrooms.

On the Hotel Zachary project, the Adamson Plumbing Contractors' crew of 10 to 15 plumbers worked on the building for a year and a half. One of the challenges for the crew was the location itself.

"There were issues on game days," Withington explains. "We don't use a crane a lot but it was shut down on certain days because they didn't want it boomed out over Clark St. The neighborhood would go from being pretty quiet to teaming with tens of thousands of people on game day. Safety was a major concern. There was no room for error with a high-profile job like that."

Noise also was an issue as the ballpark and hotel are located in a residential area. All construction crews had to be mindful of the city's noise ordinance.

the building's owners didn't have all the retail/dining space rented out when Adamson Plumbing Contractors did its system design.

"Usually we'll stub in the water and waste lines and call it a day," Withington notes. "But with this hotel, we didn't know what was going in until the project was rolling along. We had to adjust our plumbing system to facilitate their build out."

He adds: "We got too far ahead of ourselves with design and had to make a lot of changes to accommodate all the restaurant tenants. We designed the plumbing system for a hotel; in the end, it was much more a mixed-use building. It's typically good to move fast during the design/coordination phase but due to the unique use of this project, it only ended up costing us money."

The hotel boasts nearly a dozen dining/drinking options: Alma, The Bar, Big Star, Brickhouse Tavern, Dutch and Doc's, Jeni's, Lucky Dorr Patio and Tap, Mordecai, Smoke Daddy, Starbuck's Reserve and Westown Bakery and Tap.


For the hotel section, Adamson Plumbing installed Kohler fixtures in the guestrooms, which are designed with a nod to the 105-year-old ballpark — ivy-green headboards, pinstripe carpet, leather wing chairs, floor-to-ceiling windows overlooking Wrigleyville, custom lighting, local artwork, historic photographs and rare Wrigley Field memorabilia.

Sloan fixtures were installed in the public areas of the building. Sloan Valve Co. is the official water efficiency partner of the Chicago Cubs; the team's clubhouse, as well as the concourse, are outfitted with the commercial plumbing manufacturer's sustainable products.

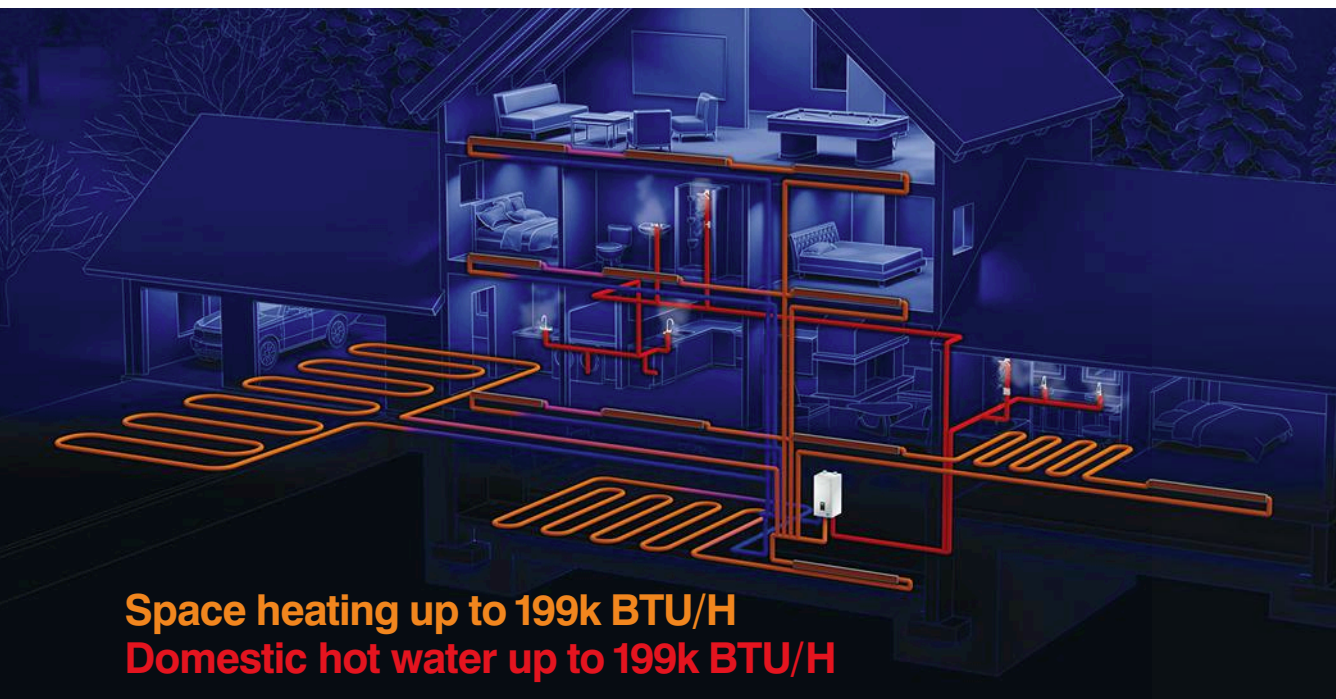
So, it only made sense to use its water-saving fixtures in the nearby hotel — Royal 111 ESS flushometers delivering 1.28 gal. per flush with hybrid SU-1009 urinals and ST-2459 water closets, and hands-free, Optima EAF-700 faucets customized with a brushed amber gold finish to match the trim along the restroom mirrors, as well as the handlebars in the water closet stalls.

Behind the walls, Adamson used cast-iron hub and spigots from Charlotte Pipe and Viega copper press fittings. The 2 million Btu domestic hot water system comes from A. O. Smith and includes a 1,000-gal. storage tank. The triplex booster pump system is from ITT Goulds.

Earlier this year, Withington had an 11-month walk-through with the facilities staff and all the mechanical trades. "The facility folks said they've been very pleased with how the building's operating across all trades," he says. "It was a great project and Adamson Plumbing Contractors is proud to be part of it."

Withington does have some advice for other design-build subcontractors working on commercial projects. "With the popularity of design-build, subcontractors need to understand the impact of being the engineer of record on projects," he explains. "We (as subcontractors) tend to underestimate this cost; as a group, we need to be sure we adequately cover it in our bids." 

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PHCC Welcomes Mr. Rooter as Sponsorship Participant

► **Continued from page 3**

working events and business coaches from PHCC, PHCC's Quality Service Contractors (QSC) and the PHCC Educational Foundation, including:

- PHCC CONNECT 2019—Oct. 2-4 in Indianapolis, Indiana
- Discounts on customer service, fi-

nancing and marketing programs

- Updates on legislative and regulatory issues affecting the p-h-c industry
- Plumbing-specific information, resources and discussion opportunities
- Frontline Service Technician and Service Manager Training
- "Pillars of Success" coaching re-

source for p-h-c service businesses

- DOL-approved apprentice training and a soon-to-be released Fast Track to Service Plumbing
 - Workforce development resources
- "We are very excited about this new sponsorship program," says PHCC President Ken Nielsen. "It is a great op-

portunity to reach more professional contractors and further PHCC's mission to provide best practices, expert resources, education and training for the industry."

Nielsen adds that the Franchisor Sponsor program is a new opportunity for franchisors to participate as a group with PHCC. "We're eager to expand our network and pursue relationships with other franchisors as we continue to advance the industry as a whole," he says.

"We are excited about this partnership with PHCC," says Glenn Galas, Mr. Rooter VP of Operations, Mr. Rooter LLC. "This will add a much-needed technician training component to our Franchisee Support so our Franchisees can continue to build and grow their businesses while providing well trained Service Professionals to provide World Class Plumbing Services to all our clients."

For more information on PHCC's Franchisor Sponsorship program and membership opportunities, contact customercare@naphcc.org or 800/533-7694. **C**



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Workers' Compensation

ASPE to Develop New Hot Water Standard

► **Continued from page 3**

ASPE 15 is intended to reduce the potential for hot water scalds and related injuries, as well as reduce the risk of thermal shock due to pressure disturbances within the domestic water distribution system. It will fill a void that exists in current product standards by addressing the total system design from the point of entry, through the distribution system, and to the point of use.

The deadline to apply is May 10, 2019. Interested individuals are encouraged to fill out the application at aspe.org/content/aspe-standards-committee-application. For more information, please contact WG 15 Chair, Chris Haldiman, at Chris.Haldiman@wattswater.com or ASPE Sr. Director of Technical & Regulatory Affairs, Ramiro Mata, at rmata@aspe.org. **C**

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ABC Congratulates 2019 National Craft Champions

LONG BEACH, CA —Associated Builders and Contractors announced the winners of the 32nd annual National Craft Championships on March 29th during its Careers in Construction Awards at the conclusion of ABC Convention 2019 in Long Beach, California.

The NCC featured a field of 168 craft professionals competing for top honors in 14 competitions representing 12 crafts, from electrical and plumbing to carpentry and welding, as well as a team competition with journey-level craft professionals from four different crafts working to complete a joint project. The competition includes a two-hour written exam and a day-long, hands-on practical performance test.

"The annual National Craft Championships honors the best the merit shop construction industry has to offer," said 2019 ABC National Chair Tony Rader, telecom vice president of National Roofing Partners, Coppell, Texas. "I am always amazed by the level of dedication NCC competitors show to their craft, safety and pro-

fessional development. This talented group of craft professionals are leaders in our workforce, and I look forward to their continued contributions to the construction industry."

Clement Prevost, a senior talent development specialist for Fluor's U.S. Gulf Coast Training Center in Pasadena, TX, was named the 2019 Craft Instructor of the Year.

Started in 1987, NCC is a part of ABC's effort to raise the profile of careers in construction and highlight the \$1.1 billion that ABC member companies spend annually on workforce development. Each year the competition draws some of the nation's most talented craft professionals and highlights the important role that craft skills education plays in the construction industry.

Milwaukee Tool, an industry-leading manufacturer of heavy-duty power tools, accessories and hand tools, is the official tool sponsor of this year's NCC. Milwaukee Tool provided tools, safety equipment and prizes for NCC competitors.

The 2019 National Craft Championships Winners by Category:

Pipefitting Safety

Jeff Barker
Manhattan Mechanical Services
Manhattan Mechanical Services

Bronze

Robert Adams
Polk Mechanical
TEXO/Construction Education
Foundation

Silver

Jeff Barker
Manhattan Mechanical Services
Manhattan Mechanical Services

Gold

Sean O'Dowd
DECCO Inc.
Gould Construction Institute

Plumbing Safety

Nichollas Dow
Humphrey and Associates Inc.
TEXO/Construction Education
Foundation

Bronze

Jonathan Epps
Pro-Craft Construction
ABC Southern California Chapter

Silver

Miko Martinez Jr.
Collins Plumbing Inc.
ABC San Diego Chapter

Gold

Danial Rex Needels
Royal Plumbing
ABC Iowa Apprenticeship and
Training Trust

Pipe Welding Safety

Joshua Brown
S & B Engineers and Constructors Ltd.
S & B Engineers and Constructors Ltd.

Bronze

Benjamin Nunan
Cianbro
Cianbro

Silver

Ryan Beaver
Performance Contractors Inc.
ABC New Orleans/Bayou Chapter
and Performance Contractors Inc.

Gold

Kenneth LaBree
Cianbro
Cianbro

Fire Sprinkler Safety


Andrew Aylies
Wiginton Fire Systems Inc.
Florida Automatic Sprinkler
Training, Inc. (FAST)

Bronze

Nicholas Beavers
Wiginton Fire Systems Inc.
Florida Automatic Sprinkler
Training, Inc. (FAST)

Silver

Tyler Ray Patch
Piper Fire Protection
ABC Florida Gulf Coast Chapter
Gold
Richard Eckert
Wayne Automatic Fire Sprinklers
ABC Florida Gulf Coast Chapter.

Categories not listed included electrical, HVAC, carpentry and others. 

Smith-Cooper to Merge With Anvil

► Continued from page 3

CON, Anvil, Anvil EPS, Anvil-Strut, Basic-PSA, Beck, Catawissa, Cooplok, Cooplet, FlexHead, FPPI, Gruvlok, J.B. Smith, North Alabama Pipe, Megawatt, SCI, Sharpe, SPF/Anvil and Sprink-FLEX. Together Anvil and Smith-Cooper will offer a more comprehensive product portfolio to national, regional and local distributors across North America serving the industrial, commercial, fire protection, energy and mining end markets.

Upon closing, Jason Hild, Chief Executive Officer of SCI, will serve as Chief Executive Officer of the combined company, and Tom Fish, President and CEO of Anvil, will serve as Chairman. All additional members of Anvil's and Smith-Cooper's senior management teams will remain with the combined company. No changes to either company's facilities footprint are anticipated at this time as a result of the combination.

"Bringing together Anvil and Smith-Cooper is a unique opportunity to significantly expand the strong and complementary capabilities of both organizations," said Jason Hild. "Anvil's commitment to domestic manufacturing and deep relationships with their distributor partners make them an excellent complement to Smith-Cooper, with our expertise in global sourcing and our ability to strongly service our customers. We are excited to work collaboratively with the talented Anvil team to create a bright future for our combined business."


"We are excited to be joining forces with Smith-Cooper and have great respect for their team, sourcing capabilities and high-quality products," said Tom Fish. "Together, we will be positioned to offer a wider breadth of products and best-in-class service that our combined customer base wants, needs and deserves. We have many terrific opportunities ahead and I

look forward to partnering with Jason and our teams to drive the long-term growth of our business."

"This transaction combines two phenomenal businesses and management teams to create a world-class platform that can comprehensively serve the pipe, valves and fittings market," said Jeff Calhoun, Partner at Tailwind. "We look forward to supporting Jason, Tom and the entire leadership team as they continue to pursue strategic growth opportunities."

The transaction is expected to close in the second quarter of 2019, and is subject to customary closing conditions.

JP Morgan and BlackArch Partners served as financial advisor and Dechert served as legal advisor to Anvil. Barclays served as financial advisor and Davis Polk & Wardwell served as legal advisor to Smith-Cooper.

For more information visit www.anvilintl.com and www.smithcooper.com. 



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by Al Schwartz
PLUMBING CONTRACTOR



Pursuing Excellence

ex-cel-lence

/ˈeks(ə)ləns/

noun

1. the quality of being outstanding or extremely good.

I wonder how many reading this would consider their trade skills as excellent? Do we value excellence in ability, training, knowledge and skill anymore? In recent times—in my opinion anyway—excellence has fallen out of favor and been replaced by “good enough.” Time though has a way of redefining our memories, and so, recollections of pursuit of excellence in skills and knowledge of times past may be suspect. In other words, perhaps my recall of doing excellent work years ago is flawed. Only my memory serves, and it’s biased.

The very word, excellent (or excellence) has become passe. It is used in the vernacular to describe something that goes our way or that makes one happy. You know what I mean. Today someone exclaiming “EXCELLENT!!” when a particular event or happenstance turns out well for them is commonplace. Is it really “excellent” or is it merely good? Much as the words ‘dude’, ‘cool’ or ‘hip’ has become severely overused, so has the word excellent. It’s now just a part of speech and has, for the most part, lost its descriptive uniqueness.

What, you may wonder, am I prattling on about? I’ll tell you. For quite a few years now, we have watched the

decline of our trade, both in the quantity and quality of the people coming into it and practicing it. There are a lot of reasons for this but, in my opinion, one of the biggest reasons is that no one (or not many) ever thought such a long-standing, basic bread-and-butter occupation would suffer the declines

we’ve witnessed in just one generation. After all, plumbing is one cornerstone of a successful civilization. Without plumbing as we know it today, disease and pestilence would be running rampant in our cities, as indeed they are in more than a few third world countries. The fact that technology has made the application of the trade in the U.S. today into a DIY paradise is not reason enough to explain the decline.

Homes and businesses still need to be built with modern plumbing systems. Commercial and industrial buildings and plants still need specialty piping systems as well. Someone has to know what they are doing

to install and maintain those systems and to make them work properly. Architects and engineers can draw and figure, but the guy who does the install is the guy who needs to make those drawings and figures work. You can compartmentalize aspects of the industry and “get by” but eventually, you’re going to come upon a situation that requires knowledge of the entire picture to solve an issue. That’s where excellence starts.

Which brings me to the point of this

Do we still teach excellence? Is excellence an outdated concept, not just in our trade but in general?


piece. Excellence is still the benchmark of a true craftsman. Excellence cannot be ‘taught’, it can only be achieved by education, hard work, repetition and developed skills. It is having not only a comprehensive knowledge of the mechanics of a particular skill, but an intimate understanding of “what goes where and what comes next.” Reaching that point in one’s career where all of those things come together, is the goal.

The catalyst for this column was a photo-gallery in the recent online edition of Contractor Magazine entitled the “Wall of Fame.” If you are a regular reader of this magazine, you’ve

seen the “Plumbing Nightmares” gallery, wherein the most bone-headed, outrageous and dangerous “fixes” for plumbing problems are highlighted. Well, the “Wall of Fame” piece is the exact opposite.

The 35 photos included in that gallery showed some of the finest examples of our trade to be found in one publication. When we think of excellence at all, the work highlighted in those photos is what we should be thinking of. The design, implementation and presentation of the piping and systems is a true representation of trade craft, skill, knowledge and artistry. Pride in workmanship, across all types of materials and for all types of piping systems practically jumps off the screen.

The workmanship and attention to detail represent the very best our trade has to offer. The people responsible for that should be justly proud of their work. They have achieved excellence in their chosen field. It represents our entire industry not only to other tradesmen, but to construction professionals and lay people alike. You cannot look at those photos and not see the expertise. The logical progression in those pictures is one of competence and skill in delivering a product in the very best way possible.

So the question remains, do we still teach excellence? Is excellence an outdated concept, not just in our trade, but in general? In a broader context, which is evident in our present day, do we settle for mediocrity by pandering to the one-size-fits-all “participation trophy” mentality that seems to pervade all aspects of our society? Or do we strive for and encourage excellence? Where do you stand? 

The Brooklyn, N.Y.-born author is a third-generation master plumber. He founded Sunflower Plumbing & Heating in Shirley, N.Y., in 1975 and A Professional Commercial Plumbing Inc. in Phoenix in 1980. He holds residential, commercial, industrial and solar plumbing licenses and is certified in welding, clean rooms, polypropylene gas fusion and medical gas piping. He can be reached at allen@proquilldriver.com.

Viega Names New Head of Human Resources

BROOMFIELD, CO – Industry veteran Terry Samona has been named Vice President of Human Resources at Viega LLC.

Terry oversees human resources management and development at Viega’s operations in the U.S., including headquarters and a seminar center in Broomfield, Colo.; a manufacturing plant and distribution hub in McPherson, Kan.; three additional distribution centers in Nevada, Georgia and Pennsylvania; and a seminar center in



Terry Samona


Nashua, N.H.


“Terry’s skill and experience make him the right person to ensure we continue to hire and develop the best people,” said CEO Dave Garlow. “Viega owes its growth and industry-leading status to its exceptional employees and we know Terry can help us improve our processes and policies even further.”

“I very much look forward to partnering with the executive team and our colleagues to develop an aligned

HR strategy,” Samona said. “We want to enable growth while maintaining an environment where a strong culture of striving for excellence and living our Viega Values continues to offer us a competitive advantage in the markets that we serve.”

Samona’s entire career has been in human resources. Prior to joining Viega, he was vice president of human resources at Hach Environmental.

He has a master’s degree in psychology from Mississippi State University and a bachelor’s degree in psychology from Louisiana State University. 

A man wearing a welding mask, safety glasses, and green gloves stands in a factory setting, leaning against a large industrial boiler. The background shows various mechanical components and pipes.

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by Dale Stroud
HOUSING AUTHORITY



New Housing – Hard to Believe?

Sometimes, things are hard to believe. Take time, for example. Often, time seems like little more than a blur. It just goes by so quickly. Things that we sometimes think just happened actually occurred much longer ago.

Think about this: It has been almost a decade since the “Great Recession” ended! Hard to believe.

