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## The Harris Prefab Advantage

BY JOHN MESENBRINK OF CONTRACTOR'S STAFF

BELLINGHAM, WA and ZUMBROTA, MN — Leading national mechanical contractor Harris is answering critical trends in the



A large prefabricated piping assembly for the Minneapolis Bus Garage job. Note the worker in back for scale.

construction industry to deliver shorter project schedules and answer workforce shortages by opening its new state-of-the-art prefabrication shop in Bellingham, Wash.

The 41,000-sq.-ft. Pacific Northwest shop houses its sheet metal, plumbing and pipe fabrication shops, and supports projects by crafting HVAC ducts, HVAC piping, plumbing piping and purity gas piping.

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## House Reintroduces the PRO Act

SPECIAL TO CONTRACTOR

WASHINGTON, DC — On February 28th, the House of Representatives reintroduced the PRO Act (the *Richard L. Trumka Protecting the Right to Organize Act of 2023* (H.R. 20)). The Act, if signed into law, would amend various labor laws such as the National Labor Relations Act for the purpose of expanding “various labor protections related to employees’ rights to organize and collectively bargain in the workplace”.

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## Work Truck Week Sets Record Attendance

SPECIAL TO CONTRACTOR

INDIANAPOLIS, IN — Work Truck Week<sup>®</sup> 2023 was back to full strength as a verified 14,885 industry professionals gathered at Indiana Convention Center in Indianapolis March 7–10 for North America’s largest work truck event. Attendance returned to pre-pandemic levels, setting a new record with a 17% increase over the 2022 event. Green Truck



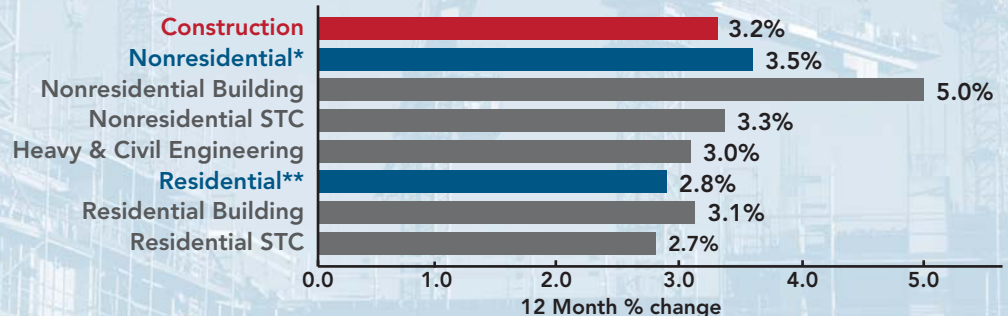
A verified 14,885 industry professionals gathered at Indiana Convention Center in Indianapolis March 7–10 for Work Truck Week 2023.

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### CONTRACTOR INFOCUS

#### Construction Employment Growth:

February 2022 vs. February 2023



\*Includes nonresidential building, nonresidential STC, and heavy and civil engineering

\*\*Includes residential building and residential STC

Source: Bureau of Labor Statistics

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# Global Commitment to Eliminate Lead from Drinking Water Supply by 2040

■ SPECIAL TO CONTRACTOR

NEW YORK, NY — A consortium of governments, manufacturers and civil society partners at the United Nations (UN) 2023 Water Conference today launched a global commitment to achieve lead-free drinking water.

There is an urgent need to reduce human exposure to lead in the environment, including lead in drinking water—a source of exposure that is wholly preventable. An

➤ **Turn to Global, page 12**



The UN Building in New York.

# ACEEE Holds 2023 Hot Water Forum

■ SPECIAL TO CONTRACTOR

SAN DIEGO, CA — Equipment manufacturers, utility professionals, local, state, and federal agency



personnel, plumbers and installers, policy-makers, NGOs, engineers and other experts were all in attendance for the American Council for an Energy Efficient Economy's (ACEEE) Hot Water Forum, held March 7-9.

The forum is an opportunity to discuss

the latest in energy- and water-saving innovations, as well as policy, regulation and legislation in the

context of the broader economy. It comes at a pivotal moment for the nation. The emergence of new water-heating technologies combined with huge investments (made possible by the Infrastructure Investment

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# ABC Honors Contractor of the Year

■ SPECIAL TO CONTRACTOR

ORLANDO, FL — Associated Builders and Contractors today announced award winners in Excellence in Construction;® Safety Excellence; Inclusion, Diversity and Equity Excellence and Contractor of the Year. The winners were announced and honored March 16 during ABC Convention 2023 at the 33rd Excellence in Construction Awards Gala.