According to the National Bureau of Economic Research, the recession began in December 2007 and 19 months later was over at the end of June 2009 — thus, ending nearly 10 years ago. However, for many, it may not seem that it actually ended in mid-2009 because, for them, both the recession itself and the subsequent recovery have been long and difficult. Many still bear scars from the effects of that economic meltdown that brought our country nearly to its knees.

On the other hand, some aspects of the post-recession recovery have been truly remarkable:

- over 20 million new jobs have been created;
- unemployment is near an all-time low;
- stock prices have more than tripled;
- GDP growth has been good; and
- thousands of new businesses have been formed.

Add the fact that consumer confidence is near a 10-year high — meaning people are willing to spend and participate in the growth of our economy. Put these and other upsides together, and you can begin to paint a pretty positive picture.

What about new housing?

And let’s not forget the all-important new housing market: It too must be booming!

Indeed, house prices have rebounded from the recessionary doldrums, mortgage rates are still affordable, financing is generally available, the vacant-home situation from the foreclosure crisis is mostly gone, and there are even housing shortages in some areas of the country.

But despite these and many other seemingly positive factors, the new-housing market, when viewed on a national basis, is NOT back to “normal.” It’s still trying to recover from the crash that occurred because of the recession. Hard to believe.

Let’s consider some history.

For the 10-year period preceding the start of the recession, annual housing

In the hole, four million starts?

Statistics from the U.S. Census Bureau show that there were 1.2499 million new

It is possible to conclude that over the past 20 years we have accumulated a shortage that could theoretically be as high as four million new homes!

starts averaged 1.72 million per year; in the five years preceding the recession, 1.8 million. Compare that with the long-term average, as calculated by the number of annual starts in the 50 years prior to the recession (national housing starts were first tracked beginning in 1959): about 1.5 million starts per year.

Not surprisingly, that 50-year average is the number of annual starts that housing experts say are needed, on average over time, to satisfy demand. In other words, for the years leading into the recession, it can be argued that we were building more houses than demographic-driven demand actually required. As a result, an inventory of unsold new homes was created for which, in many cases, there was no need. A surplus of dwellings was created.

It was a time of easy money and a lot of speculative house-buying took place. Many people were buying houses they truly couldn’t afford or actually need!

As it has since been described, a “housing bubble” of unneeded new homes was created that, in many respects, was ultimately one of the primary triggers for the start of the Great Recession. All bubbles eventually burst, and this one was no exception, sending the new-housing market into a steep downward spiral. The market finally “bottomed out,” in 2009, at 554,000 starts, or about 30 percent of the pre-recession level.

By now, nearly ten years later, you would think that we would be back to building houses in numbers that at least equate to that 1.5 million “sustainable” level. But we’re not!

Again, it’s hard to believe. (See **Chart #1.**)

housing starts in the U.S. in 2018: 875,800 were single-family homes and 374,100 multi-family units. And 2018 was the high mark for starts in the post-recession

that could theoretically be as high as four million new homes! In other words, the quantity of homes NOT built since the recession far out-numbers the excess number built prior to the recession.

Far more conservative methods of calculating the deficit still put the shortage at between one-half and one-million housing units. So, whether the number is one-half million or four million, there is a recognized shortage of new homes.

Hard to believe. (See **Chart #2** on page 48.)

Is there really a shortage of homes?

So why aren’t we back to normal? For

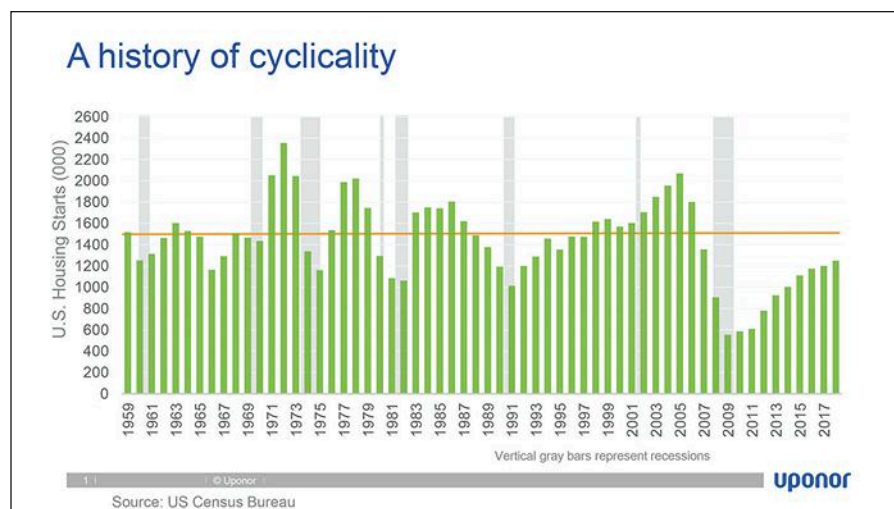


Chart #1 - Historical housing starts.

era! In the 10 years since the end of the recession, cumulative starts totaled just over 9.2 million, for an annual average of 920,000 — well under the 1.5 million per year needed, in theory, to meet demand.

On the other hand, as stated previously, in the five years prior to the recession, annual starts averaged 1.80 million, resulting in a cumulative “surplus” above the 1.5 million per year level. As a result, the calculated pre-recession surplus of new homes has now been more than eliminated by the low level of post-recession building.

In fact, when you “simply” compare the pre-recession surplus with the deficit generated during the recession and the post-recessionary period — i.e., subtract the deficit from the surplus — it is possible to conclude that, over the past 20 years, we have accumulated a “shortage”

starters, we should consider whether there truly is a shortage. Or is it in theory only?

It’s not an easy question to answer. Understanding the true demand for new homes is a rather complex puzzle. A number of big-picture factors must be taken into account, including:

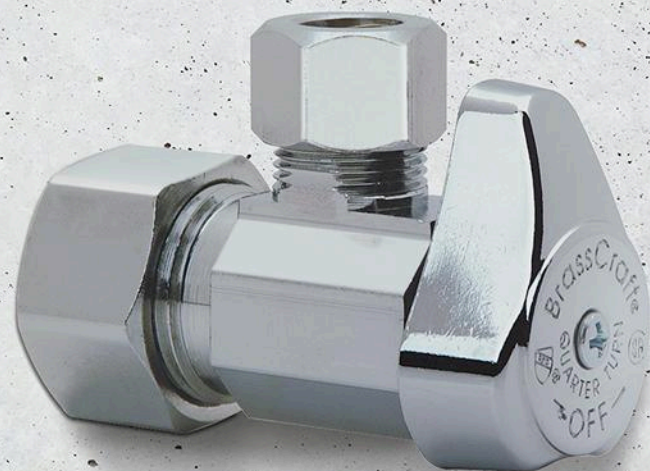
- overall population growth;
- household formations;
- housing vacancies;
- net immigration;
- conversion of existing structures into housing units;
- demolitions of dwellings (both intentional and unintentional); and
- the purchase of “second” homes.

In addition, some “softer” considerations come into play:

- the desire/intent to own a home;

➤ **Turn to Housing Market, page 48**

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Book of Giants

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Giants 2019: The Good Times Roll

Despite economic storm clouds the nation's largest mechanical contractors post another strong—for some a record—year.

BY STEVE SPAULDING OF CONTRACTOR'S STAFF

At the end of 2018 a number of economic forecasters checked their tea leaves with wary, troubled eyes. Not that the year hadn't been a strong year; 2018 saw three consecutive quarters where the U.S. GDP grew 3.5 percent. The unemployment rate was at a low not seen in 50 years. But still, almost everywhere an analyst turned for data there was reason to predict gloom (if not doom).

Housing sales, which had never quite recovered from the Great Recession (see Dale Stroud's Forum piece in this issue, starting on page 18), took a dip. So did auto sales (both, in part, due to the Federal Reserve raising interest rates). In fact, at the end of November 2018, GM had to shutter five factories, cutting 14,000 jobs. Consumer confidence continued the steady decline it had been on since about June of 2018.

On the international stage there were worries about Brexit and its knock-on effects for the North American economy. There was the ongoing trade war with China, the effects of which continue to bite. (A recent economic report from NPR estimates that for every job preserved or created by the Trump administra-

tion's policies, tariffs have cost the American economy \$900,000—about thirteen times the average salary of one of those workers.) In December of 2018 the International Monetary Fund issued a warning that most governments around the world were so saddled with debt that they might be unable to cope with a second Great Recession.

But if there was any one thing that troubled the average market watcher it was the simple law of gravity: what goes up must come down. Since the Great Recession the U.S. had seen more than 10 years of expansion. How much longer could it possibly last? The 2017 Tax Cuts and Jobs Act had pumped another \$1.5 trillion into the economy, but by 2018 it was feared the "sugar high" of that stimulus was wearing off. When, many people wondered, would the music stop?

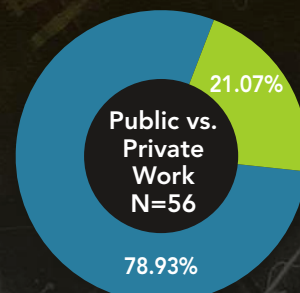
Strong First Quarter

Fast forward to May of 2019 and First Quarter GDP is up 3.2 percent. A disastrous jobs report in February (just 20,000 for the month) proved an anomaly with the economy adding an average of 173,000 jobs per month in Q1. In fact, job openings

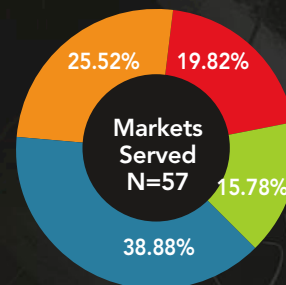
outpaced the number of Americans looking for work for the 13th straight month, with the rate of workers quitting jobs holding steady at 2.3 percent. The most-watched U.S. consumer confidence index, maintained by the Conference Board, rose 5.0 points in April to 129.2.

While existing home sales declined 4.9 percent in March, new home sales picked up, reaching an 18-month peak and increasing 4.5 percent month-over-month. Developers and builders appeared to be slashing prices, as the Census Bureau said that the median new home price fell 9.7 percent in March to a two-year low of \$302,700. Additionally, the NAR pending home sales index, a gauge of housing contract activity, rose 3.8 percent for March after a 1.0 percent February dip.

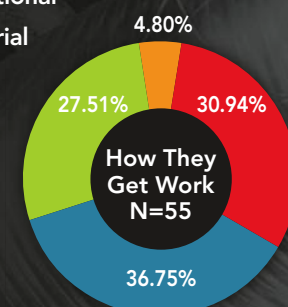
None of which means that the economic headwinds discussed above have all somehow magically vanished, but few people are talking about a recession anytime soon. It looks (for now) that the good times will continue to roll, and our Giants roll with them. Our top 100 mechanical contractors re-



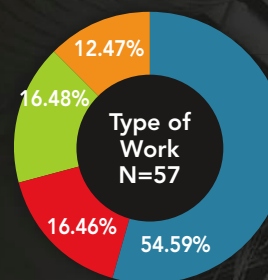
Private
Public



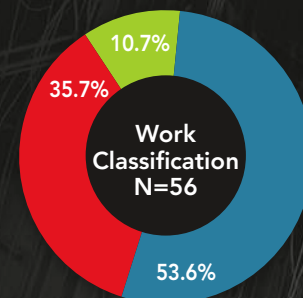
Residential
Commercial/High-Rise Residential
Institutional
Industrial



Design/Build
Bid Spec
Negotiated
Other



New Construction
Service/Maintenance/Repair
Retrofit/Replacement
Remodeling/Reconstruction



Union
Non-Union
Mix

Contractor’s Top 100 Who They Are

Rank	Company	Location	Revenue (millions)
1	EMCOR Group	Norwalk, CT	\$4,273.00*
2	APi Group, Inc.	New Brighton, MN	\$3,730.25
3	Comfort Systems USA	Houston, TX	\$2,180.00
4	Team Industrial Services	Sugar Land, TX	\$1,246.93
5	ACCO Engineered Systems, Inc.	Glendale, CA	\$1,246.00
6	Southland Industries	Garden Grove, CA	\$900.00*
7	McKinstry Co.	Seattle, WA	\$685.00
8	TDIndustries	Dallas, TX	\$631.00
9	Harder Mechanical Contractors, Inc.	Portland, OR	\$617.00
10	Conti Corp.	Sterling Heights, MI	\$550.00*
11	Limbach Holdings, Inc.	Pittsburgh, PA	\$546.50
12	The Brandt Companies LLC	Carrollton, TX	\$500.00*
13	Apollo Mechanical Contractors	Kennewick, WA	\$450.00*
14	U.S. Engineering Company Holdings	Kansas City, MO	\$436.00
15	Dynamic Systems, Inc.	Austin, TX	\$427.30
16	Harris Companies	St. Paul, MN	\$400.00*
17	Kirlin Group	Rockville, MD	\$375.00*
18	RK Mechanical, Inc.	Denver, CO	\$365.53
19	J.F. Ahern Co.	Fon du Lac, WI	\$331.45
20	Murray Co. Mechanical Contractors	Rancho Dominguez, CA	\$320.00*
21	Pan-Pacific Mechanical, Inc.	Fountain Valley, CA	\$315.00
22	WDF, Inc.	Mount Vernon, NY	\$290.00*
23	MacDonald-Miller Facility Solutions	Seattle, WA	\$280.00
24	AZCO, Inc.	Appleton, WI	\$270.00*
25	VSC Fire & Security	Ashland, VA	\$270.00*
26	Murphy Co. Mechanical Contractors & Engineers	St. Louis, MO	\$266.40
27	The Hill Group	Chicago, IL	\$260.00*
28	John W. Danforth Group, Inc.	Tonawanda, NY	\$247.00
29	Lee Co.	Franklin, TN	\$237.56
30	Mechanical, Inc. (Helm Group)	Freeport, IL	\$233.86
31	J.C. Cannistraro, LLC	Watertown, MA	\$230.00*
32	KSW Mechanical LLC	Long Island City, NY	\$230.00
33	Hermanson Co. LLP	Kent, WA	\$222.22
34	Therma Corp.	San Jose, CA	\$220.00*
35	E.M. Duggan, Inc.	Canton, MA	\$212.20
36	John E. Green Co.	Highland Park, MI	\$210.00
37	Critchfield Mechanical, Inc.	San Jose, CA	\$200.00*
38	MMC Contractors	Kansas City, MO	\$200.00*
39	Sauer Holdings, Inc.	Pittsburgh, PA	\$185.46
40	Dorvin D. Leis Co., Inc.	Kahului, HI	\$185.24
41	Baker Group	Ankeny, IA	\$180.00*
42	Fire & Life Safety America	Richmond, VA	\$180.00*
43	Ivey Mechanical Co.	Kosciusko, MS	\$178.00
44	P1 Group	Lenexa, KS	\$175.00*
45	Total Facility Solutions, Inc.	Plano, TX	\$175.00*
46	AMPAM Parks Mechanical	Carson, CA	\$172.99
47	Arden Building Co. LLC	Pawtucket, RI	\$167.00
48	HB Global, LLC	Harrisburg, PA	\$163.46
49	BCH Mechanical LLC	Largo, FL	\$160.00*
50	MTech Mechanical	Westminster, CO	\$146.50

Rank	Company	Location	Revenue (millions)
51	GEM Inc., a member of the Rudolph Libbe Group	Walbridge, OH	\$145.15
52	Shapiro & Duncan Mechanical Contractors	Rockville, MD	\$140.00*
53	Worth & Company, Inc.	Pipersville, PA	\$140.00
54	Villara Corp.	McClellan, CA	\$135.30
55	Herman Goldner Co., Inc.	Philadelphia, PA	\$131.50
56	Atlantic Constructors, Inc.	Richmond, VA	\$130.00*
57	Thomas G. Gallagher, Inc.	Cambridge, MA	\$129.20
58	Grunau Co., Inc.	Oak Creek, WI	\$126.00
59	Southern Air, Inc.	Lynchburg, VA	\$125.00*
60	University Mechanical Contractors, Inc.	Mulkiteo, WA	\$120.80
61	Century Fire Protection LLC	Duluth, GA	\$120.00*
62	Letsos Co.	Houston, TX	\$118.13
63	Harry Grodsky & Co., Inc.	Springfield, MA	\$117.37
64	Entech Sales & Service, Inc.	Dallas, TX	\$116.40
65	Icon Mechanical Construction & Engineering LLC	Granite City, IL	\$110.00*
66	Polk Mechanical Corp.	Grand Prairie, TX	\$110.00*
67	R.T. Moore Co., Inc.	Indianapolis, IN	\$105.10
68	Pueblo Mechanical & Controls, LLC	Phoenix, AZ	\$104.17
69	Hussung Mechanical Contractors, Inc.	Louisville, KY	\$99.79
70	Wayne Automatic Fire Sprinklers, Inc.	Ocee, FL	\$95.00*
71	W.G. Tomko, Inc.	Finleyville, PA	\$94.50
72	DE-CAL, Inc.	Warren, MI	\$92.34
73	J.M. Brennan, Inc.	Milwaukee, WI	\$91.32
74	RANDALL Mechanical, Inc.	Apopka, FL	\$90.50
75	Charter Mechanical Contractors, Inc.	Portland, OR	\$90.00*
76	Hiller Plumbing, Heating, Cooling & Electrical	Nashville, TN	\$86.88
77	Dave Jones, Inc.	Madison, WI	\$85.53
78	McCarl's LLC	Beaver Falls, PA	\$84.23
79	Goyette Mechanical	Flint, MI	\$80.83
80	Charles E. Jarrell Contracting Co., Inc.	Earth City, MO	\$80.00*
81	Kimbel Mechanical Systems, Inc.	Fayetteville, AR	\$80.00*
82	Dunbar Mechanical, Inc. (acquired by Limbach)	Toledo, OH	\$78.44
83	Corval Group, Inc.	St. Paul, MN	\$75.80
84	Fresh Meadow Mechanical Corp.	Fresh Meadows, NY	\$75.00*
85	Modern Companies, Inc.	Cedar Rapids, IA	\$75.00*
86	Wayne Crouse, Inc.	Pittsburgh, PA	\$75.00
87	EGAN Companies, Inc.	Brooklyn Park, MN	\$70.00
88	Heating & Plumbing Engineers, Inc.	Colorado Springs, CO	\$70.00*
89	W.J. O'Neil Co.	Livonia, MI	\$70.00*
90	Integrated Facility Services (IFS)	St. Louis, MO	\$67.23
91	HACI Mechanical Contractors, Inc.	Phoenix, AZ	\$65.30
92	IMCOR - Interstate Mechanical Corp.	Phoenix, AZ	\$61.22
93	Isaac Heating & Air Conditioning, Inc.	Rochester, NY	\$60.39
94	Bel-Aire Mechanical, Inc.	Phoenix, AZ	\$60.00*
95	Corrigan Co.	St. Louis, MO	\$60.00*
96	Frank M. Booth, Inc.	Marysville, CA	\$55.00*
97	Western Allied Corp.	Santa Fe Springs, CA	\$55.00*
98	R.W. Warner, Inc.	Frederick, MD	\$50.00*
99	Cullum Mechanical Construction, Inc.	North Charleston, SC	\$47.87
100	Tempo, Inc.	Portland, OR	\$42.00

*Editor's Estimates

Photo: ACCO



Photo: E. M. Duggan

ported more than \$23.30B in revenue, with some hitting record revenues, record profits, and almost all reporting strong backlogs.

We reached out to three of our Giants to get their individual perspectives on the year gone by, their hopes for the year to come, and how they, as large companies, are staying agile and responsive in the marketplace.

ACCO Engineered Systems, Inc., Glendale, CA. Rank #5

Last year was a record year for ACCO, and the company's second in the billion-dollar range. "We've experienced growth consistently since the west coast climbed back out of the recession," Jeff Marrs, President and CEO of ACCO said. "We work hard to set ambitious yet realistic goals throughout our footprint. For 2018 we anticipated growth of 13 percent and finished the year with actual growth of 23 percent."

One of the constraints on that growth—as it has been for years among all our Giants—is finding enough skilled people to do the work. Retiring Baby Boomers and a tight job market have exacerbated the problem. ACCO has reached out to the unions to aid their recruiting efforts. It has also leveraged

its strength as a large mechanical contractor with a constant, high volume of work. The company has been able to move people from one project to the next and to schedule work far enough in advance to work with the union halls and get the workers they need.

"We've been fortunate enough to maintain growth in our human resources over the past few years," Marrs said. "Over the past two years alone we have hired over 1,000 employees, which represents roughly a quarter of our current workforce. We work with our signatory partners to help wherever we can on recruiting people into the skilled labor trades."

As part of that recruitment effort, ACCO stresses safety as a core component of the company's culture. That emphasis, Marrs said, makes ACCO a company people want to work for.

For ACCO, evolving, adapting, and staying agile are something which its market demands. Recent projects that the company has completed include the Wilshire Grand in LA and Salesforce Tower in San Francisco. ACCO is close to completing work on the Chase Arena in San Francisco.

"Projects throughout the western United States tend to be complex and



Photo: IFS

Contractor's Top 10 Companies By Region

Northeast			
Rank	Company	Location	Revenue (millions)
1	EMCOR Group	Norwalk, CT	\$4,273.00
2	Limbach Holdings, Inc.	Pittsburgh, PA	\$546.50
3	WDF, Inc.	Mount Vernon, NY	\$290.00*
4	John W. Danforth Group, Inc.	Tonawanda, NY	\$247.00
5	KSW Mechanical LLC	Long Island City, NY	\$230.00
6	J.C. Cannistraro, LLC	Watertown, MA	\$230.00*
7	E.M. Duggan, Inc.	Canton, MA	\$212.20
8	Sauer Holdings, Inc.	Pittsburgh, PA	\$185.46
9	Arden Building Co. LLC	Pawtucket, RI	\$167.00
10	HB Global LLC	Harrisburg, PA	\$163.46

Midwest			
Rank	Company	Location	Revenue (millions)
1	APi Group, Inc.	New Brighton, MN	\$3,730.25
2	Conti Corp.	Sterling Heights, MI	\$550.00*
3	U.S. Engineering Co.	Kansas City, MO	\$436.00
4	Harris Companies	St. Paul, MN	\$400.00*
5	J.F. Ahern Co.	Fond du Lac, WI	\$331.45
6	AZCO, Inc.	Appleton, WI	\$270.00*
7	Murphy Co. Mechanical Contractors & Engineers	St. Louis, MO	\$266.40
8	The Hill Group	Chicago, IL	\$260.00*
9	Mechanical, Inc. (Helm Group)	Freeport, IL	\$233.86
10	John E. Green Co.	Highland Park, MI	\$210.00

South			
Rank	Company	Location	Revenue (millions)
1	Comfort Systems USA	Houston, TX	\$2,180.00
2	Team Industrial Services	Sugar Land, TX	\$1,246.93
3	TDIndustries	Dallas, TX	\$631.00
4	The Brandt Companies LLC	Carrollton, TX	\$500.00*
5	Dynamic Systems, Inc.	Austin, TX	\$427.30
6	Kirlin Group	Rockville, MD	\$375.00*
7	VSC Fire & Security	Ashland, VA	\$270.00*
8	Lee Co.	Franklin, TN	\$237.56
9	Fire & Life Safety America	Richmond, VA	\$180.00*
10	Ivey Mechanical Co.	Kosciusko, MS	\$178.00

West			
Rank	Company	Location	Revenue (millions)
1	ACCO Engineered Systems, Inc.	Glendale, CA	\$1,246.00
2	Southland Industries	Garden Grove, CA	\$900.00*
3	McKinstry Co.	Seattle, WA	\$685.00
4	Harder Mechanical Contractors, Inc.	Portland, OR	\$617.00
5	Apollo Mechanical Contractors	Kennewick, WA	\$450.00*
6	RK Mechanical, Inc.	Denver, CO	\$365.53
7	Murray Co. Mechanical Contractors	Rancho Dominguez, CA	\$320.00*
8	Pan-Pacific Mechanical, Inc.	Fountain Valley, CA	\$315.00
9	MacDonald-Miller Facility Solutions	Seattle, WA	\$280.00
10	Hermanson Co. LLP	Kent, WA	\$222.22

* Editor's Estimate

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Revenue Breakdown by Work Type (Top 50)

(Based on companies that supplied a detailed revenue breakdown per work category.)

Rank	Company	Location	Revenue (millions)	HVAC	Piping	Plumbing	Sheet Metal	Refrigeration	Controls/Testing & Balancing	Fire Protection	Waste/Wastewater Treatment	Other
1	APi Group, Inc.	New Brighton, MN	\$3,730.25	\$255.47	\$5.14	\$178.28	\$89.06	\$0.00	\$17.10	\$1,369.05	\$0.00	\$1,816.15
2	Comfort Systems USA	Houston, TX	\$2,180.00	\$1,976.37	\$0.00	\$0.00	\$0.00	\$0.00	\$95.09	\$0.00	\$0.00	\$111.41
3	McKinstry Co.	Seattle, WA	\$685.00	\$322.50	\$65.00	\$92.50	\$92.50	\$37.50	\$37.50	\$37.50	\$0.00	\$0.00
4	TDIndustries	Dallas, TX	\$631.00	\$303.00	\$126.00	\$183.00	\$0.00	\$7.00	\$11.00	\$2.00	\$0.00	\$0.00
5	Harder Mechanical Contractors, Inc.	Portland, OR	\$617.00	\$30.85	\$555.30	\$30.85	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
6	U.S. Engineering Company Holdings	Kansas City, MO	\$436.00	\$52.32	\$226.72	\$95.92	\$47.96	\$4.36	\$4.36	\$0.00	\$4.36	\$0.00
7	Dynamic Systems, Inc.	Austin, TX	\$427.30	\$0.00	\$107.10	\$149.10	\$136.90	\$0.00	\$0.00	\$0.00	\$0.00	\$34.20
8	RK Mechanical, Inc.	Denver, CO	\$365.53	\$70.50	\$101.73	\$120.50	\$31.50	\$0.00	\$0.00	\$0.00	\$0.00	\$41.30
9	J.F. Ahern Co.	Fon du Lac, WI	\$331.45	\$47.60	\$29.75	\$39.56	\$45.12	\$0.00	\$4.48	\$137.36	\$17.03	\$10.55
10	Pan-Pacific Mechanical, Inc.	Fountain Valley, CA	\$315.00	\$69.30	\$24.26	\$245.70	\$38.12	\$3.47	\$3.47	\$0.00	\$0.00	\$0.00
11	MacDonald-Miller Facility Solutions	Seattle, WA	\$280.00	\$280.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
12	Murphy Co. Mechanical Contractors & Engineers	St. Louis, MO	\$266.40	\$58.00	\$110.40	\$30.00	\$49.00	\$16.00	\$3.00	\$0.00	\$0.00	\$0.00
13	John W. Danforth Group, Inc.	Tonawanda, NY	\$247.00	\$32.00	\$116.00	\$25.00	\$70.00	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00
14	Lee Co.	Franklin, TN	\$237.56	\$84.00	\$23.34	\$44.13	\$65.69	\$0.00	\$3.27	\$0.00	\$0.00	\$17.14
15	Mechanical, Inc. (Helm Group)	Freeport, IL	\$233.86	\$0.00	\$202.57	\$10.56	\$15.83	\$0.00	\$3.45	\$0.00	\$1.45	\$0.00
16	KSW Mechanical LLC	Long Island City, NY	\$230.00	\$195.50	\$0.00	\$0.00	\$0.00	\$0.00	\$25.30	\$0.00	\$0.00	\$9.20
17	Hermanson Co. LLP	Kent, WA	\$222.22	\$0.00	\$64.44	\$64.44	\$93.33	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
18	E.M. Duggan, Inc.	Canton, MA	\$212.20	\$115.60	\$0.00	\$81.70	\$0.00	\$0.00	\$0.00	\$14.90	\$0.00	\$0.00
19	John E. Green Co.	Highland Park, MI	\$210.00	\$70.00	\$54.50	\$51.00	\$0.00	\$0.00	\$0.00	\$21.00	\$13.50	\$0.00
20	Sauer Holdings, Inc.	Pittsburgh, PA	\$185.46	\$32.15	\$46.50	\$71.33	\$33.25	\$0.00	\$2.23	\$0.00	\$0.00	\$0.00
21	Dorvin D. Leis Co., Inc.	Kahului, HI	\$185.24	\$40.75	\$55.58	\$59.28	\$3.70	\$9.26	\$1.85	\$14.82	\$0.00	\$0.00
22	Ivey Mechanical Co.	Kosciusko, MS	\$178.00	\$125.00	\$0.00	\$53.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
23	AMPAM Parks Mechanical	Carson, CA	\$172.99	\$0.00	\$0.00	\$172.99	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
24	Arden Building Co. LLC	Pawtucket, RI	\$167.00	\$115.50	\$8.00	\$3.00	\$8.00	\$0.00	\$3.00	\$16.00	\$0.50	\$13.00
25	HB Global, LLC	Harrisburg, PA	\$163.46	\$52.82	\$19.44	\$50.86	\$25.18	\$0.00	\$11.19	\$0.18	\$0.00	\$3.79
26	MTech Mechanical	Westminster, CO	\$146.50	\$20.00	\$35.40	\$49.50	\$41.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
27	GEM Inc., a member of the Rudolph Libbe Group	Walbridge, OH	\$145.15	\$14.51	\$94.35	\$21.77	\$0.00	\$7.26	\$7.26	\$0.00	\$0.00	\$0.00
28	Worth & Company, Inc.	Pipersville, PA	\$140.00	\$84.00	\$0.00	\$37.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.00	\$0.00
29	Herman Goldner Co., Inc.	Philadelphia, PA	\$131.50	\$26.30	\$26.30	\$19.73	\$0.00	\$6.58	\$0.00	\$0.00	\$0.00	\$52.60
30	Thomas G. Gallagher, Inc.	Cambridge, MA	\$129.20	\$92.00	\$0.00	\$26.00	\$0.00	\$0.00	\$0.00	\$11.00	\$0.00	\$0.00
31	Grunau Co., Inc.	Oak Creek, WI	\$126.00	\$31.50	\$12.60	\$12.60	\$12.60	\$2.52	\$2.52	\$50.40	\$1.26	\$0.00
32	University Mechanical Contractors, Inc.	Mulkiteo, WA	\$120.80	\$0.00	\$40.00	\$30.00	\$40.00	\$0.00	\$1.00	\$0.00	\$10.00	\$0.00
33	Letsos Co.	Houston, TX	\$118.13	\$84.14	\$0.00	\$23.69	\$10.30	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
34	Harry Grodsky & Co., Inc.	Springfield, MA	\$117.37	\$70.42	\$11.74	\$35.21	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
35	Entech Sales & Service, Inc.	Dallas, TX	\$116.40	\$50.30	\$0.00	\$3.12	\$0.00	\$0.00	\$47.00	\$0.00	\$0.00	\$16.00
36	R.T. Moore Co., Inc.	Indianapolis, IN	\$105.10	\$15.70	\$0.00	\$89.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
37	Pueblo Mechanical & Controls, LLC	Phoenix, AZ	\$104.17	\$33.87	\$38.79	\$0.49	\$25.86	\$0.27	\$4.89	\$0.00	\$0.00	\$0.00
38	Hussung Mechanical Contractors, Inc.	Louisville, KY	\$99.79	\$45.00	\$10.00	\$40.00	\$0.00	\$0.00	\$4.00	\$0.00	\$1.00	\$0.00
39	W.G. Tomko, Inc.	Finleyville, PA	\$94.50	\$18.90	\$14.18	\$51.98	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$9.45
40	DE-CAL, Inc.	Warren, MI	\$92.34	\$10.00	\$35.00	\$25.00	\$4.30	\$3.50	\$1.00	\$0.00	\$10.80	\$2.74
41	J.M. Brennan, Inc.	Milwaukee, WI	\$91.32	\$76.60	\$0.00	\$14.72	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
42	RANDALL Mechanical, Inc.	Apopka, FL	\$90.50	\$31.00	\$9.00	\$19.10	\$15.00	\$1.00	\$3.00	\$4.00	\$0.00	\$8.40
43	Hiller Plumbing, Heating, Cooling & Electrical	Nashville, TN	\$86.88	\$47.00	\$0.00	\$31.87	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.71
44	Dave Jones, Inc.	Madison, WI	\$85.53	\$32.50	\$0.00	\$40.20	\$0.00	\$0.00	\$0.00	\$7.70	\$0.00	\$5.13
45	McCarl's LLC	Beaver Falls, PA	\$84.23	\$0.00	\$63.17	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$21.06
46	Goyette Mechanical	Flint, MI	\$80.83	\$16.17	\$16.17	\$24.25	\$8.08	\$4.04	\$8.08	\$0.00	\$0.00	\$4.04
47	Dunbar Mechanical, Inc. (acquired by Limbach)	Toledo, OH	\$78.44	\$26.81	\$23.73	\$11.64	\$0.00	\$0.50	\$1.20	\$0.00	\$0.00	\$15.06
48	Corval Group, Inc.	St. Paul, MN	\$75.80	\$0.00	\$55.60	\$0.00	\$0.00	\$20.20	\$0.00	\$0.00	\$0.00	\$0.00
49	Wayne Crouse, Inc.	Pittsburgh, PA	\$75.00	\$30.50	\$15.00	\$4.50	\$0.00	\$1.00	\$0.00	\$0.00	\$25.00	\$0.00
50	EGAN Companies, Inc.	Brooklyn Park, MN	\$70.00	\$15.00	\$20.00	\$21.00	\$4.00	\$0.00	\$8.00	\$2.00	\$0.00	\$0.00

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Photo: E. M. Duggan

often make use of exotic systems,” Marrs explained. “We see it as our responsibility to remain ahead of the curve of what is available with regard to products and technologies and to leverage our deep experience with engineering.”

ACCO has always been a design-build firm, serving its clients from a project’s inception through construction and commissioning—the company has more engineers on staff than some consulting engineering firms do. But now the company’s construction and facility management teams, which had been somewhat siloed in the past, are working closer together than before to deliver service, maintenance and retrofit capabilities to its customers.

On the front lines are the company’s Project Managers, who are given the authority and the responsibility they need to adapt and innovate in the field. “Each PM operates as the face of ACCO Engineered Systems and is the single point of contact for the customer,” Marrs said. “They are completely accountable for the success of the project and the relationship with the customer. We’ve pioneered that approach for the past 85 years.”

E. M. Duggan, Inc., Canton, MA. Rank #35

CONTRACTOR’s 2018 Contractor of the Year had another strong year—which it was expecting. “We do a really good job at budgeting,” Len

Monfredo, Executive Vice President said. “We spend a lot of time with our division heads figuring out our percentages of getting various jobs, and also targeting specific jobs we’d like to have on our backlog... Overall we had a great year.”

Monfredo gives a lot of the credit to the Boston area, which he describes as going through a kind of “micro-explosion” in the real estate market, remaining mostly unaffected by the trade issues that take up so many headlines. He sees a lot of room for growth in the market still, which he hopes will trans-

Contractor’s Top 10 Companies By Type of Work

(Based on companies that supplied a detailed revenue breakdown per work category.)

HVAC Top 10		
Rank	Company	HVAC \$ (millions)
1	Comfort Systems USA	\$1,976.37
2	McKinstry Co.	\$322.50
3	TDIndustries	\$303.00
4	MacDonald-Miller Facility Solutions	\$280.00
5	API Group, Inc.	\$255.47
6	KSW Mechanical LLC	\$195.50
7	Ivey Mechanical Co.	\$125.00
8	E.M. Duggan, Inc.	\$115.60
9	Arden Building Co. LLC	\$115.50
10	Thomas G. Gallagher, Inc.	\$92.00

Plumbing Top 10		
Rank	Company	Plumbing \$ (millions)
1	Pan-Pacific Mechanical, Inc.	\$245.70
2	TDIndustries	\$183.00
3	API Group, Inc.	\$178.28
4	AMPAM Parks Mechanical	\$172.99
5	Dynamic Systems, Inc.	\$149.10
6	RK Mechanical, Inc.	\$120.50
7	U.S. Engineering Co.	\$95.92
8	McKinstry Co.	\$92.50
9	R.T. Moore Co., Inc.	\$89.40
10	E.M. Duggan, Inc.	\$81.70

Piping Top 10		
Rank	Company	Piping \$ (millions)
1	Harder Mechanical Contractors, Inc.	\$555.30
2	U.S. Engineering Company Holdings	\$226.72
3	Mechanical, Inc. (Helm Group)	\$202.57
4	TDIndustries	\$126.00
5	John W. Danforth Group, Inc.	\$116.00
6	Murphy Co. Mechanical Contractors & Engineers	\$110.40
7	Dynamic Systems, Inc.	\$107.10
8	RK Mechanical, Inc.	\$101.73
9	GEM Inc, a member of the Rudolph Libbe Group	\$94.35
10	McKinstry Co.	\$65.00

Sheet Metal Top 10		
Rank	Company	Sheet Metal \$ (millions)
1	Dynamic Systems, Inc.	\$136.90
2	Hermanson Co. LLP	\$93.33
3	McKinstry Co.	\$92.50
4	API Group, Inc.	\$89.06
5	John W. Danforth Group, Inc.	\$70.00
6	Lee Co.	\$65.69
7	Murphy Co. Mechanical Contractors & Engineers	\$49.00
8	U.S. Engineering Company Holdings..	\$47.96
9	J.F. Ahern Co.	\$45.12
10	MTech Mechanical	\$41.60

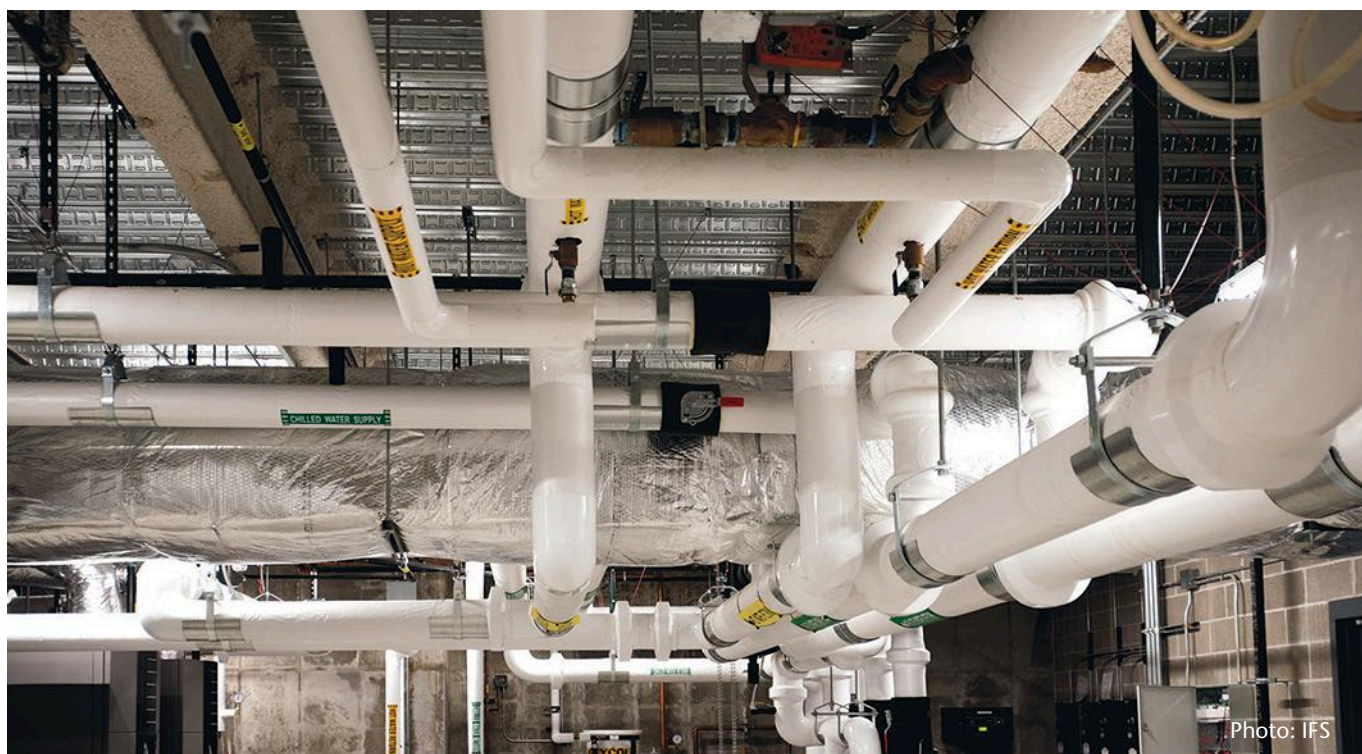


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late into yet another good year to come.