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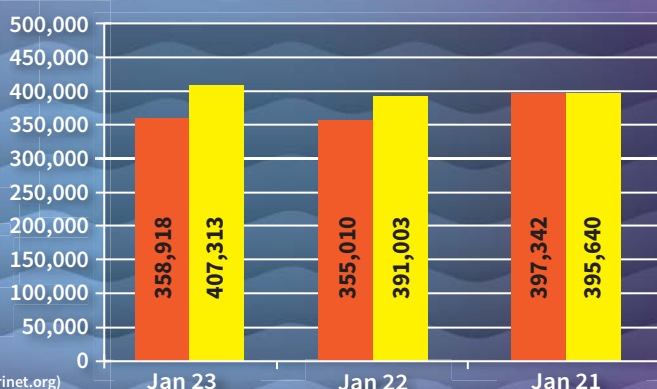
National Chair of the ABC Board Milton Graugnard (center) presents an award to Kyle McMullen of Brasfield and Gorrie.

## CONTRACTOR INFOCUS

### U.S. SHIPMENTS OF RESIDENTIAL STORAGE WATER HEATERS

Jan 2021 - Jan 2023

■ Residential Electric  
■ Residential Gas



SOURCE: AHRI (ahricommunications@ahrinet.org)

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## Editorial Offices

### EDITORIAL STAFF

Group Editorial Director-Buildings & Construction  
Mike Eby, meby@endeavorb2b.com

### Editor-In-Chief

Steve Spaulding, sspaulding@endeavorb2b.com

### Editor-At-Large

John Mesenbrink, jmesenbrink@endeavorb2b.com

### Contributing Writer

Kelly Faloon

### COLUMNISTS

Al Schwartz, Management  
Pat Linhardt, Hydronics & Radiant  
Patti Feldman, Technology  
Matt Michel, Marketing

Art Director, Susan Lakin

Ad Services Manager, Deanna O'Byrne

Production Manager, Sam Schulenberg

Classified Production Designer, Terry Gann

Audience Development Manager, James Marinaccio



CEO, Chris Ferrell

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COO, Patrick Rains

CRO, Reggie Lawrence

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EVP Buildings, Lighting, Technology group: Lester Craft

EVP, Marketing Solution & Data: Jacquie Niemiec

VP, Buildings & Construction, Mike Hellmann

VP, Production Operations, Curt Pordes

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## In Brief

**Leonard Valve Co.** has announced its affiliation with their new Manufacturer's Sales Representative, **Michel Sales Agency**. The agency is representing Leonard Valve in the states of Minnesota, North Dakota, and South Dakota. A fourth-generation, family-owned PHCC/R-HVAC company founded in 1932, the Michel family traces its beginnings in the commercial plumbing industry back to 1891.

**BoomNation**, the skilled community platform connecting tradespeople with employers announces the launch of its new podcast series, "*Long Live The Trades*." New episodes are set to drop every two weeks. Listen on Apple Podcasts and Spotify. Go to [TheTrench.com](http://TheTrench.com) and subscribe for more skilled stories.

Full-service design-build mechanical and energy contractor, **UMC** has announced that Chris Olmsted has been named Life Sciences Market Lead. Most recently, Olmsted was Sales Manager for UMC's Facility Services sales team. As the Life Sciences Market Lead, Chris will be responsible for developing a framework to maintain the group's position as an industry leader throughout the Pacific Northwest.

**National Technical Institute** (NTI), a state approved trade school with campuses in Las Vegas, Phoenix and Houston specializing in HVAC, plumbing and electrical training, has named Ryan Woodward as the new CEO. Woodward is a partner in the business and previously served as CFO. He is also on the Board of Directors at the Vegas Chamber of Commerce and co-chair of the Vegas Chamber Workforce Task Force.

A joint initiative between **SMACNA-Western Washington** and **Smart Local 66** will be the first in the industry to make lactation pods available to mothers in need starting in April 2023. The clean, secure, sanitary pods will include a seat, sink, HVAC, electricity for the breast pump and phone chargers, plus a refrigerator to keep the breast milk cold.

**Oatey Co.** announced it has named **RKR** its 2022 Wholesale Manufacturer Representative of the Year. This award highlights a top agency's successes and shows appreciation for their outstanding support of Oatey's business.