"Revenue-wise we'll probably do more than we did last year," Monfredo said. "We've got some big projects coming out, most of them already on our backlog, so we're confident we're going to be hitting budget, if not a little above budget." Some of those large projects include One Dalton, a residential tower, Winthrop Square, a combined office/condo building, and the latest Wynn Casino.

Monfredo is quick to point out that, to E. M. Duggan, it isn't really about the revenue, it's about the bottom line. "We don't need to be the biggest in the area," he laughs, "we just want to be the most profitable."

Much like ACCO, having a strong backlog allows E. M. Duggan to better schedule its work, and either shift its employees around or ramp up its hiring as the workload surges. The company has an outside super in all three trades—plumbing, HVAC and fire sprinkler—and each one keeps careful track of how the company is using labor. But the company's not-so-secret weapons in boosting workforce efficiency are its prefab shops.

"We have two state-of-the-art prefab shops right in Canton," Monfredo said. "We try to do 90 to 99 percent of the cutting in our prefab shops, which takes out the guesswork." Prefabbing boosts the safety factor, improves the quality of the final product, and, because the shops have consistent crews with steady work, makes highly efficient use of labor.

"We're building some of the things that are going to be out on the site months in advance," Monfredo said. "We're getting it all done, we're storing it in our intelligent warehouse, and then as it's needed it goes out to the men and women in the field."

Monfredo sees two trouble spots when it comes to the E. M. Duggan workforce. The first is in the Service Group, where good HVAC and plumbing technicians are simply hard to come by. Working closely with the local union to bring in new licensees seems to be helping the situation.

The other area is in the company's Coordination Group that does all the computer models and helps manage and schedule the various trades as they work through a project. It is, necessarily, complex, technical, demanding work, but done well delivers fantastic returns on productivity and efficiency.

One solution for E. M. Duggan has been taking people out of the field and teaching them coordination. "Even if they don't stay in the office they at least then have knowledge of how the coordination process happens," Monfredo said. And yes, there was some pushback from people who didn't understand why the company should pay a union worker to do drawings. But Monfredo could see the value.



Photo: ACCO

"At the end of the day we're paying someone that understands the trade... the only thing they don't understand is the computer," he said. "They're working from a different point of view. At the end of the day we feel that a good mix of union and non-union people doing that is healthy."

Supporting the Coordination Group is the company's new Innovation and Technology Group, which has been operating for less than two years. Monfredo calls the establishment of the IT Group one of the smartest moves the company has made because it helps all the departments communicate and operate better.

"That group identifies operational software that we can use for the whole company, initiates it, and then does training for it," he said. The IT Group has a software engineer on staff. The group writes software for Revit, helps do fixes, and is even working on software tools the company is looking to patent and perhaps sell to the wider industry. "Where we used to have people doing all kinds of different things, now we're all on the same page, using the same thing," Monfredo said.

Monfredo sees the investment as vital for the company's future, something which he, as a fifth-generation owner eager to pass the baton to the sixth,

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is keenly aware of. "At the end of the day," he said, "if you're not innovating, if you're not changing, if you're not keeping up with the times to the point where you're setting the trends, you're dying."

Integrated Facility Services (IFS), St. Louis, MO. Rank #90

"Last year was our best from a profitability standpoint," John Rundquist, President, Integrated Facility Services, said. "Also one of our top two years from a revenue standpoint." IFS has a diverse offering that includes mechanical design, installation, 24/7 service, and planned maintenance programs. Unlike many of the Giants, the company started out on the service side and only began bidding large projects as it grew.

"I think [2019] will be another good year," Rundquist said. "So far this year our backlog is very strong and we see a lot of opportunities, so I think we're going to have another very successful year... It's been a good few years for just about everybody in the contracting business."

He also credits the company's location near a large urban center for much of the company's success. The St. Louis area has seen a lot of recent large capital projects, and Rundquist sees even further growth on the hori-

zon.

And also, like many Giants, IFS is having trouble finding and keeping skilled labor, in particular plumbers, pipefitters and sheet metal workers. Rundquist is quick to stress the situation isn't critical, but it could certainly be better.

"We strategically try to acquire people over the winter and early spring," Rundquist said, "because we gear up for a lot of work in the summer months. Perhaps we don't have enough work for some of these gentlemen, but we don't want to let them go."

Much like E. M. Duggan, IFS has done more with prefabrication, having recently converted a truck garage that wasn't getting enough use into a stainless steel pipe fab shop. "That opened up quite a bit of opportunity for us and helped us make better use of the space," Rundquist said.

That type of innovation—creating new capacities, finding new efficiencies—is a vital part of what Rundquist believes keeps IFS successful. Innovation, in fact, is one of the company's core values. "I do think we are on the leading edge of certain services and some technologies we provide to our customers," Rundquist said. "We've built a few initiatives in the past year that I think have really stepped us up." 

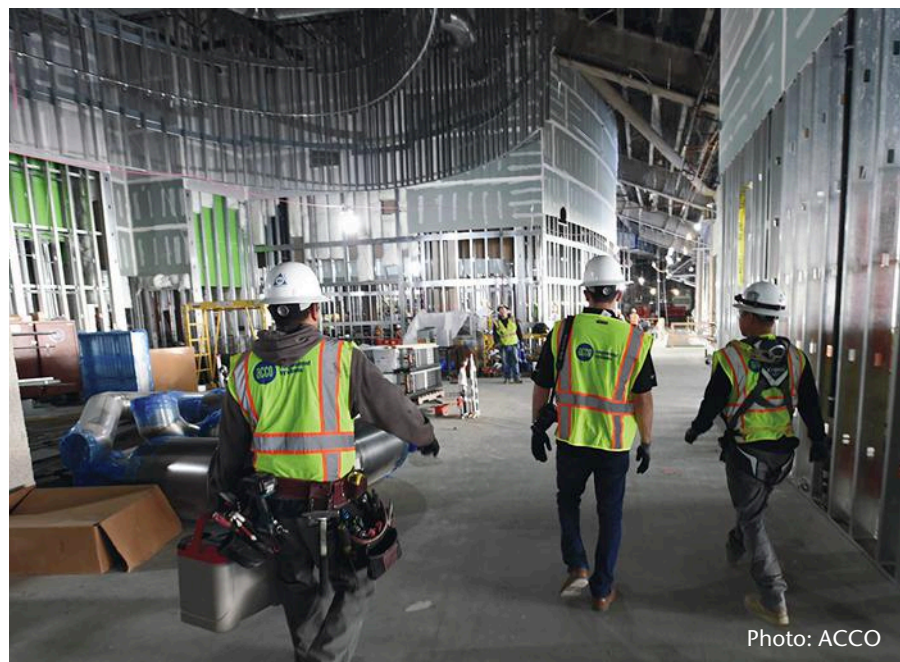


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by Dave Yates
PLUMBING CONTRACTOR



Hot Work

Watching Notre Dame Cathedral in Paris, France, burn was gut wrenching. All indications are the fire was connected to the ongoing renovations. Imagine you were on the crew that had been working that day. When I saw pictures of the attic at Notre Dame (<https://www.cnn.com/style/article/nortre-dame-fire-oak-wood-trnd/index.html>), it struck me just how many similar tinder-dry timber-framed attics of churches, warehouses-turned-apartments, theaters and hotels I've been in over the past five decades to perform work. It also amazes me how many crushed-out cigarette butts are often present. Performing "hot work" in these confined spaces presents clear and present dangers that often cannot be avoided. One thing missing at Notre Dame and all those attic spaces I've visited: a sprinkler system! Hopefully fire suppression will get the attention it deserves during the rebuild and for other structures.

Where do we find the mechanical equipment in these darkened recesses of buildings? In their timber-framed attics, of course. The timber framed attic at a local church is hauntingly similar to what had been Notre Dame's attic construction. That's where their existing eight air handlers are shoehorned in-between the timber framing. Getting into the attic above the sanctuary is no easy feat. You have to go through the Rectory and exit to the second floor "porch", climb over a condenser that serves the rectory, up a set of wooden stairs, traverse a sloped roof,

enter an access door to climb a curved ladder (2x3's fastened to framing that matches the curve of the sanctuary upper wall), then a steep ladder to reach the catwalk that runs the length of the sanctuary where the air handlers are located. That's the ordeal

- Have fire extinguisher(s) present, ensure they are the proper type, and know how to use them.
- Have someone else present to be on fire-watch and that is to be their only job.
- If possible, cover combustibles with a fire-resistant tarp.

• If a confined space, continuous air quality monitoring while following OSHA guidelines using certified personnel.

OSHA defines flammable as ignition

under 100°F while combustible as 100°F to 200°F range. What is Hot Work? Soldering; brazing; cutting (Sawzall, grinder, plasma, or torch); heat gun, pipe thawing, any open flame; or any power tool operation that can generate sparks.

Commercial work sites often have strict oversight regarding hot work. When we were contracted to install the radiant hydronic snowmelt tubing and manifolds at the York Hospital Wellspan helipad, ambulance bays, roadways, bridges, sidewalks, and emergency entrance, we wrestled with ¾" PEX tubing in 6°F outdoor weather. It would have been nice to have a turbo-heater to warm the PEX, but the open flame would have required a fire watch that would have to be manned for hours after work was completed each day.

One of the first jobs I worked on as an apprentice was installing baseboard heating in a centuries old farmhouse. The stone foundation was two feet thick and that meant soldering ¾" copper in the deep recess under the floors atop that foundation. I was soldering a joint on the second floor when the other apprentice came casually up from the basement and waited patiently for me to finish soldering. Then he said: "I think I may have set the house on fire!" Rushing to the basement, smoke was billowing out from one of the deep recesses between floor joists. Fortunately, a bucket of water could quickly be drawn from the well water pump tank and tossed into that void to quickly douse the embers. More water followed and we kept a close eye on that spot for the remainder of the day.

Notre Dame Cathedral will no doubt be rebuilt, but at considerable expense and over many years. If you're doing hot work don't forget to follow those common sense guidelines. Believe me, there's not enough time to run to retrieve a fire extinguisher from your truck before a fire can be beyond being extinguished, or contained, by a single fire extinguisher. **C**

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Most mechanical contractors are not strictly following hot work guidelines.

you have to overcome just to change the air filters! No surprise then, that when we first serviced those eight air handlers, the air filters completely blocked the sun when held up to the sun's rays: more like blankets instead of air filters!

Getting those air handlers up there was, no doubt, an arduous task. Given the fact that you can barely squeeze by each air handler and that the timber-frame forms a constricted upside-down V, changing out any but the very first air handler will pose an incredible challenge – unless a new approach is considered. Looking around at the copper refrigerant lines, there were dozens of braze joints quite close to the tinder-dry beams. The planked cross-walk hovers over deep recessed cavities just waiting for a dropped cigarette, dripping molten braze media, a dropped red-hot fitting, an errant spark, or frayed wiring exposing wires that could arc or short. If you found yourself on the wrong end of a fire on that catwalk, your only way out would be through the plastered ceiling that's 45' above the pews. Geronimo!

Let's be honest here: most mechanical contractors are not strictly following hot work guidelines. Sole proprietors don't have a second set of eyes to be on fire-watch. Be aware that the chemicals available for flushing older R22 oil from copper line sets are very flammable. Don't be fooled by the liquid chemical having evaporated because the vapors are extremely flammable and can result in a flash-fire the instant you light up your oxy/acetylene torch. In Notre Dame's case, those 850-year-old oak timbers had been subjected to centuries of hot-attic drying, which made them exceptionally susceptible for combustion. The first alarm came in after the workers were gone for the day. Following the first alarm and attic check - no fire was detected. A second alarm and attic check, just 25-minutes later, revealed the fire was substantially involved.

I reached out to York City Fire Chief Chad Dear-dorff to ask what guidelines were suggested for hot work and he echoed the guidelines provided by OSHA.

- Identify what potential hazards are present before starting the work.
- If loose combustible materials are near the work area, sweep & clean out as needed.

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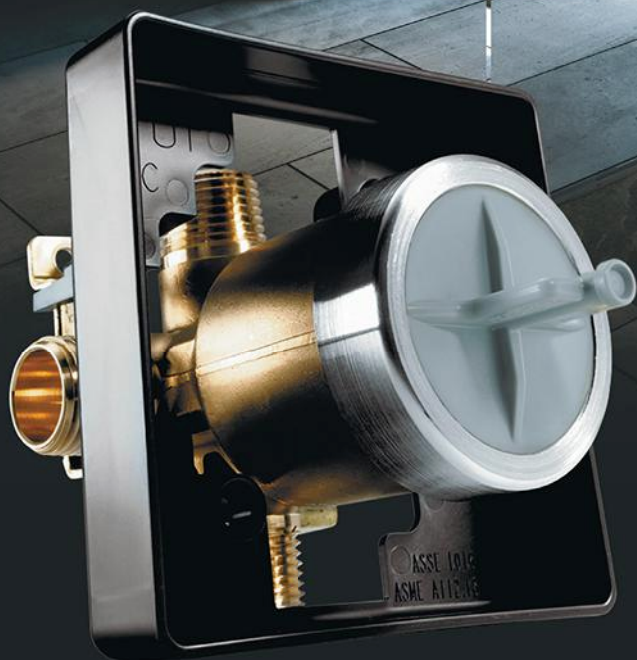
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by Mark Eatherton
RADIANT COMFORT CONTRACTOR



Boiler Replacement Opptys. - Part 3

The next phase of evaluation takes place outside of the boiler room. This is where you get a chance to go out and see what the distribution system looks like. In most cases, the physical plant was engineered, so the chances of having an undersized distribution system are slim to none. If anything, these components are probably oversized in comparison to the real time loads being exerted on the system.

If blueprints are available, it's always a good idea to not only look at the drawings, but also to look at the building to compare what was designed and installed to what exists today. Remember, many systems have gone through changes of one sort or another, and if the drawings show automatic air venting at the tops of the risers, but someone eliminated them for reasons unknown, you will need to adjust your labor factors for the need to eliminate air during the filling and draining of the system, if that becomes necessary.

Remember also that what "was" when the building was built, as it pertains to insulation and window R values has probably changed significantly over the years. I like to do due diligence in looking at all of the R values that are in place and perform a building heat loss based on the building's exterior skin and compare it to the heat emitters that are currently in place. I also check for roof insulation. What was originally installed has probably settled or broken down

and doesn't have the same R value that it had when it was new. Remember, conservation in any form is less expensive than physical plant, and may end up in a decrease in the required driving forces.


Remember, conservation in any form is less expensive than physical plant.

While you are out looking at the upper reaches of the building, you also want to look at the methods of heat emission, be that radiators, fan coil units or natural (baseboard) convectors. I will always do a "worst case scenario" heat loss/heat gain calculation, typically on an outside corner, on the top floor. I check the heat loss against the heat gain to make sure that the worst-case scenarios are covered. If it is not adequate, then it's a good idea to make mention of this to the building owner and then ask them if they've ever had complaints of discomfort due to a lack of heating or cooling in these units. If they answer in the affirmative, then I include the additional cost of the necessary emitters to ensure good comfort.

In my years of experience, I've rarely come across this situation, except where radiation has been removed. Generally speaking, if radiation has been removed, it's an indication of a heating system with little to no controls, and people who are uncomfortable due to too much heat. Again, pay attention to the number of windows you see open during your initial visit and visual observations. It may tell you a lot more about energy waste than management can tell you.

In the course of going through the building, I also like to ask the occupants about any comfort issues that they can relate. Bear in mind that in a subsidized rental operation, most of the occupants do not pay for their energy, and oddly enough, are the first ones to complain if there are any discomfort issues, whether they are related to heating, cooling and/or DHW. Temper the answers that are given with

that notion (free energy = fast complaints) in mind. When you ask this question of the management, they might not answer honestly, due to the possibility of it going against their records.

While you are touring through the living units, look at the methods of temperature control. Not just the thermostats, but also the zone control valves. If the building is of the vintage age where pneumatic controls were employed, I'd strongly recommend that you consider either the use of thermostats with individual zone valves, or preferably the use of thermostatic non-electric control valves. Retrofitting a low voltage transformer, and running wires between the transformer, thermostat and flow control devices is much more expensive than simply placing a non-electric TRV and running a remote capillary tube to the thermostat's location. Numerous TRV manufactures make these devices. I have placed them with the TRV head protruding from the convector (baseboard) cover, as well as placing them on standing cast iron radiators. Regardless of which method of TRV you decide to use, as a part of your Project Management procedures, I strongly recommend that you provide a written copy of the operating instructions for these devices, most of which are written in "Europeanese" and use a "comfort number" instead of a "degree Fahrenheit" setting. Instead of just handing the property management a copy of the instructions that comes with the device, I'd recommend that you put the instructions in your own words and explain the correlation between "comfort numbers" and the Degree Fahrenheit "air temperature" settings that the occupants are used to seeing on their thermostats. 

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Viessmann Recalls Boilers Due to CO Hazard

WARWICK, RI — Viessmann Mfg. Co. announced a recall of its Vitodens 200-W and Vitodens 222-F series boilers used for space or domestic water heating. The boiler heat exchanger back plate can corrode and leak flue gases, allowing the boiler to emit excessive amounts of carbon monoxide, posing a CO poisoning hazard to consumers. No incidents or injuries have been reported at this time.

Consumers with recalled boilers should immediately contact the installer or distributor from whom they purchased the boiler or Viessmann to schedule a free in-home safety inspection and repair. Con-

sumers who continue the use of the boilers while awaiting repair should have a working carbon monoxide alarm installed outside of sleeping areas in the home.

Contact Viessmann at 800-288-0667 from 8:30 a.m. to 5 p.m. ET Monday through Friday, by email at recall@viessmann.com or online at www.viessmann.com and click on "Important Notice" located in the middle of the homepage for more information.

To see model numbers and photos, go to www.cpsc.gov/Recalls/2019/Viessmann-Recalls-Boilers-Due-to-Carbon-Monoxide-Hazard. 



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by Patti Feldman
COMPUTER AUTHORITY



Inventory, Service, and Productivity

Activate Inventory and Business Management Software for QuickBooks (Alterity, Inc. <http://bit.ly/2J7uHTW>, 817/870-1311, available based in the cloud or on premise), tracks inventory locations and levels and product availability, along with various service management tools. The software allows an unlimited number of product entries.

The system, which uses barcoding, can locate and trace all stock in any location(s), monitor levels including keeping track of established min/max quantities, and issue an alert when stock is low. The solution can suggest re-order quantities and automate purchase orders. Pre-committed inventory can be labeled (e.g. customer, specific work order).

Service management tools include drag and drop scheduling of service orders, at-a-glance calendar views of activities for any specific day, and the tracking and billing of time and materials used for services. Users can communicate with service techs through text messages, pagers, or email.

The solution also has pricing tools that enable flexible options to accommodate promotions, customer specific discounts, and custom tier pricing that adjusts margin levels per demographic or other parameter.

Users can create purchase orders manually or using a Reorder wizard, a Special Order wizard, or a Drop Ship wizard, and can set customer service alerts for overdue or priority service.

It is possible to track purchase order status (entered, request for quote, pending approval, issued), initiate a P/O invoice directly from a P/O with one click and a receipt from a P/O, also with a single click. Users also have quick access to detailed customer histories, including historical records of service requests and billable and non-billable hours.

The onboarding process takes a total of about twelve weeks from initial interview with an Activate specialist to going live with the system. The one-time purchase price is dependent on the base system, additional features, and the number of user licenses (three

or more).

3C Connect service management software for small to medium size res-

Using the mobile app, technicians in the field can see if the customer for an upcoming appointment has a maintenance plan and, if so, the bill would reflect the customer-specific pricing. is with a customer with an existing maintenance plan.

The website portion of the program enables users to create service agreements with pricing and schedule fol-

type (residential or commercial), time periods, technicians, referral sources, leads, call backs, proactive repairs, and other parameters a contractor may want to report. Reports are delineated by a color graph, actual number, and percentage.

The solution includes a library of over 70 training videos for indoor and outdoor units showing techs how to troubleshoot and test and what the sequence of operations is for the different types of HVAC units.

The software, which syncs with Quickbooks, carries a one-time set-up fee and a monthly fee based on the number of users. A portion of the fee is automatically added to each customer invoice for service repairs, essentially reimbursing the contractor.

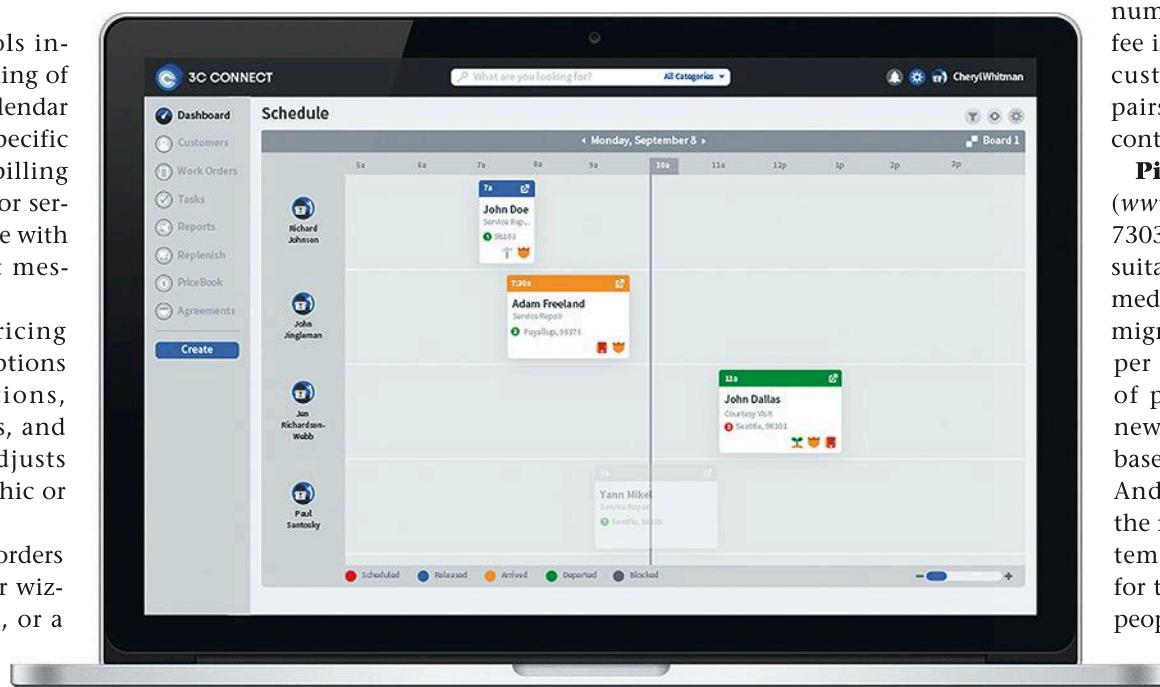
PipelineDeals CRM software (www.pipeline-deals.com 866/702-7303) is sales productivity software suitable for sales reps at small and medium-sized contractors ready to migrate away from pencil and paper or spreadsheets to keep track of prospects and estimates for new work. The solution, which is based in the cloud and has native Android and iOS apps for use in the field, has 92 pre-formatted system fields in which to enter data for tracking deals, companies, and people through the sales process.

The software is highly customizable with unlimited custom fields that can

be added by the user. You can keep notes on each deal and prospective deal and the data is accessible as calendar views and list views. A "morning coffee" report is generated each day that highlights the current pipeline and details your company's successes from the previous day and the numbers you need to know to move the needle. Pricing for the software, which comes with U.S. based phone support, is per salesperson per month or annually. A free 14-day trial available. **C**

Patti Feldman writes articles and web content for trade magazines and manufacturers of building products. She can be reached at productpad@yahoo.com.

The onboarding process takes a total of about twelve weeks.



The 3C Connect scheduling screen.

idential and commercial contractors (www.3connect.com, 888/518-7025) consists of three core modules: scheduling/technician dispatch, invoicing, and parts supply for inventory management.

The scheduling module centers on a color-coded dashboard that shows the status of the appointments for each technician, identified by a distinctly colored icon, delineated down to each hour of the work day, with the location and specified job, tasks, or customer agreement status and call notes included in that block. For emergency repairs, dispatchers can select the best technician based on proximity and job status.

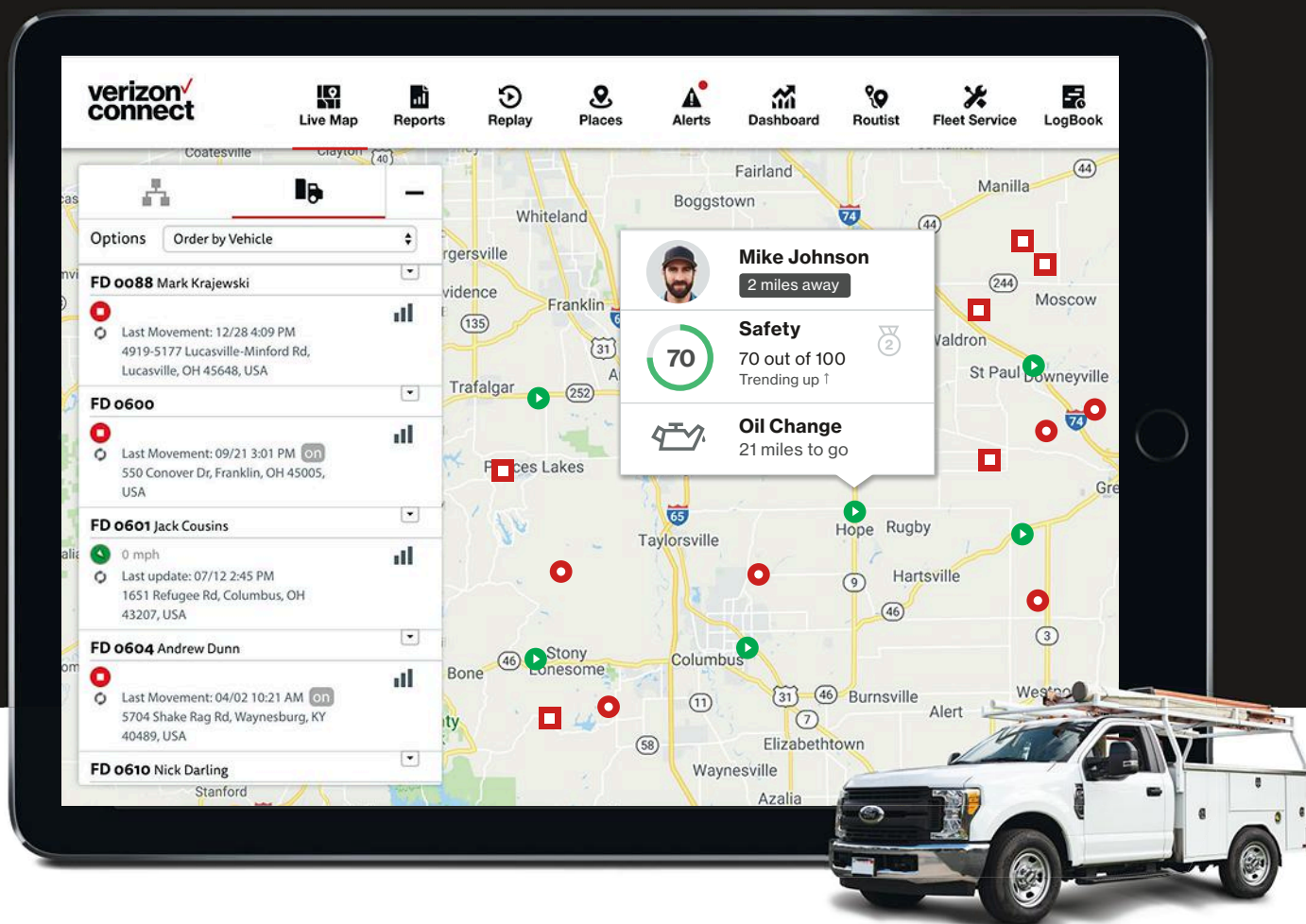
low-up tasks automatically. A built-in pricing book features customized algorithms based on unit pricing, distributor pricing, technician commissions, and other factors. You can customize the flat rate system, including pricing of non-stock parts and repairs performed in the field.

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by Matt Michel
MARKETING AUTHORITY



The Living in Place Opportunity

One of the greatest opportunities facing plumbing contractors today is retrofitting baths for people to live in place in their homes. Here is what you should know.

The Baby Boomers Will Spur Greater Demand

In 2010, 13% of the U.S. population was age 65 or over, according to the Census Bureau. By 2030, the percentage of Americans 65 and older will jump to 20%. This is a massive increase, spurred by aging baby boomers (born 1945 to 1964). Demand of senior friendly housing is going to shoot up.

The Cost of Assisted Living is Significant

In their 2018 Cost of Care Survey, long term insurance provider Genworth found that the average cost of an assisted living facility was \$48,000. By 2030, it is projected to reach \$68,437. While living at home is not free, it is not nearly as expensive as assisted living even when some outside help is required. This means there is a lot of room for remodeling if it means moving to an assisted living facility can be delayed for a few years.

Seniors Prefer to Stay in Their Homes

Research by the American Association of Retired Persons found that nine out of ten seniors prefer to live in their own homes. Not only is staying in their own homes financially better, it is what people want.

Falls are the Biggest Risk

The Centers for Disease Control reported that senior deaths from falls increased 31% from 2007 to 2016. According to the University of Wisconsin – Oshkosh, “It is estimated that 30% to 40% of community-dwelling elders aged 65 years and older fall each year. However, no specific data is available to confirm the number of unreported falls. Falls are the most common cause of injuries and hospital admissions for

trauma in older adults (Lueckenotte & Conley, 2009).”

Plumbers Can Help

There are a number of things plumbers can do to help seniors live in place. One of the easiest is apply-

ing non slip shower and bath floor stickers to prevent falls. They are inexpensive enough to be used as a promotional item to open discussions about living in place.

Grab bars are the next easiest item. However, few people want industrial looking grab bars in their homes. Find attractive ones that come in different finishes and colors. They can replace towel bars, which can be dangerous because seniors might grab them for support and pull them out of the wall. Not only are people more likely to accept attractive grab bars, they can command higher prices and better margins.

Fold down toilet grab bars are another item to add to your living in place product portfolio. Along with fold down toilet grab bars, tall toilets or toilet risers can make it easier for seniors to stand after using the bathroom.

Seniors can have a hard time turning faucet handles. Offer to change out the faucets and handles for a lever handled faucet. Consider faucets with forward mounted handles that are easier for someone to use who is wheelchair bound. Touchless faucets are another option.

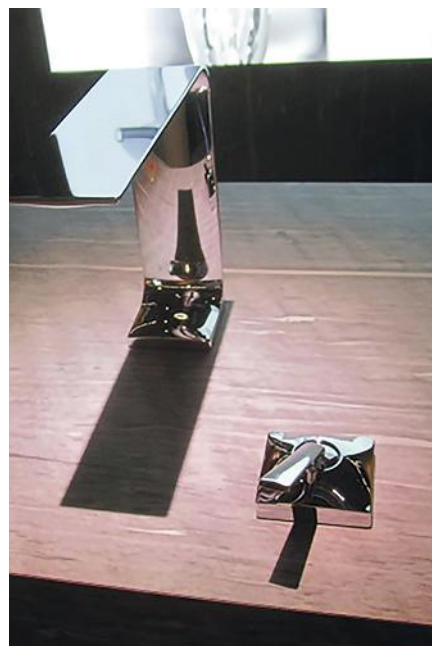
Because scalding risk increases for seniors, offer pressure balanced thermostatic mixing valves. The best solution is one located at the water heater to provide whole house protection. Another option is to install them at every faucet or shower.

When a senior is wheelchair bound, wheelchair compatible sinks should be discussed. These sinks are wall

mounted so a wheelchair can slip under them.

Walk-in tubs get a lot of attention, but most are not attractive. Yet, some are. Find attractive ones and discuss additional work to increase the flow and drain rates. Recommend tubs

Begin talking with home health care providers about your living in place offering. It is in their interest to keep seniors in their homes as long as it is safe.



Lever-handle faucets with forward-mounted handles are easy to operate from a wheelchair.

with heated seats to prevent chilling while the tub is draining.

Steps to Take

To develop your living in place program, the first challenge is to source the products. Challenge your suppliers to help but do not be afraid to search online. Some of the most attractive and function living in place products come from Europe so a manufacturer with a European presence is more likely to offer the products you seek. Offering them will differentiate you from competitors.

Assemble manufacturer photographs into a catalog. Once you



ADA-compliant sinks are an ideal retrofit opportunity.

begin providing your own installations, you can use photographs of your own work.

Work up pricing for each product. Some items, like grab bars, can be paid out of pocket. For others are for a larger retrofit, you might need to arrange third party financing. There are lots of companies that specialize in this.

Begin talking with home health care providers about your living in place offering. It is in their interest to keep seniors in their homes as long as it is safe. Still, consider spiffing them for leads.

Prepare a living in place section of your website. Publish information about it on social media. Start mailing and emailing information to your customers. **C**

For more information on how to grow your plumbing business affordably, join the Service Roundtable. For \$50 a month you gain access to the Service Roundtable's vast library of downloadable sales, marketing, and business operations tools. You can also access the Plumbers Roundtable for peer support and you get a free membership in Roundtable Rewards, the trade's largest contractor buying group. Learn more at ServiceRoundtable.com or call 877/262-3341.

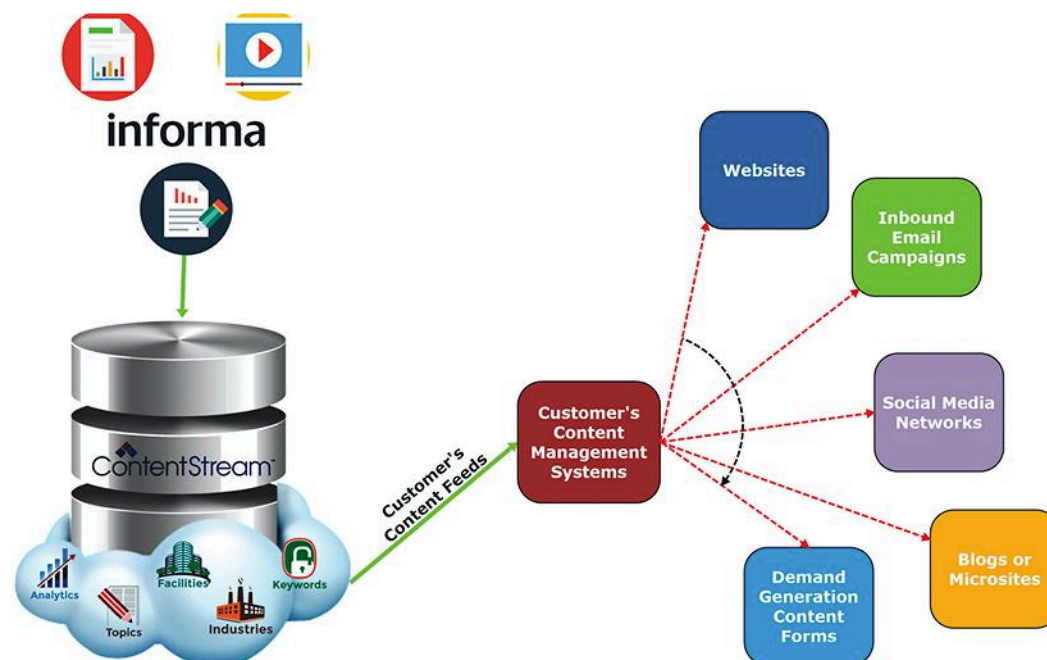


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by Mike Agugliaro
FOUNDER, CEO WARRIOR



How To Win Big This Summer

The summer time is usually a busy time for contractors: the weather is nice, people have emerged from winter hibernation and are thinking about improving their home and spending more time entertaining friends in a beautiful backyard.

This can mean a busy time for a contracting business like yours. For some businesses, it's the best time of year as you get swamped with calls and enjoy being fully booked. Perhaps you're making more money than you do the rest of the year.

But most business owners will miss something. They'll think they are getting the most they can out of the busy summer months but what they won't realize is this: there are opportunities to squeeze the lemon and enjoy an even more prosperous summer!

- More work, for longer throughout the summer months
- More profitable when you sell any service
- More work for the rest of the year
- ... And all without adding to your stress and overwhelm

Yes, it's entirely possible to have an even better summer! Here's how...

#1. Rally Your Troops

Everyone knows this is coming up to the busy time for your business. But that doesn't mean you should let your team just do what they've always done. Instead, rally them. Hold an all-company meeting and get them excited about the coming months.

Why excited? Because there's a chance that some of your team is dreading the busyness. Or maybe they don't like the heat. Or maybe they feel overwhelmed at this time. So, get them excited and let them know that you

value their hard work and you'll support them as they work harder than ever.

As a leader, it's your job to lead your team. That doesn't necessarily mean

that you have to get back into the truck to do it, but it does mean that you need to step up in front of them and show them that the busy summer months are nothing to dread.

#2. Learn To Sell 1+1

When your team is working with customers, and selling your services to them, you can easily add more income to your business by using the 1+1 selling system: whenever a customer buys one thing, offer them one other related thing.

- HVAC duct cleaning customer may also want filters
- A new water heater customer may also want a water filtration system
- A whole home generator customer may also want GFIC receptacles

Train your team to always offer one other thing. Yes, your summer is already busy but this sale occurs with an existing customer, which means you're not selling two things to two customers; you're selling two things to one customer—so you're making the same number of sales as with two customers but you're saving the legwork of marketing, traveling to the second customer's house, etc. This is a simple way to add profit to your business.

#3. Pre-sell Your Slow Season

If the summer is your busy season, that means you probably have a slow season too, right? Maybe the fall? Maybe the spring? Identify when the

slow season is for your business and pre-sell appointments for customers to that season.

For example, if you're at a customer's home for one project in the early summer but you offer another service, product, or project, offer a discount if the customer pays and schedules now to receive it in October or November.

You'll make more money now but you also get the advantage of leveraging your busy season now to turn a slow season later into a busier season!

#4. Pay Attention to What's Broken

Do you hit your head against the wall because it feels like you face the same problems summer after summer? Maybe your employees do the same dumb thing over and over. Or maybe there's always a shortage of something critical. Or maybe the heat of summer creates a lot more truck breakdowns.

Whatever the case may be, write it down on a "summer problems list." Write down anything that is a hassle this year, and especially if it's been a hassle in previous years.

Then, at the end of summer, look at that list and use it as a problem-solving list for the fall, winter, and spring.

Build systems, invest in training and equipment, and fix whatever is causing those problems. You'll discover next summer that you'll have eliminated many of the stop-you-in-your-tracks problems that held you back this summer.

It won't make THIS summer better but it's the first step to making every other summer better than ever.

#5. Ask For Referrals

How often does your team ask for referrals? Although people may think they "ask everyone," they often only ever ask one out of ten... or worse.


Train your team to ask for referrals every single time, even whether or not you win the job. (Yes, even prospects who don't hire you can refer people to you!)

Get referrals and contact them to do work for them. Again, schedule them into your slower seasons if you can. Referrals are a simple way to get more customers who are already very warm (not a lot of selling required!) and who are likely to buy from you.

Since you're talking to more customers than ever this season, it's the perfect time to get into the habit of asking for referrals.

Summary

Most contractors are looking forward to the summer because it's a busy season and there's the high likelihood that you can make a lot of money.