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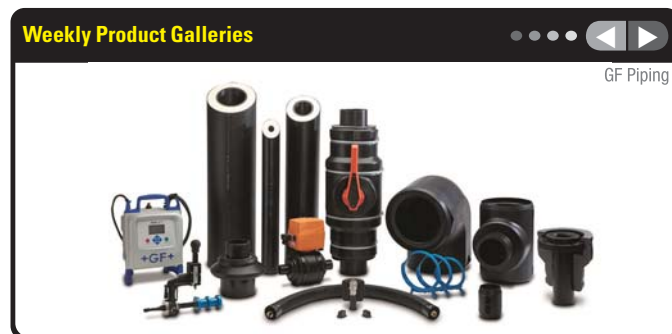
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## Top Stories

- Anatomy of a Kitchen Remodel Permit
- Wolseley Canada Donates to Support Clean Water Initiatives
- NCCER'S Complete Sprinkler Fitting Curriculum Fourth Edition Now Available
- Third-Annual Jobber Grants to Award \$150,000 to 25 Home Service Businesses

## Videos & Media Galleries



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For the latest news on the federal and local response, code and regulation developments, opinions and best practices from industry experts and more, bookmark **CONTRACTOR'S Coronavirus News Page**: [www.contractormag.com/covid-19](http://www.contractormag.com/covid-19).

## How Much Do You Know About Faucets & Fixtures?

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## INDUSTRY PERSPECTIVES

- ▶ 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 [contractormag.com/industry-perspectives-0](http://contractormag.com/industry-perspectives-0)

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](http://www.Contractormag.com).

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# German Faucet Manufacturer Pledges 10% of Net Profit to Bring Water to Drought Areas

**E**stablished in 2014 in Stuttgart, Germany, in2aqua makes and markets decorative bathroom and kitchen faucets and showering products with a special emphasis on partnering with bath and kitchen showrooms and the professionals who operate them—initially in Europe and now in North America. Today, in2aqua GmbH is headquartered in Holzgerlingen, Germany, while its North American operations are based in Livermore, CA.

According to **Chris Marshall**, founder and Managing Director of in2aqua GmbH, the company was developed with a keen sense of environmental responsibility and the will to push technological and design boundaries to reach its goal. For this reason, all of in2aqua's faucets have received a high-efficiency and high-performance rating. The result is a designer product that is highly functional yet promotes sustainable usage.

## Pledge to Help

Rooted in its passion for people, water, and faucets, in2aqua has pledged to donate 10% of its net profits to help drought-ridden regions become water independent, as well as donating to other water-related projects and investing in carbon-offset initiatives worldwide.

Marshall's personal travels in Africa inspired in2aqua's commitment to doing more. "Back in the early '90s, I was vacationing in Kenya, an East African country, and saw a need for better sanitation in many villages," he explains.

"I promised myself if I was ever in a position to help...I would."

Shortly after Marshall established in2aqua nine years ago, the company subsequently fulfilled that promise by implementing an initiative called "Build a Well."

## Build a Well

According to UNICEF, 2.2 billion people worldwide still lack access to safe drinking water, and more than half of the global population does not



A well building team used a truck-mounted drill rig made by Atlas Corp.

**in2aqua has made bringing water resources to drought-ridden areas one of its company goals.**

have access to safe sanitation.

That's part of the reason why in2aqua has made bringing water resources to drought-ridden areas one of its goals. By building wells closer to Africans in need, the time women and children spend collecting water can be reduced significantly. This enables the women to take better care of their families and gives children more time to go to school.

in2aqua has undertaken several well-building projects in Africa. Since the company's inception in 2014, two wells have been built, one in Uganda and a second as part of a Rain Harvesting Project in Tanzania.

## • Apac District-Village of the Odyek Pe

The first well was built in the Apac District in the Northern Region of Uganda.

Before in2aqua worked with Water

to Thrive to build a well for the Odyek Pe village, the villagers had to walk approximately half a mile (over 1km) to an unprotected water source. Most families spend about sixty minutes per day collecting water. With a 167-ft. (51 meters) deep well, the Abongomola sub-county inhabitants were given access to fresh water within their own village.

The well building team used a

truck-mounted drill rig made by Atlas Corp to dig the well. The drill is capable of drilling wells anywhere from 30m to 150m in depth.

Each day, the well provides clean, safe water to more than 300 people. The community participated in the construction process and has taken full ownership of the project. A water committee, selected by the community, maintains the water point and ensures it is being properly used. The committee, along with the rest of the community, works hard to ensure the well is sustainable and provides clean water for many years.

"in2aqua was very proud to have been part of this wonderful project and wishes the Odyek Pe village continued health and happiness," says Marshall.

## • Namnyaki Maasai School

Located in Southern Tanzania, Namnyaki Secondary is a school established, owned, and operated by a Tanzanian Non-Governmental Organization known as Namnyaki Maasai Girls and Women Organization (NAMGWO).

As part of a project spearheaded by the Naserian Project (a non-profit organization) and The Long Well Walk, in2aqua extended financial support to build a rainwater harvesting system. The rainwater harvesting system provided the life-saving resource of clean, safe water to the pupils of Namnyaki Massai School.

"This project is a life-changing venture, and it is going to cause a considerable developmental impact as far as the health and sanitation of our pupils and school community is concerned," says a Naserian Project Coordinator.

## What's to come?

in2aqua is planning to assemble 300-500 shower/roughs and lav sets for shipment to war-ravaged Ukraine in April/May. **C**



Children at the new well in Odyek Pe.



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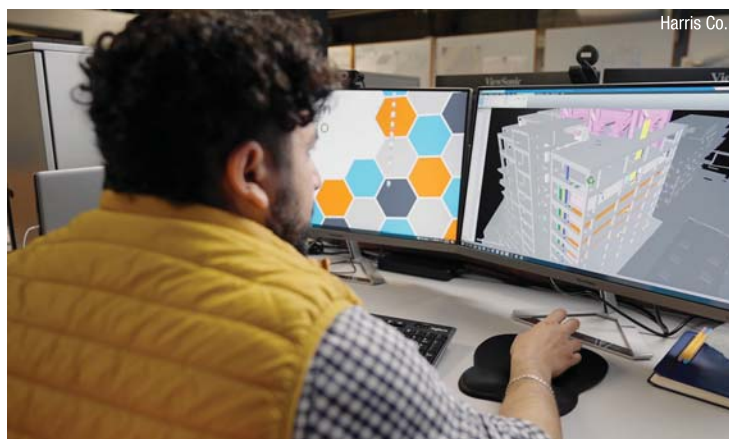


# The Harris Prefab Advantage

## ► Continued from page 1

Harris' prefabrication approach focuses on innovation, efficiency and safety. By manufacturing components and assemblies in an environmentally controlled shop, Harris can maintain safer, more efficient job sites. Shifting work from the field to an offsite location and utilizing building information modeling (BIM) allows Harris to reduce safety risks in the field, minimize material waste, keep job sites clean, decrease install time, save labor costs and ensure projects and budgets stay on track.

Harris' Bellingham shop can adapt to challenges and handle unexpected



**BIM and VDC provide greater accuracy in budget, cost estimation, scheduling, multi-trade and discipline coordination, fabrication, safety and constructability.**

items on a quick turnaround, often in less than 24 hours. This local facility's average fabrication is 64 pounds per hour. With this premier fabrication shop, Harris has the expertise and resources to develop advanced solutions and deliver results.

And it's not a stretch to say that the new Bellingham prefab shop mimics some of Harris' other shops nationwide. Harris has nine state-of-the-art fabrication shops across the country—totaling just over 270,000 sq. ft. of manufacturing space. The company has been very strategic and thoughtful in its response to meeting the increasing industry demand for prefabricated mechanicals in building construction.

## A Better Way

And here's why. "While prefabrication and modularization have been used extensively in manufacturing, widespread use in the construction industry is more recent," says **Mike Nelsen**, Plant Manager, Midwest Fabrication & Supply (MFS), Harris, Zumbrota Minn. "As the trade labor shortage became more prominent over the last five to 10 years, the industry shifted and innovative companies started looking at better ways for project teams to come together and maximize opportunities for prefabrication. Harris has taken full advantage of the progression we've seen in BIM, virtual design and construction (VDC) and prefabricated equipment," says Nelsen.

Across the country, Harris has more than 110 BIM professionals, 129

pipeworkers and 160 sheet metal workers. "At Harris, prefabrication and BIM/VDC work hand in hand," says Nelsen.

"We use BIM and VDC to provide greater accuracy in budget, cost estimation, scheduling, multi-trade and discipline coordination, fabrication, safety and constructability. All of our prefabrication shops work closely with our in-house design studio to maximize prefabrication and deliver significant value throughout the life cycle of the project," continues Nelsen.

All of Harris' designers, engineers and building simulation specialists use advanced tools to optimize designs that take into consideration key metrics around energy, cost and comfort. "We can make earlier and more informed decisions, better plan our fabrication and installation and react more efficiently to design or site issues," says Nelsen.

## Hub-and-Spoke Approach

Harris developed its strategic hub-and-spoke prefabrication strategy to efficiently and effectively complete projects anywhere in the country. Its primary fabrication facilities are geographically located and tied to its regional offices. "We utilize these facilities for the initial fabrication, which we refer to in the process as our 'hubs,'" says Nelsen.