But what if you could make more? Use these five strategies that I shared with you here to squeeze the lemon and make this great summer even better than ever. 


Mike Agugliaro is a Business Warrior on a mission to change the lives and businesses of service business owners. Mike and his business partner started and grew a struggling home service company into a multi-million dollar empire before selling the company in 2017. Today Mike is an author, speaker, and mentor; and he's the co-founder of CEO Warrior, a high level coaching and training organization for home service businesses. Learn more about Mike and CEO Warrior at www.CEOWARRIOR.com.

Pentair Adds Rewards to Popular Partner Program

BROOKFIELD, WI – Pentair®, a leading global water treatment company, has added even more incentives for water treatment professionals to participate in its popular Partner Program. All dealers in the United States and Canada who register for the Pentair Partner Program are now eligible to earn reward points throughout 2019.

To accumulate points, Partner Program dealers simply download the custom Scan & Service app and scan eligible Pentair products. Reward points earned during 2019 can be redeemed for pre-paid debit cards, gift cards and a broad array of merchandise, including electronics, tools, home goods and brand name products.

The Pentair Partner Program was launched in 2017 for professionals looking to increase their revenue and customer portfolio. All three tiers of the program – Bronze, Silver and True Blue – receive special marketing, sales, training and support resources.

To enroll, visit www.pentairpartners.com. 

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by Michael A. Capasso
FOUNDING OWNER AND PRESIDENT OF C.A.C. INDUSTRIES, INC.



3 Steps to Unifying the Moving Parts of a Large Company

As the owner of CAC Industries, a large public works contracting company in New York City, I used to coordinate a lot of moving parts on a daily basis – both literally, ensuring we have people at all of our myriad job sites performing work up to our high standards, and figuratively, handling the operations for a large business and coordinating our work on roads, sewers, water mains, gas lines and more. While our company has continued to grow immensely over the years, I felt it was time to incorporate more structure and efficiency in how we work. In addition, we had an influx of new employees, and our long-standing culture just wasn't sinking in with them.

That's when we turned to Petra Coach, a business consulting firm that I met at entrepreneur and author Verne Harnish's CEO Boot Camp. We wanted to bring in a business coach not only to oversee this process of learning and growing, but more importantly, to make sure it was done correctly, in a timely manner and in a way that was best for our company.

With Petra's help, our management team implemented the Rockefeller Habits, the legendary strategies John D. Rockefeller used to grow his empire. They ensure that the team is aligned and that all members are held accountable for meeting organizational goals – which can make a large company like ours function much more efficiently.

We began implementing these "habits" in the last year, and we're already noticing how much tighter our operations have become with only a few changes:

1. Effectively communicating core values and core purpose

Our company had been in business for 25 years before we brought Petra Coach and the Rockefeller Habits into the mix. We already had

a great family feel within the company, but as the business grew, it became harder to keep that intimate, caring culture, especially as new generations of workers joined the team. We needed to define and articulate our values.

Prior to starting the coaching process, we developed 27 of what we call "Fundamentals," or the basic rules by which we live and work. They

detail the CAC Industries Way with points such as, "Think Safe, Work Safe," "Use Data to Make Decisions," "Act Like It's Your Own" and "Be Relentless About Improvement." Now, every employee has those values on cards that they carry around at all times as a constant reminder of their commitment to carrying those out.

We also defined our core purpose – our motivation for doing what we do – and four core values – the foundational principles our company is built on. Once they were outlined, we had a "Rollout" event, where – over food, drinks and camaraderie – we revealed them to everyone in the company.

The event allowed us to celebrate our core purpose and core values and make them something exciting for everyone to be a part of – but it didn't stop there.

We want to make sure we're living them out every day. We now have these five phrases printed on every single safety vest as a way of driving positive accountability. It serves as a constant reminder to the team – and makes it public to anyone passing our workers on the street – who we are, how we work and what we stand for.

2. Holding myself and others accountable

I'll be honest, it was not easy to take responsibility for the issues we were having. It isn't for most leaders who are deeply and emotionally invested in what they do because it means admitting you've made mistakes and opening yourself to scrutiny. But it was a necessary step to begin this process of change.

To get a baseline of how we felt we were performing, we started by doing a talent assessment with the executive team in which each team member "graded" one another on his or her performance. It was an opportunity to be very frank with each other about what's working and what's not – myself included.

Once those concerns were voiced, each team member came away with an action plan to make those changes, Key Performance Indicators (KPIs) to measure when that goal has been reached and an accountability partner to make sure each person stays on the right track.

We plan to start doing these kind of assessments, and developing action plans, with all employees later this year, as it's so important to get them in the habit of sharing their goals with others and understanding how their work affects both themselves and others – all of which is the basis for accountability.

3. Ensuring everyone in the company is aligned and meeting goals

If I've learned anything, it's that it's very hard to steer a ship if nobody knows where we're going. It takes the

whole crew pitching in to move in the right direction. So, it became crucial to get everyone on the same page.

Part of the issue, I realized, was that I knew exactly what I wanted the company to accomplish, but having everything in my head was not helping anyone else understand. Once I started sharing my vision with the leadership team, and we turned them into specific goals, they were able to share those with others, which allowed everything to fall into line.

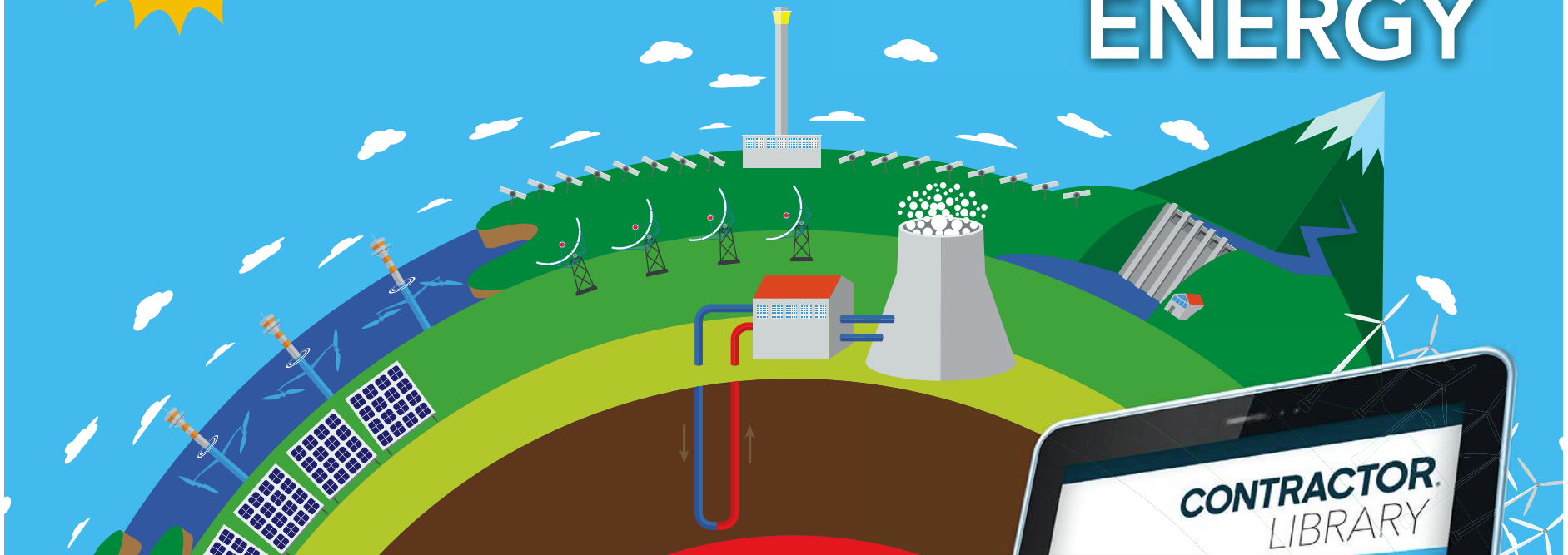
And we don't just share those goals by word of mouth, we make it something tangible that can be measured and tracked. For example, we decided to make cash flow a priority, so now we track it for each job on a scoreboard that everyone can see. Often it's very motivating to visually understand where we are with that goal and what we need to do to reach it.

As owner, I want to move more outside of the operations and get others to feel comfortable making decisions for themselves and for the company. Now that I'm sharing my perspective with them on a regular basis, I feel more confident that we're all headed in the same direction.

Because of all the work we have done and the engagement that it has brought to our employees, the feel of the team has been much more positive. And we didn't have to make any major overhauls, but we couldn't have done it on our own. It required the outside perspective and guidance from our coach, and some open-mindedness on our part, but now we are seeing the transformation take place in our company. Now, what changes are you going to make? **C**

Michael A. Capasso is the founding owner and President of C.A.C. Industries, Inc. He has over 20 years' experience in the construction industry. Michael is dedicated to the personal growth and success of his employees, and his philosophy is simple: Lead by example, be a courageous risk taker, embrace conflict and show good judgment.

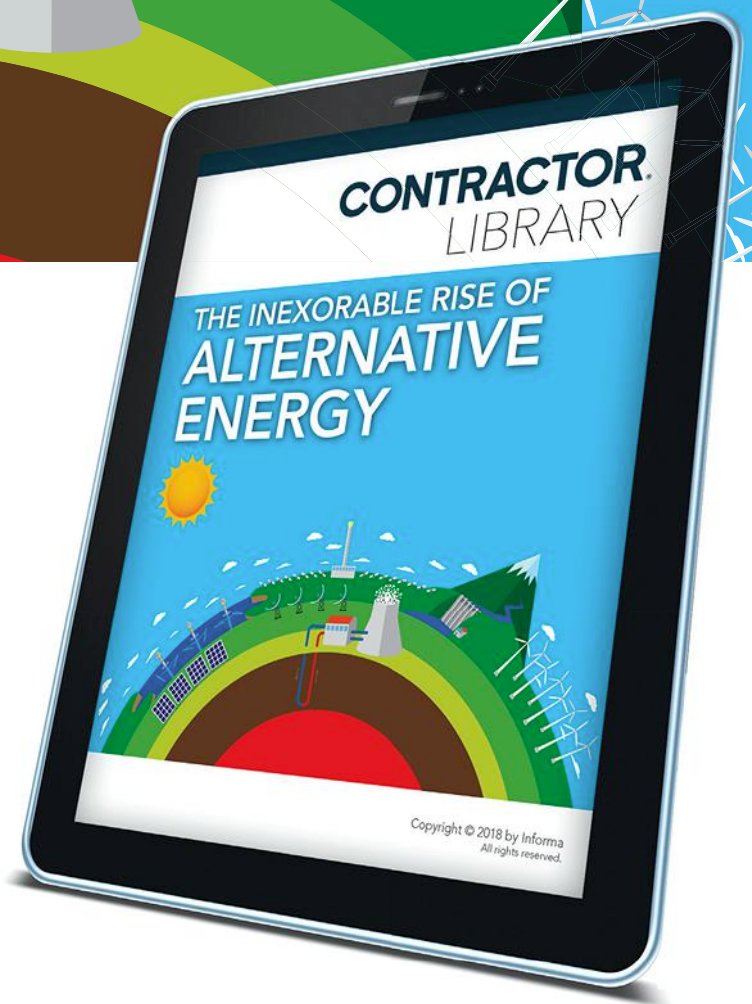
THE INEXORABLE RISE OF ALTERNATIVE ENERGY



It's safe to say the alternative energy market is facing some pretty severe headwinds. Yet, there are indications it is on the rise despite them. After all, solar panels and wind turbines were novelties in 2008, and now they are commonplace. Alternative energy technology – heat pumps, solar panels and the like – is improving while the price of that technology is dropping. Meanwhile demand remains high in certain market and geographic segments (the state of California being a standout).

This eBook is far from a comprehensive guide, but we hope it serves as an illustrative sampling, a signpost for those who would like to go further, and hopefully an inspiration for other contractors looking to add alternative energy systems to their offerings

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by Michael Tobias
FOUNDER AND PRINCIPAL OF NEW YORK ENGINEERS



Air-Source Heat Pumps in Cold Weather

Heat pumps are emerging as an efficient solution for space heating and air conditioning, especially when used in variable refrigerant flow systems. They can match the most efficient air conditioning systems in cooling mode, and can compete with the low cost of combustion heating while using only electricity.

Compared with a conventional resistance heater, a heat pump achieves savings in the range of 40 to 80 percent, depending on the specific model and operating conditions.

While air-source heat pumps exchange heat directly with outdoor air, ground-source heat pumps take advantage of the stable underground temperature to achieve a higher efficiency. Considering the high price and complex installations of a ground-source system, air-source heat pumps are the most common option.

The main limitation of air-source heat pumps is a significant drop in performance when outdoor temperatures reach the freezing range. Design engineers must consider the effect of local weather when specifying a heat pump, and ensure the system is equipped with adequate measures for the lowest temperatures expected.

How Does the Extreme Cold Affect Air-Source Heat Pumps?

The main challenge when using an air-source heat pump with freezing temperatures is controlling ice accumulation on the outdoor coils. Since the unit is removing heat from outdoor air that is already cold, humidity can easily collect and freeze on the surface of its coils.

Although the heat pump defrost cycle can melt ice on the outdoor coils, the unit cannot deliver space heating while the cycle lasts. As outdoor temperatures drop, the heat pump must enter the defrost cycle more frequently to compensate for ice formation, and this limits the heat delivered to indoor spaces.

Since ground-source heat pumps

do not exchange heat with outdoor air, they are relatively unaffected by freezing temperatures. However, they require excavations that can be difficult to perform under existing buildings, especially those in crowded urban areas.

Specifying Air-Source Heat Pumps for Cold Weather

When using air-source heat pumps with freezing temperatures, there are two main ways to compensate for the heating loss during defrost cycles:

- Adding a backup heating system,

a moderate temperature. This minimizes the frequency of the defrost cycle and the operating time of the backup heating system, lowering total energy consumption.

Heat Pumps with Built-In Measures Against Cold Weather

Air-source heat pumps from leading manufacturers are typically rated for outdoor temperatures as low as -4°F. However, when the units are enhanced with cold weather measures, their operating range can extend below -10°F or even -20°F. The


inate the defrost cycle completely, they can reduce its impact on the heating output.

To achieve the best results with an air-source heat pump system, the first recommended step is an assessment of the local weather. This way, an adequate system can be specified from the start; which is simpler and less expensive than upgrading an unsuitable installation.

Complementary Measures to Enhance Heat Pump Efficiency

Having an energy-efficient heat pump system reduces heating and cooling expenses. However, the building itself can also be designed to minimize cooling needs during summer and heating needs during winter. A building envelope with adequate insulation and airtightness minimizes the need for heating and cooling, compared with a building with poor insulation and many air leaks.

Ventilation controls also contribute to heating and cooling efficiency, by adjusting airflow according to the needs of the building. When ventilation systems operate at full airflow all the time, the air volume that must be conditioned is higher. On the other hand, if ventilation is adjusted according to occupancy, the total air volume that must be conditioned is lower.

There is a wide range of heating and cooling configurations that can be deployed in buildings. However, the lowest ownership cost is achieved when the installation is optimized according to the building's needs. 

Michael Tobias is the founder and principal of New York Engineers, an Inc 5000 Fastest Growing Company in America. He leads a team of 30+ mechanical, electrical, plumbing, and fire protection engineers from the company headquarters in New York City; and has led over 1,000 projects in New York, New Jersey, Pennsylvania, Connecticut, Florida, Maryland and California, as well as Singapore and Malaysia.

The first recommended step is an assessment of the local weather. This way, an adequate system can be specified from the start; which is simpler and less expensive than upgrading.

typically a gas burner or electric resistance heater.

- Specifying a heat pump with built-in measures against frost accumulation.

Backup heating systems for air-source heat pumps are a simple solution, but they tend to increase the system ownership cost. The design considerations change depending on the type of backup heating specified:

- An electric resistance heater runs with the same energy source as the heat pump. However, it draws more current for a given heating load, requiring an increased wiring capacity. The overall system efficiency also drops, since resistance heating is much less efficient than heat pump operation.
- A gas burner achieves a much lower operating cost than a resistance heater. However, it requires a gas supply and an exhaust system, driving up the cost of the installation.

When a heat pump system uses backup heating, a recommended practice is setting the thermostat at

following are some common design features used by heat pump manufacturers to mitigate the impact of the defrost cycle:

- Some manufacturers include heat accumulators, which can continue delivering heat when the heat pump enters the defrost cycle.
- There are also heat pump configurations where one of the hot refrigerant lines circulates through the outdoor unit to help prevent freezing. The defrost cycle only activates when this heating effect is not enough.
- When a heat pump system uses multiple outdoor units, they can be programmed to enter the defrost cycle in a sequence and not simultaneously. This way, the system never loses its full heating capacity due to defrosting.
- Outdoor units can also be equipped with housings that protect the unit from direct snowfall. This way, the unit must only deal with the ice that forms directly on the coils.

While these measures do not elim-

by Brent Meyers
VICE PRESIDENT OF NATIONAL SALES FOR NVOICEPAY



Why Your Contracting Company Needs a Payments Strategy

I've written about the importance of a vendor payments strategy for companies in today's business climate. But the reality is it's twice as imperative for construction companies to implement this process because the industry's payment challenges are bigger – and so is the opportunity. Payments are at the center of two critical areas of the construction business—vendor relationships and job progress. So getting strategic about how you pay can make a big impact.

What exactly is a payments strategy? In the check-centered world of the past, it meant managing float, capturing early-pay discounts, and/or shifting some payments to credit card in order to get rebates. Today it means using intelligent payments automation to get the most leverage from every payment you make.

Beyond replacing checks

It starts with eliminating paper checks—but it doesn't end there. You have to think strategically about how you're going to replace them.

First, you want to encourage as many vendors as possible to take virtual card payments. Designed specifically for AP, virtual cards offer the convenience and rebates of credit cards along with an extra level of security.

You can sign up any vendors that won't accept a credit card for ACH payments. After that, only holdouts that absolutely won't take any form of electronic payment should get a paper check.

Sounds easy, right? It's not, for two reasons—workflow and vendor enablement.

Workflow changes can mean extra work

For years, businesses have tried to eliminate paper checks, with only moderate success. Simply adding a card product or bank-provided ACH hasn't gotten them across the finish line because those solutions only

move money electronically. They don't help reduce the necessary front-end work to get to the point of payment. Ironically, introducing payment types like card and ACH solutions on their own can actually add more workflows and complexity to the process.

That's one reason construction companies are still mostly check-based. They're already managing lien releases, progress payments and job-cost accounting on top of the usual AP process. Adding more work-

ment complexity as construction.

At the same time, construction also faces low profit margins and scarce IT resources, and sees fit to spend most technology investment on field operations. Further, with many construction companies run by founding families, the tradition of the owner signing every check dies hard.

Not just for consumers

Here's the good news: just as they did with consumer payments, tech-

Many companies are often slow to adopt electronic payments because they're unaware of new automation solutions.

flows for electronic payments is the last thing they need.

The vendor enablement challenge

The other factor that's kept businesses from going electronic is the task of vendor enablement. All you need to pay any vendor by check is their name and address. But electronic payments require you to know who will accept a card or ACH—and getting that information is a lot of work.

Besides that, in order to pay vendors who agree to accept ACH, you need to collect, securely store and maintain their banking information. Most AP departments don't have the resources to add comprehensive, on-going vendor enablement and data security to their workload.

Construction companies face even bigger vendor-enablement challenges. Every job is almost like a mini-company, with different owners and different business entities, localized vendors, and an everchanging roster of local and specialty subcontractors. I've sold AP solutions for over a decade, and I've never seen an industry with as much pay-

nology companies have stepped up to go beyond moving money electronically. Automated payment solutions enable you to make every type of payment from a single interface. There's just one workflow—deciding which invoices to pay and clicking the “pay” button.

You don't even have to know how a vendor wants to get paid. Solution providers now use cloud-based networks to handle vendor enablement and information management at scale—and a lot of your vendors are probably already part of their networks. Plus, the cloud lets providers integrate their solutions into your ERP or accounting system with just a few hours of IT time. These new fintech systems can help most businesses reach 80 percent or more electronic payments. It's a project that pays for itself quickly and frees up AP time for other initiatives.