According to Nelsen, the many different projects Harris has taking place are referred to as the spokes around that hub. The customized portion of



**Harris Co.'s new facilities allow for very large prefabricated assemblies.**

the fabrication is done at the hub. "We then flat-pack those products in a way that's efficient to ship and then ship those flat packs to a job-specific location where assembly takes place or to a co-fabrication site on-or-near the project," says Nelsen.

With this method, the collaboration between MEP trades and the overall workflow is heightened and schedules are optimized as multiple building systems integrate. "Overall, with the hub-and-spoke method, you don't ship as much air, which is typically the case when dealing with large duct systems and pipe," says Nelsen.

The combination of Harris' skilled workers, state-of-art equipment and its nationwide systematic approach to prefabrication set the company apart. "What that means for our customers is that we can yield product and materials with unmatched precision at a high speed. Our team manufactures every component to exact specifications using industry-leading equipment. Whether a project calls for HVAC ductwork, high-pressure air and nitrogen lines or process piping, we're able to produce high-quality results," says Nelsen. **C**

## Sampling of Advanced Technology

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# Bemis Supports Cancer Fight Event in DC

SHEBOYGAN FALLS, WI — Bemis Manufacturing Company, a leading manufacturer of toilet and bidet seats, teamed up with leading advocacy organization Fight Colorectal Cancer (Fight CRC) for March, Colorectal Cancer Awareness Month, for the second year in a row.

The family-owned manufacturer donated 100 toilet seats that are displayed on the National Mall in Washington, DC, as part of Fight CRC's Call-on Congress, an event where colon and rectal cancer survivors, caregivers, and loved ones from all over the U.S. unite to make their voices heard. As part of the installation, each seat displays an awareness fact or statistic about the disease, which is the second-most fatal cancer in the US.

The seats were surrounded by more

than 27,000 blue flags on the National Lawn, each symbolizing a projected case of colorectal cancer in someone under age 50 by the year 2030.

Fight CRC hosted the second installation for colorectal cancer on the National Mall to gain attention from lawmakers about the fact that colorectal cancer is projected to be the No. 1 cancer killer among those ages 20-49 by 2030. There is an urgency to fund more research to uncover groundbreaking treatments to save lives.

"We are honored to support the second iteration of this event to bring




One of the seats on the National Mall in Washington, DC.



awareness to the fight against colorectal cancer," said **T.J. Stiefvater**, Vice President of marketing for Bemis. "Virtually everyone has a relative or friend who's been impacted by this disease. We feel strongly about shining a light on it and helping raise

awareness about what can be done to alleviate the suffering it causes."

Contrary to what most people believe, colorectal cancer is not an "old man's" disease. One in 23 men and 1 in 26 women will be diagnosed with this type of cancer in their lifetime. In 2023, the American Cancer Society estimates 153,020 people will be diagnosed with colorectal cancer in the US, and 52,550 people will die from the disease.

68% of deaths from colorectal cancer could be prevented with timely screening. Bemis's home state of Wisconsin is the 39th deadliest state for colorectal cancer. In this state alone, 2,650 new cases are estimated to occur in 2023, with 880 deaths estimated.


The exhibit was in Washington, DC, from March 12-14. To learn more about colorectal cancer, visit [FightCRC.org](https://FightCRC.org). 

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# Global Commitment to Eliminate Lead from Drinking Water by 2040

► **Continued from page 3**

invisible, odorless and tasteless chemical contaminant present in water supply systems worldwide, lead is a toxin that irreversibly impacts neurological and cognitive development. Exposure in childhood or during pregnancy can cause life-long harm, yet globally, 800 million—or roughly 1 in 3—children have elevated levels of lead in their blood.

The primary source of lead in many drinking water systems is lead-containing pipes and parts that leach lead into the water. While there is growing awareness of the long-term dangers posed by lead in drinking water, new systems across the globe continue to be built with unsafe materials.

Founding members of the consortium presented “A Global Pledge to Protect Drinking Water from Lead,” which aims to build momentum around local and global initiatives to progressively reduce lead exposure from drinking water.

The pledge highlights actions to eliminate the use of lead-leaching parts in the construction of new drinking water systems and to improve

the monitoring and remediation of existing systems.

Founding members of the consortium include the governments of Ghana, South Africa and Uganda; the World Health Organization; World Vision; WaterAid; the Conrad N. Hilton Foundation; LIXIL; RTI International;

philanthropic organizations and individuals to support global efforts by joining the Lead Pledge at [www.global-leadfreewater.org](http://www.global-leadfreewater.org) and by working collectively to protect drinking water through the following actions:

- Ensure that all new water systems are constructed with products and

## Inaugural convening event held at United Nations 2023 Water Conference.

the Rural Water Supply Network; the Skat Foundation; the University of Leeds; The Water Institute at UNC; the International Water Association; the International, Water, Sanitation and Hygiene Foundation (IWSH); the World Plumbing Council; and the International Association of Plumbing and Mechanical Officials (IAPMO).

### Working Collaboratively

The consortium invites governments, the private sector, manufacturers, suppliers, financial institutions,

materials that meet international standards for lead-leaching, material safety, and performance.

- For existing water systems develop and implement plans for periodic water lead monitoring and data sharing.
- Investigate water systems reporting lead levels at 10 ppb or above to identify contamination sources and implement necessary interim or long-term remedial measures.
- Support communities to reduce or eliminate exposure to lead through



education and action such as designating safe taps for drinking and cooking.

To implement these commitments, the consortium will support:

- Adoption of national policies and regulations based on international standards and testing/certification requirements for products and materials used in drinking water systems that address lead-leaching, material safety, and performance.
- Manufacturing of products and materials used in drinking water systems that meet international standards for lead-leaching, material safety, and performance.
- Affordable access to fittings, fixtures and filters that meet international standards for lead in drinking water.
- Development of low-cost technologies to enable widespread testing for lead in drinking water and materials to better understand the sources, impacts and mitigation/remediation of lead contamination in drinking water.
- Training and certification of professionals to oversee the design and construction of safe drinking water systems.
- National and local laboratory and monitoring capacity to assess and monitor lead in drinking water and materials to support the implementation of these commitments.
- High-quality research to better understand and identify sources, impacts and effective prevention and remediation methods and approaches to minimize harm from lead in drinking water.

For more information, visit <https://sdgs.un.org/partnerships/global-commitment-stop-flow-lead-drinking-water>.

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by Al Schwartz  
PLUMBING CONTRACTOR



# Getting Paid

**B**eing a contractor, or a subcontractor, is not for the faint of heart in the best of times. With market conditions as they are today, nerves of steel are a prerequisite. The age-old problem of timely payment has been drawn into even sharper focus as projects become scarcer and funding difficult to obtain, at best. General contractors are being squeezed by the architects, the architects are being squeezed by the owners and the owners are being squeezed by the banks to get the most for their money in the fastest time possible. It is interesting to note that the banks—with billions of our tax dollars—don't seem to be squeezed at all, but that's not an absolute any more either.

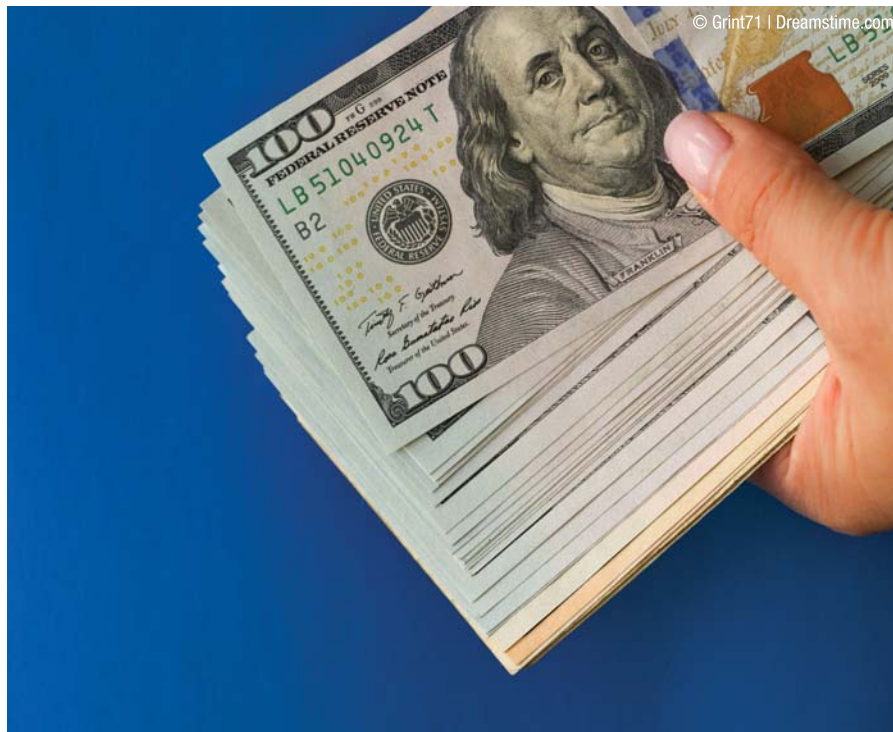
A subcontractor bids a job. He gets the job. He signs a contract (one which he presumably has read thoroughly) agreeing to the terms and conditions as set forth therein. He mans the job. He puts material on the job. He provides accurate phase completion invoicing and submits it as required by said contract. He doesn't get his check as per said contract.