Early electronic-payment adopters in construction have found that being able to pay vendors on time consistently with full remittance data helps them attract top subcontractors to bid on their jobs. They can also enable field supervisors to approve payments in the cloud while

on their jobsites, which saves tons of time and really helps keep jobs moving.

Positioning for the future

Although construction lags other industries in adopting technology in general, it's not far behind in terms of payment automation. Many companies are often slow to adopt electronic payments because they're simply unaware of new automation solutions.

For years, bank and card products have been the only game in town, even though they haven't solved for all the complexity surrounding payments. Things have changed, and there's a lot coming down the pike, including innovations in accounts receivable, trade finance and dynamic discounting.

As payments become automated in the cloud, companies are gaining enough visibility and speed in invoicing and payments to leverage these advanced programs. Even if you're still heavy into checks, you're not a long way from being able to capitalize on new technology solutions.

So it's time to start thinking strategically about payments—not just as paying bills or shifting from paper to electronic. Think about payments as an area where you can leverage technology to increase value and get out on the leading edge of back-office innovation. **C**

Brent Meyers is the Vice President of National Sales for Nvoicepay. His extensive knowledge of the accounts payable industry includes regulation compliance and expense reporting solutions. Brent has held positions in accounts payable, claims, and credit cards, both on the merchant and issuing side. He is an accredited Payables Solutions Consultant through The Accounts Payable Network and a Certified Purchasing Card Professional through the National Association of Purchasing Card Professionals.

USGBC Releases 2018 Sustainability Report

DALLAS, TX – Informa and the U.S. Green Building Council (USGBC) announced the release of the 2018 Greenbuild Sustainability Report, highlighting valuable metrics and key benchmarks regarding the impact on sustainable sourcing, community involvement, and carbon footprint reduction at the 2018 Greenbuild International Conference and Expo, held last November at McCormick Place in Chicago. The event achieved an overall 86% waste diversion rate.

[Editor's note: CONTRACTOR Magazine and contractormag.com are owned by Informa, LLC.]

"We're thrilled to have made such great strides for event sustainability," said Sherida Sessa, Greenbuild brand director, Informa. "We had a lot of 'firsts' in 2018 and tried new approaches that worked well. Our hope is that these achievements will be adopted through the events industry. Greenbuild's education is about sustainability in the built environment, but the way the event is produced leads to these sustainability wins. We're extraordinarily grateful to our vendors and partners for helping us to cross these milestones." The

comprehensive report details the sustainability initiatives implemented for the 2018 event, through a review of all objectives, goals and best practices. Case studies provide detailed overviews of sustainability strategies and initiatives including waste diversion, attendee and stakeholder engagement, sourcing and donation of materials, performance tracking improvements, and community engagement. Highlights include the elimination of single-use plastics, 28,000 pledges cast by attendees, and more than 20,000 pounds of carbon offset. The report can be accessed online at greenbuildexpo.com.

"Greenbuild continuously seeks to set the standard for event sustainability. This is only possible through the support of incredible partners and vendors as well as our Greenbuild Host Committee," said Kim Heavner, vice president, conference and events at USGBC. "For the second year, we incorporated the TRUE Zero Waste Rating System, and



elevated our tracking processes while capturing our waste reduction efforts."

The report shares the progress of seven sustainability objectives at Greenbuild, including the following highlights:

• **Waste Management:** Informa, USGBC, McCormick Place, Freeman, and local vendors worked together to optimize waste management strategies resulting in an overall 86% waste diversion rate.

• **Stakeholder Engagement:** Greenbuild is unique in that sustainability practices permeate the entire event; it's produced in a genuinely sustainable manner. In 2018, attendees were prompted to think about sustainability prior to arriving on-site. They could commit to specific pledges, including bringing a reusable water bottle or selecting local or organic food while onsite in Chicago. For the first time, attendees were also asked to reserve a copy of the printed expo guide, which resulted in a reduction

in overall print quantity and leftover paper at the conclusion of the show.

Sustainable Sourcing: The Greenbuild team consistently evaluates the materials used on-site to reduce the show's overall impact on the environment. Greenbuild was able to remove plastic straws from all concession areas throughout the convention center.

• **Performance Tracking:** USGBC and Informa were thrilled to have Greenbuild 2018 pursue, for the second time, the TRUE (Total Resource Use and Efficiency) zero waste event certification and once again certified at the Platinum level. Through this effort, Greenbuild achieved a 93% TRUE waste diversion.

• **Greenhouse Gas Emissions:** Meat, cheese and egg production are the largest carbon footprint culprits in Greenbuild's menu planning. This year, for the first time, catered meals featured plated lunches that were 100% vegan – totaling 3,500 meals. This initiative reduced Greenbuild's carbon footprint by more than 9.35 metric tons of carbon dioxide equivalent (MTCO2 Eq).

• **Community Impact:** The 2018 Greenbuild Legacy Project, led by Illinois Green Alliance, the Greenbuild 2018 Host Committee chose to support the Science Giants Program at Project Exploration, an education organization dedicated to making science accessible to youth from underrepresented communities. Students built a garden bed and harvest for Inspiration Kitchens, a neighborhood restaurant that employs and serves homeless and previously incarcerated community members.

• **Hospitality Industry:** An educational session on event sustainability was offered to event organizers, venues and vendors. The session featured the Greenbuild sustainability team and partners sharing how Greenbuild incorporates sustainability throughout the event and offered actions and information on how to include greener practices into any event management strategy.

Greenbuild continues to prioritize sustainability and demonstrate leadership when it comes to greening the conference and events industry. This year's conference will take place November 20-22 in Atlanta. Registration will open in the summer. www.greenbuild.com

TDIndustries Hires Steve Cunningham

DALLAS, TX – TDIndustries (TD) has hired Steve F. Cunningham as its new Chief People Officer.

In his new role at TD, Cunningham will support the growth of a company that has grown to 2,600 Partners (employee-owners). His duties will include talent acquisition, employment compensation, benefits, training, succession planning, and safety. Hiring and developing a diverse workforce of skilled tradesmen and tradeswomen will be a top priority for TD's People department under Cunningham's leadership.

Cunningham comes to TD with a diverse background from more than 20 years of executive human resources experience. He has led numerous human resources, benefits, talent acquisition/development, and retention strategies with Essilor of America, a leading optical products developer and manufacturer.

During his time as Senior Vice President of Human Resources, Cunningham



Steve Cunningham.

worked to create a unified organization. He was responsible for the introduction and execution of programs and policies that benefited the company and its more than 9,000 employees.

Prior to Essilor, Cunningham spent time in HR leadership roles with Frito-Lay, BCE West, and the Circle K Corporation.

Cunningham holds a Bachelor of Science in psychology from Creighton University and a master's degree in in-

dustrial/organizational psychology from the University of Nebraska at Omaha. He is on the board of directors for Frisco Family Services Center and a member of the Society of Human Resources Management.

"We are excited to welcome Steve to the senior leadership team at TD," said CEO Harold MacDowell. "He is an example of a humble guide and a mature and unassuming leader who builds strong relationships, gains trust, and produces results. Steve's expertise in talent management and his progressive People strategies will be vital in our continued commitment to grow our Partners and to the success of making our 2025 Vision a reality."

Since 1946, TD has provided innovative engineering, construction and facilities services that optimize the performance of world-class mechanical systems. Learn more at www.TDIndustries.com. www.linkedin.com/company/tdindustries

ISH China and CIHE Opens Next Week

ISH China & CIHE is ready to open its doors next week at the New China International Exhibition Center in Beijing, running from 6 – 8 May.

Visitors to the fair can expect to see the latest products and technologies from leading overseas brands, while many domestic suppliers, driven by eco-friendly policies in China, will showcase their latest innovations designed with environmental protection in mind. The full product spectrum on offer at ISH China & CIHE includes boilers & wall-hung boilers, burners, water heaters, electric heaters, water pumps, heat pumps, radiators, valves, pipes & fittings, control systems, cooling & heating systems, as well as products for floor heating, air-conditioning, fresh air, air purification, water purification, intelligent households, renewable energy and more.

Highlights at a Glance

- New Floor Cooling & Heating System Display Area in hall E4 which will include a live demonstration room
- Debut Clean Energy District Heating Area in hall W3 showcasing district heating and intelligent heating solutions
- Water Pump Zone featuring renowned worldwide water pump exhibitors in hall W1
- Overseas Area in halls E1 and W2 promoting global HVAC technologies



- German Pavilion presenting advanced HVAC solutions in hall E2

Leading International and Chinese Brands

In the Overseas Area, the likes of Ametek, Bode, Boilermag, Bowers Eclipse, Caleffi, Cewal, Cofi, Condevo, Cordivari, Giulinai, Groppalli, Heatmiser, Kane, KMC, Madas, Nordgas, Pedorollo, Polidoro, Pres Block, Sermeta, Shinwoo Valve, Solin, Spirotech, Tubedeluca, Unidelta, Varem, Vexve, Wellhausen and Zero feature in halls E1 and W2. German exhibitors participating in their country pavilion in hall E2 include Aquatherm, Brugg, Get Air, Halmburger, Hedda, in-VENTer, Jurgen Schlosser, Karl Dungs, Lamtec, Lunos, ORE, Smart Heat, S+S and TECE.

Showcasing their latest products in the Water Pump Area in hall W1 are DAB, Dafu, Greenpro, Grundfos, Hydroo, LEO, Minamoto, Pentax, Morgan, Topsflo, WDM, Xiling and Xylen. While in the Clean Energy District Heating Area in hall W3, Jinghai, Lcarbo, Ripeness, Tiger-control, Ploum-meter and Tianshi Future feature.

Some of the leading domestic and international brands also participating include A.O Smith, AIC, Aike, Aikeduo, Airpower, Alarko, Anze, Ariston, Avonflow, Bekaert, BLLC, Bluepure, Centrotherm, Chant, Chongguang, Cordivari, Danfoss, Defu, Devotion, Ebm-papst, Elco, Gassero, Gree, Gude, Haier, Hailin, Hansa, Haydn, Herush, Homebase, Honeywell, Hurge, Ideal, Industrial Combustion, KD Navien, Kinghonor, Kitu-

rami, Lemember, Linuo-Paradigma, Nasen, Noritz, OMELEX, OUTES, Paragon, Phnix, Powerworld, Radiant, Ravenplus, RBI, Resideo, Rheem, Rinnai, Royalstar, Sanica, SIME, Smnwater, SMS, Squirrel, Stiebel Eltron, TCL, Tesso, Thenow, Tsinghua Tongfang, Unbeatable, Unmak, Varki, Värmebaronen, Vicot, Warmhaus, Watts, Westone, York and Zehnder.

Concurrent Events

In response to a series of national policies and initiatives tackling air pollution, the fair will host the Clean Heating Development Summit, inviting industry experts from around the world to explore the future of clean energy heating. This summit is part of the China International HVAC Congress (iHVAC), which will also feature six forums:

- Technical Forum of Electric Heating Development in Northern China
- Solar Heating Forum
- Fresh Air Systems
- Home Comfort Systems and HVAC & BIM Technology Forum
- Innovative and Smart Heating Technologies Forum
- Air Source Heat Pump Heating Technologies

In addition, events for floor cooling & heating systems and clean energy heating will also take place. Details of all concurrent events can be found here: <https://ishc-cihe.hk.messefrankfurt.com/beijing/en/programme-events.html>.

ISH China & CIHE is organised by Messe Frankfurt (Shanghai) Co Ltd and CIEC GL events (Beijing) International Exhibition Co Ltd. It is headed by the biennial ISH event in Frankfurt, Germany, the world's leading trade fair for HVAC + Water which will next take place from 22 – 26 March 2021. For more information, please visit www.ish.messefrankfurt.com.

A further ISH event in China, ISH Shanghai & CIHE, will be held from 3 – 5 September 2019 at the Shanghai New International Expo Centre. For more information about ISH China & CIHE and ISH Shanghai & CIHE, please visit www.ishc-cihe.hk.messefrankfurt.com.

ICC-ES Lists PPE and PE Pipes for New Uses in ASTM F3371

BREA, CA — The ICC Evaluation Service (ICC-ES) is now listing non-pressure polypropylene or polyethylene pipes and fittings for use in drainage, waste and vent applications to the new Standard Specification for Polyolefin Pipe and Fittings for Drainage, Waste, and Vent Applications (ASTM F3371). Prior to the availability of this new standard, such manufacturers needed to comply with the Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems (ASTM F1412).


"Being able to be listed to this new standard specifically devoted to drainage, waste and vent applications gives



these manufacturers a clearer path to market allowing them to be more competitive with alternative materials and methods," said Dawn La Fleur-Qualley, ICC-ES PMG Program Director. "ICC-ES, the trusted source for plumbing, mechanical and fuel gas product evaluations and listings, strives to stay

at the forefront of industry needs and support innovation by quickly offering certifications to new standards such as ASTM F3371."

The ICC-ES PMG Products Listing Program provides manufacturers a way to indicate to code officials, designers and specifiers that products comply with applicable codes and consensus standards used in the built environment. Manufacturers with ICC-ES listings can go to jurisdictions throughout the U.S. and have confidence their products will be readily approved by code officials.

For more information visit the web site of the ICC Evaluation Service. 

New Housing Market – Hard to Believe?

► Continued from page 18

- generational preferences; and
- life-style effects.

Housing vacancies and household formations, in particular, deserve a little more attention.

Housing vacancies: The pre-recession overbuilding of housing that resulted in homes never being occupied, coupled with the foreclosure crisis that developed during the recession and lasted well into the recovery, together created a very large surplus of vacant homes. Those vacancies helped provide a supply of homes needed to fill demand during the period of relatively depressed new-home building during the post-recession era.

As such, we have temporarily been able to overcome — partially — the low level of new-home building through the occupation of previously vacant dwellings. Housing vacancies are now almost two million units lower than during the recessionary peak, according to estimates from the U.S. Census Bureau (See **Chart #3**).

Household formations: During the recession and the early stages of the recovery, household formations were low. It's not that people were not reaching the stage of life when home-ownership or rental typically takes place, not striking out on their own, or not getting married. Instead, Americans were not actually forming new households. Rather than embarking on ownership or rental of a home, many people were "house-sharing": adult children living with parents, siblings with siblings, parents with children, families with families, roommates with roommates, and other possible arrangements. Thus, during that period of low household formation, the demand for housing was unusually low.

Over the past few years, household formations have returned to more "normal" level. However, data shows that household formations among younger adults is still lagging, and some of those alternative living accommodations are still prevalent for that age group (see **Chart #4**).

Nonetheless, between a decrease in vacant housing and an increase in household formations, one would think that demand for new housing would be robust, and housing starts would, at minimum, be back at normal. We should be on the cusp of a boom in new-home construction!

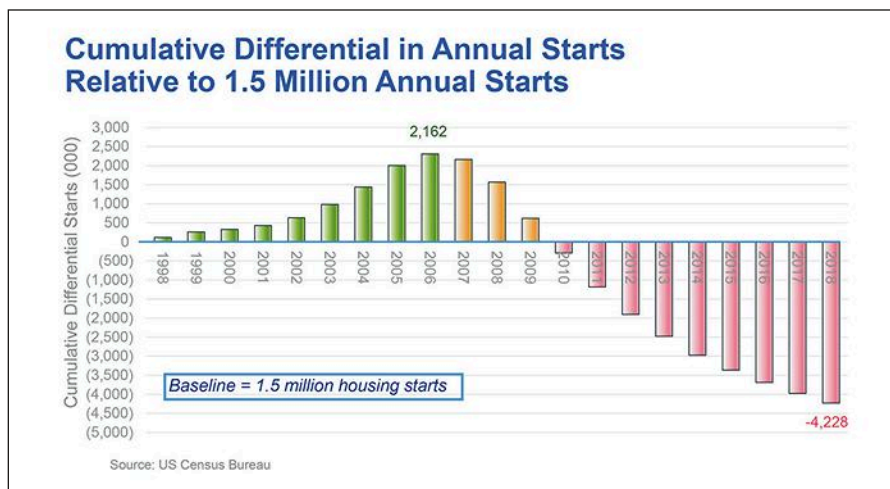


Chart #2 - Rise of the housing deficit.

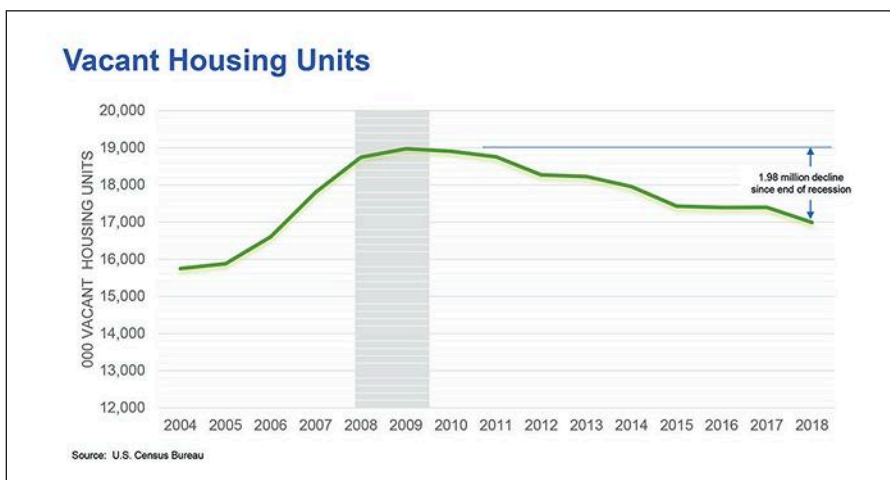


Chart #3 - Change in vacancies.

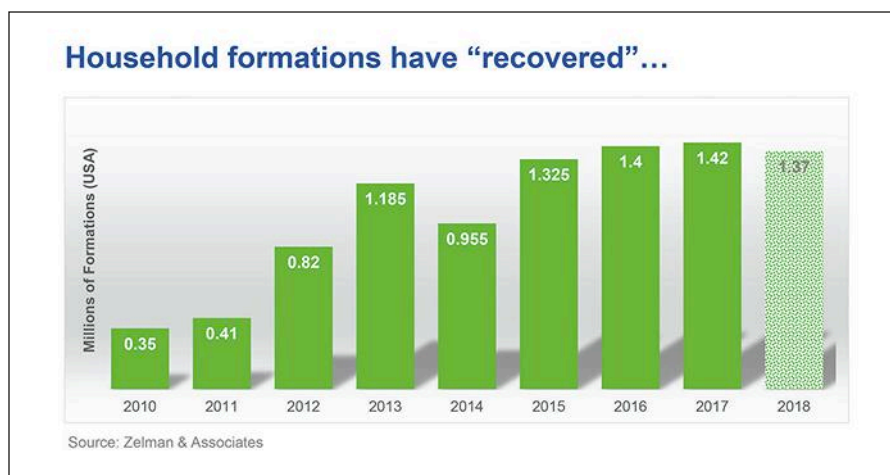


Chart #4 - Household formations.

struction!

But, it appears that we are not — at least yet. In fact, some data shows that we are actually in the midst of a slowdown in

new-home construction and new-home sales. For example, through the month of March, housing starts, on a year-to-date cumulative basis are about 9 percent

lower in 2019 than they were for the same period in 2018; and, in the same type of year-over-year comparison, permits are down 5.4 percent. Though sales of new homes have recently ticked up, the trend over the past 15 months has shown no growth in new home sales. Further, optimism on the part of new-home builders has recently declined (albeit from high levels). Together, these factors indicate that growth in new-home construction may be taking a temporary "pause" (See **Charts #5-#8**).

Again, hard to believe.

What's Housing Hold-up?

What is going on? Demand should be high but, for nearly 10 years now, we have not been building a "sustainable" number of new homes needed to meet that demand. Things don't seem to add up. Some contributing factors to this apparent dichotomy that various market observers have put forth are:

• **Affordability:** The number of median income families who can afford to buy a house is at a ten-year low, according to the National Association of Home Builders (NAHB). Only 57 percent of median income families can now truly afford to purchase a home. Furthermore, in many parts of the country, the price of new homes is higher than in the pre-recession era, thus affecting affordability for all ranges of family income.