This situation is commonplace in the industry, and has been as far back as I can recall (almost 65 years, and counting). Why it is so has as many answers as there are facets of human interaction. They range from poor planning on the part of the GC to outright greed, to a practice euphemistically called "sub-busting" wherein a GC deliberately tries to put subcontractors out of business by withholding legitimately owed payment.

## Doing the Dance

Assuming that there is no legitimate reason for withholding payment, the sub and the GC begin what I like to call "the dance." The dance is not accompanied by music (except perhaps the whining, crying and tooth gnashing of the parties involved) but it has very definite steps. Knowing the dance steps is critical to every subcontractor in business today.

The first "step" in this dance is one which should have taken place before the first billing cycle: the **pre-lien**. If the sub hasn't submitted a pre-lien



**The age-old problem of timely payment has been drawn into even sharper focus as projects become scarcer and funding difficult to obtain.**

document to the GC, the owner and the lender, he's already behind in the dance. Without lien rights the sub is truly at the mercy of the other dance partners.

The next steps involve relationships with the GC and his relationship with the owner/architect/lender. If the sub has a history with the GC, he can simply ask where his money is and expect an honest answer. If the GC blames the owner/lender, the sub can offer to act as the "tip of the spear" in prodding the money loose by using lien rights as a lever. If this is a new relationship, the sub must do his homework before engaging the various parties in discourse.

The sub must ascertain the source of the funding: who controls said funding, when the funds are being disbursed and to whom. If the project is municipal (government) in nature, there are specific rules in most states

that dictate when funds must be disbursed after billing. Knowing the rules (dance steps) in these cases is a critical lever in negotiating payment.

Some other dance steps involve contracts. "Pay when paid" and "pay if paid" contract clauses are illegal in most states, but that doesn't stop them from appearing in most contracts. Proper due diligence will have the sub "excluding" these clauses when signing such documents. The easiest way to do this is to ~~strike~~ the offending sentences from the contract documents and initialing them before returning the signed contract. Protestations of "you can't alter the contract documents!" should be ignored unless you have a desire to give up your right to timely payment.

## The Bottom Line

Knowing when to draw the line in the "getting paid dance" is a matter of

personal choice, but it is a choice that every successful subcontractor must make if he expects to be in business very long. Once again, relationships need to be considered as well as the sub's tolerance for interrupted cash flow, but at some point, he needs to say enough.

Once that line has been reached, the sub's only criterion is getting paid for work performed and he must be ruthless in pursuing the debt. Tactics might include beginning the lien foreclosure process, placing a stop order on the project, contacting the owner/lender and the most precipitous move: pulling off the project, citing breach of contract, until the issue is resolved.

All such actions carry risk to the sub as well as to the GC, so knowing the dance and doing the homework is critical to the sub's chance of success. The last, and most undesirable, action that the sub can take is filing a lawsuit. Avoid that at all costs. The only people who benefit from a legal "dance" are the lawyers. Drawing that sword is a sure way to waste large amounts of time and to lose not only the money in question, but attorney's fees as well. File suit as an absolute last resort.

Lastly, some subs are squeamish about demanding their due. They are afraid of offending the GC at the cost of losing any other work with that contractor. Don't be. Do you really want to work for someone who holds you in such low regard that they would withhold legitimately earned payment? You can work for anyone for nothing. That's not why you are in business. If you do not stand up for yourself, who will? **G**

*The Brooklyn, N.Y.-born author is a retired 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@pro-quilldriver.com.*

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# Staying Ahead of the Curve

*From boiler room to board room, MCAA president Robert Beck says working together in today's changing landscape is key to moving the industry forward*

■ BY JOHN MESENBRINK OF CONTRACTOR'S STAFF

**A**s a former business development manager for Lochinvar, his foray early in the industry taught him how important industry relationships are regarding opportunity and success. For Robert Beck, current President of MCAA, and President and CEO for John W. Danforth since 2018, business development and project management became his forte. From project clerk in a jobsite trailer to president and CEO, Beck's journey is a clear testament that this industry can make dreams come true with hard work and determination. CONTRACTOR recently talked with Beck about his path to the trades and his tenure as MCAA president.