• **Shortage of skilled labor:** Like many industries, home builders are having problems in finding the number of workers needed to build their homes. The number of workers in the construction field is NOT yet back to pre-recession levels, according to data from the U.S. Bureau of Labor Standards (BLS).

• **Cost of building materials:** Though cost increases of building materials have moderated, a recent survey by the National Association of Home Builders indicates that the cost of building materials is the second-greatest concern now faced by builders (with labor the first).

• **Mortgage rates concerns:** Rates have recently moderated, but they are up from levels of two and three years ago and are a limiting factor for some prospective home owners. Although mortgage rates remain low from a historical perspective, any possible interest-rate increases could

Cumulative U.S. Housing Starts

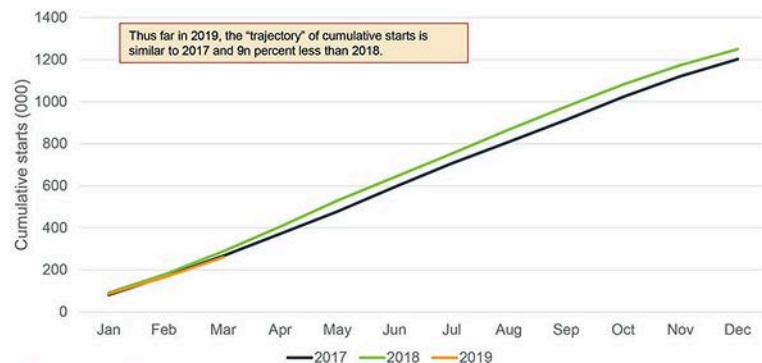


Chart #5.

New SFH Houses Sold (USA)

Most recent 15 Months



Chart #8.

Single-family home builders optimism, though good, is down from previous levels

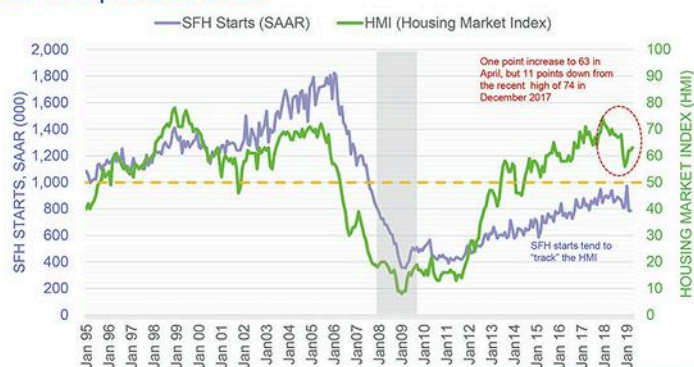


Chart #6.

Total U.S. Housing Starts (SFH + MFH)

Most recent 15 Months

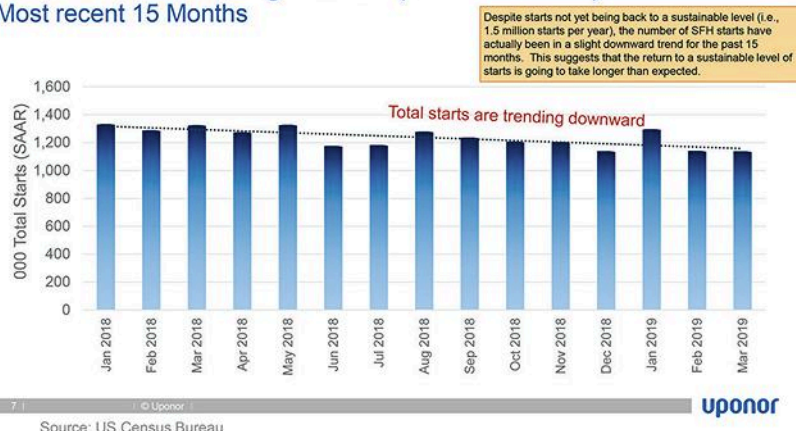


Chart #7.

put them in a range that an entire generation of home buyers never previously experienced.

• **Student debt:** Many younger, prospective home buyers are saddled with high levels of debt from financing their

college educations; thus, limiting their ability to acquire a down payment for a new-home purchase. According to Forbes, the cumulative student loan debt for 44 million borrowers now totals \$1.5 trillion. In addition, debt due to car loans

is affecting the cash flow of many potential home buyers.

• **Not enough “starter” homes:** In many parts of the country, there is an insufficient supply of starter homes for first-time buyers; thus, making it difficult for those prospective buyers to find a house that fits their needs and their budgets.

• **Lack of developed land:** In some area of the country, shovel-ready tracts of land or vacant lots are not readily available. Hence, builders and developers must first acquire and prepare land and put in place the necessary infrastructure before construction of homes can begin.

• **The rise of urbanization:** The ongoing trend to urbanize, rather than “suburbanize,” means that many existing urban, nonresidential structures are being converted into housing. Also, conversion of existing, single-family homes into duplexes (or more) is occurring. Such conversions supplement new-home construction and, in a sense, negate the need for new-home building.

• **Manufactured homes are taking up some of the slack in new site-build home building:** About 96,500 manufactured homes were built in 2018, a 60% increase since 2013, according to the Manufactured Housing Institute (MHI). Thus, manufactured homes were built at a level equal to about 10.5 percent of new stick-build single-family homes. (Manufactured homes are not accounted for in new-home-start statistics, but are additive to the total available new housing.)

Fortunately, none of the above considerations, by itself, is an impediment to a more robust housing market. Even when taken collectively, they do not negate the underlying need to build more new

homes. Further, most of the above considerations are somewhere in a “state of repair” that, as the mending process takes effect, will increasingly diminish their possible negative effect on the market.

Okay, so it’s still an open question: When will new housing starts be back to “normal”?

The 1.2499 million starts that we had in 2018 was simply NOT normal when viewed in the larger context of longer-term need for new housing; i.e., that sustainable level of 1.5 million starts annually. When you sort out all of the “ifs, maybes, and buts” outlined above, it appears that new-home building may, indeed, be in a temporary pause, but NOT a severe or ongoing decline. We are not about to burst a bubble again!

Yes, there is a chance that starts in 2019 might actually be no greater than 2018, which, if so, would mark the first time in the post-recession period that starts will not have a year-over-year increase. However, normal market forces dictate that we must eventually build more new homes — and, we hope, sooner than later.

Thus, it is highly likely that in three of the next four years, we will — barring a possible recession — re-attain the sustainable 1.5 million annual start level, and then even surpass that amount in subsequent years.

Hard to believe? No, it’s actually quite believable.

Dale Stroud is a business advisor to Udonor, Inc., a consulting role that he has held since recently retiring from Udonor after a 16+ year career. While full-time at Udonor, he held various senior management roles in the marketing and offering functions. He can be reached at dale.stroud@udonor.com.

ICC Kicks Off Building Safety Month 2019

WASHINGTON, DC — Starting May 1, the International Code Council, together with corporations, government agencies, professional associations and nonprofits, celebrates the 39th annual Building Safety Month. The international campaign raises awareness about building safety and the importance of building codes in making our communities safer and more resilient. This year, the Code Council will be exploring the roles building codes play in our day-to-day lives, including disaster mitigation, access to safe water, job opportunities in the building industry, and innovations in building safety.

To kick off this year's Building Safety Month, the focus for week one is "Preparing for Disasters: Build Strong, Build Smart." Natural disasters are increasing in severity and frequency. Helping individuals and community

leaders plan in advance for events like hurricanes, floods, tornadoes, wildfires and earthquakes saves lives and mitigates costly damages.

One of the most effective ways to prepare for disasters is adopting the most up-to-date building codes, which are crucial for ensuring the resilience of our structures. Not only does building to code keep people safer, it is also a smart investment: a recent report from the National Institute for Building Sciences found that municipalities that have adopted the 2018 International Codes can expect to save \$11 for every \$1 invested in bringing buildings and physical structures up to code. In addition, home and business owners can take a number of common-sense steps to protect their properties in advance of a



Building Safety Month is an international campaign celebrated in May to raise awareness about building safety. [Learn more.](#)



natural disaster.

"Building failures due to improper construction often end tragically, such as lost lives and economic distress, especially when natural disasters like hurricanes and earthquakes strike," said Jeff Ellis, Engineering Manager, Codes & Compliance, Simpson Strong-Tie, a Building Safety Month sponsor. "But in places where more robust and modern codes are properly followed, there

is much less damage and fewer lives lost. With more public understanding and support for good codes, compliant design and code enforcement, we can do even better."

Other strategies for increasing the resilience of structures include using durable materials designed to withstand extreme weather. Tara

Mattina, Director of the Marketing Communications Division of APA – The Engineered Wood Association, a Building Safety Month sponsor, commented, "We share the Code Council's commitment to building safety, and the APA works to educate code officials and designers on the integrity of structural engineered wood products in creating durable, sustainable, resilient communities."

The American Institute of Architects (AIA) also supports Building Safety Month and is highlighting the importance of resilient structures: "Today the built environment is subject to a number of shocks and stresses from climate change, environmental degradation, age and other forces," said AIA EVP/Chief Executive Officer Robert Ivy, FAIA. "Designing safe and resilient buildings is more important than ever before. The American Institute of Architects and its members are committed to ensuring the health, safety and welfare of people inhabiting buildings around the world."

ISO, a leading provider of information about risk to the property and casualty insurance industry, is also a sponsor of week one of Building Safety Month. "The theme 'Build Strong, Build Smart' has a direct relationship to our efforts to provide insurers with informed decisions about risk," said Dale K. Thomure, ISO's Manager of Community Hazard Mitigation. "Building code enforcement is the first line of defense against damage from disasters, and we are committed to working together for safer communities."

Learn more about Building Safety Month and how to get involved at www.buildingsafetymonth.org, and join the conversation on social media using #BuildingSafety365. [C](#)

Shapiro & Duncan Prefab Facility

► **Continued from page 6**

tion—approximately 105%—and will help draw quarterly checks through SREC's purchased on the utility market and monthly credits directly from the electric utility.

In the current form, these panels feed into a Solar Edge power inversion and monitoring system, which is directly connected to the grid at a new dual direction electrical meter. The system has a 25-year lifetime guaranty and the initial capital investment will be recouped in less than six years. "Taking this step made sense as a company capital investment with a tremendous return, as well as doing the right thing for the planet by switching from coal power to sun power. As a company, we are looking to push the envelope, to serve the community and leave the world a better place. With a payback of approximately six years, this was a very smart investment by the company as a whole," said Drury.

The system went live on December 28, 2018 and is already making a positive impact on the environment. "To date, our change in energy source has saved 115,000 lbs. of CO2 emissions and is the equivalent of 3,000 trees be-



The 925 SunPower solar modules on a Panel Claw support system complete a 302 kW production capacity.

ing planted," said Drury.

Moreover, in the center hallway of the shop, a wall of big screen monitors shows in detail the assembly production by task and individual tracking progress and effectiveness. "Now we have a monitor showing the solar PV production, as well, and now the whole team not only gets to see where we are in producing our assemblies, we

can also monitor our electrical production as well," said Drury.

The prefabrication facility is a shining example of the company's commitment in future investments. "As we move forward, we will continue to invest in our people, our processes and our plant to ensure that we are always ready to take the next step," said Drury. [C](#)

green choice

THE SM REV C GEOTHERMAL HEAT PUMP

features a new control microprocessor, which can communicate with the new Bosch EasyStart app. The Energy Star-rated model now comes with eight thermistors strategically placed within its cabinet to relay temperature readouts such as entering water, leaving water, return air, discharge air, discharge refrigeration, freeze evaporate, freeze coaxial, and domestic water. The local wireless interface module allows for remote install and monitoring within a 20-ft. unobstructed radius. With sound levels as low as 52 dB, it offers quiet operation while improving indoor air quality and comfort.

Bosch Thermotechnology

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features minimalist geometry. The lavatory faucets feature a water-efficient flow rate of 1.2 GPM, are EPA WaterSense-certified and compliant with CEC regulations in California.

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SERIES 212 TWO-WAY COMPOSITE VALVE

is designed for water purification, conditioning and distribution in commercial/industrial markets with membrane-based reverse osmosis systems. It features a modular design.

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THE QUICKTOP ZONE VALVE

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THE BETELLO TWO-PIECE TOILET

is equipped with Revolution 360 flushing technology powered by Aqua-Piston, which cleans two times better than a conventional flush. An easy-to-clean, skirted trapway installs to the floor flange and attaches to the toilet. It is certified by the EPA's WaterSense program.

Kohler Co.

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THE ME BY STARCK ONE-PIECE TOILET

is modified to be ADA-compliant. Rimless flush technology ensures a powerful flow of water that rinses the entire inner surface. The weight of the toilet is reduced, resulting in self-contained components that do not require attachment niches. It will be available in a toilet seat height of 17-3/8".

Duravit USA

WWW.DURAVIT.US

THE ECO PLUS WC CARRIERS

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Lennox Industries

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▲ THE CO260 DATALOGGING IAQ METER

measures carbon monoxide, carbon dioxide dew point, wet bulb, air temperature and relative humidity. The meter offers an eight-hour time weighted average snapshot of CO₂ readings. The auto power off can be disabled while datalogging up to 32,000 readings (in addition to 99 manually saved readings).

Extech

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▲ 225 SERIES DUCTILE IRON-RESISTANT VALVES

are valves manufactured to the latest AWWA C515-15 standard and are UL-listed and FM-approved. Its NSF-61/NSF-372 certifications as verified by UL Water Quality. The series comes in 3" to 12" and 3" to 24" models and sizes. Their flanges and MJ bells are full thickness.

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Pure Safety Group

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▼ THE GLI18V-1200CN 18V LED AREA LIGHT

offers users full control over the cordless smart light using a mobile device. Pros can turn the light on and off remotely via Bluetooth, dim the light to the desired brightness, put it on a timer and even check the battery — all from the free Bosch Toolbox App.

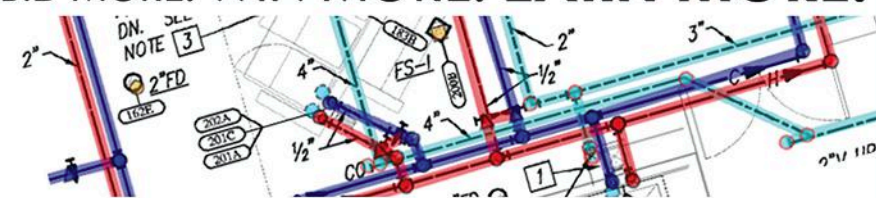
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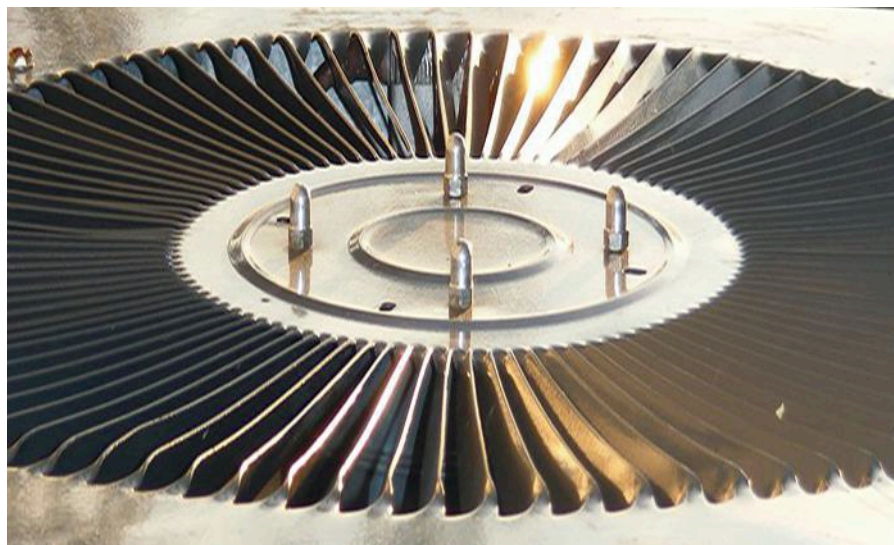
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by Steve Spaulding
CONTENT DIRECTOR



Staying Successful Means Taking Risks

I'm a big James Bond fan. (Yes, I know, James Bond is neither a plumber nor a pipefitter. Just bear with me here for a few paragraphs.)

Much like government, each generation gets the James Bond it deserves, and for mine that James Bond was Roger Moore, usually on late-night network TV. He was suave, urbane, unflappable and somehow constantly bemused by everything, be it a stunning blond, a death ray, or a giant man with metal teeth.

It wasn't until I was older I saw the Sean Connery Bond, and it wasn't until much later it dawned on me what a huge risk the caretakers of the Bond film franchise were taking in casting Roger Moore. All the superficials may have been the same—the tuxedos, the cars, the girls—but the character is a 180-degree turn.

Connery is not suave. He's charming, but more often than not menacing and sometimes downright brutal. He comes across not as a playboy, and certainly not as a dandy (which Moore could sometimes be) but as a soldier fighting

a highly specialized war. When Moore makes a joke it sounds witty; when Connery makes a joke it sounds savage.

So why? Why deliberately change a

part of the reason for taking such a huge risk: because they could. The James Bond movies had already become one of the most successful film franchises

Not one of the companies on our Book of Giants list got there by resting on their laurels.

very successful formula that was making a lot of people lots of money? Why take such a huge risk?

Part of the reason was they had to. Connery was fed-up playing the character. The first shot at a replacement (George Lazenby in *On Her Majesty's Secret Service*) tried to follow the formula—the look, the attitude—and ended up suffering by comparison. It seemed that Connery was just too closely associated with the character.

The solution? Radically change the character. Which brings us to the other

world had ever seen. They were the prototype for the "event film," the big summer blockbusters that still dominate movie screens today.

The producers knew that they could afford to take the risk; that even with a new actor, even with big changes to the character, the next James Bond movie would still make them money. They were big enough, successful enough, that they could afford to fail, and if need be try and fail again and again until they found a new formula that would bring them new success.

Which brings us to our Giants (which starts on pg. 20). Not one of the 100 companies on our Book of Giants list got there by resting on their laurels. Time and again, each of them over the course of its company history has gambled on new technology (such as BIM), ventured into new types of work (such as service), invested money in new facilities (like prefab shops), on new types of employees (like software engineers).

And yes, part of it was because they could. Large, profitable companies have the freedom to take those kinds of risks. But just as much it was because they had to. To quote Len Monfredo, Executive VP for our Contractor of the Year E. M. Duggan, "If you're not innovating, if you're not changing, if you're not keeping up with the times to the point where you're actually setting the trends, you're dying. You are a company that's in demise."

Innovation is always difficult, but no matter what the size of your business—and no matter what business you're in—it's necessary. **C**

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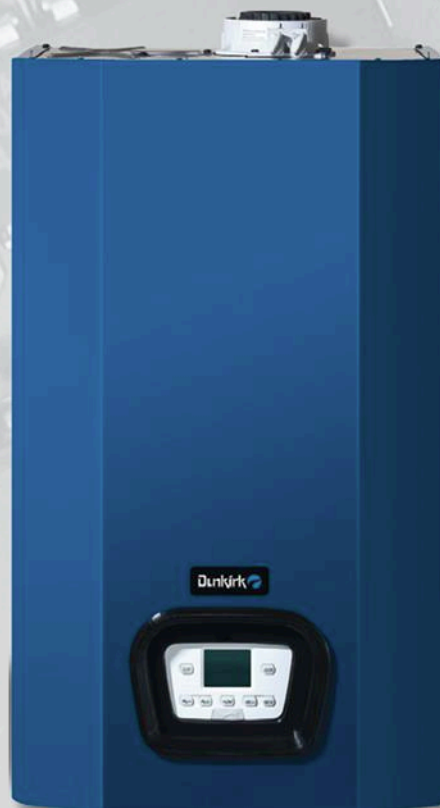
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