Robert Beck

**CONTRACTOR:** *After working with Lochinvar, what was next in your professional journey?*

**BECK:** John W. Danforth Company hired me early in 1993. [John W. Danforth was CONTRACTOR's Contractor of the Year in 2021 - Ed.] My career at Danforth started in a jobsite trailer as project clerk. My next phase was in business development followed by move back to operational side of business. After developing and advancing in project management, I was appointed to oversee company operations. The executive phase started as

# MCAA

Mechanical Contractors Association of America

**It is the unselfish sharing of information and lessons learned that is priceless to membership.**

a vice president followed by president, and currently CEO since 2018.

**CONTRACTOR:** *At what point did you get involved with MCAA? What were the benefits that attracted you to the MCAA? And, what are some of your past duties with MCAA?*

**BECK:** I first got involved with MCAA in the 1990s when I attended the Institute for Project Management. The caliber of the industry-specific class content, the faculty and instructors, and especially the talent of my fellow students, was extraordinary. They were all rock stars to me. I realized very quickly these were people I wanted get to know. Getting involved with MCAA and building a network of industry leaders as peers was essential to our company success and my professional development.

MCAA appointed me to the Project Manager's Education Committee (PMEC) in 2005 and I was chair for many years. The PMEC is a perfect example of how the MCAA thrives as a member-driven organization. This committee consists of amazing member volunteers who have created a world-class mechanical contracting specific curriculum that ranks second to none. The PMEC acts as program advisors, faculty and instructors.

After various other appointments, assignments and committee positions,

I was appointed to the MCAA National Board in 2015, and I was privileged enough to be voted to the Executive Committee in 2019.

**CONTRACTOR:** *The MCAA is a storied and venerable association. What does it mean to you to be the next president?*

**BECK:** It is both humbling and an incredible honor to serve as President of MCAA. To follow the past presidents as an ambassador of this great organization is a privilege I take very seriously. The foundation and principles of this organization were built by those amazing people who served by leading this organization with vision, strength and integrity. My focus remains the same as when I first became a committee member back in 2005—build upon the momentum those before me have created. It will be our mission to continue the journey and tradition of providing the highest value to our MCAA membership and industry.

**CONTRACTOR:** *We are three years removed from the pandemic. What are some of the major issues facing contractors today, and is some of it a result of COVID residue?*

**BECK:** Our major issue as mechanical contractors largely remain the same on surface but continue to evolve as our industry environment and challenges evolve. The pandemic

reinforced our need to anticipate, identify, manage and mitigate risk at all levels. Risk is not only project or contract related, but also relevant from a technology, market and people perspective.

**CONTRACTOR:** *What are some of your top initiatives to tackle such issues?*

**BECK:** First, by increasing efforts to encourage our industry leaders to engage and participate in our organization. As previously mentioned, the tradition of this world-class organization was built by our membership. We want to motivate our members to participate with relevance and continue to provide best in class value to our members and industry. It is the unselfish sharing of information and lessons learned that is priceless to membership.

Second, find more avenues to connect MCAA companies with our vast resources available to assist with every aspect of our business and industry. Our mission is to provide our member companies the tools to improve, reduce risk and maximize profitability.

And last, but by no means least, we must work together to find ways to stay ahead of the curve by reinventing how we provide value and conduct business in an industry that no longer looks like it did yesterday—and that will undoubtedly look very different tomorrow.

This cannot be done individually but will take collaboration by all of us, from the boiler room to the board room. Working together with our amazing partner, the hard working and greatest skilled trade professionals from the United Association (UA) will be essential. We will have the right talent in the room to get the job done.

**CONTRACTOR:** *What are some core values you've learned during your tenure at John W Danforth that you want to take with you to this new position?*

➤ **Turn to Staying Ahead, page 40**



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# 3D Modeling: Save Money, Reduce Risk, Increase Productivity

by Kelly L. Faloon



**BIM**

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# Two of the biggest adoption barriers are the skills required to do the modeling work and the upfront time required to get it done. The industry can help with that.

**T**he construction industry has a love-hate relationship with technology. Some are wary of any new software/hardware the boss brings back from a convention or trade show. In fact, much of this software and equipment help automate certain processes to reduce errors, increase productivity and save money. All good things, right?

3D modeling is a family of technologies that collect pre-construction, construction and post-construction data into one repository. Conditions can be easily changed, and the entire construction team can view those changes in real time.

However, 3D modeling software is still not 100% adopted by the industry, including mechanical/electrical/plumbing (MEP) contractors. We spoke with Matt Curry, head of product at Avvir, about this 3D adoption problem, and uses for artificial intelligence (AI) and reality capture in today's construction landscape.



Matt Curry, head of product at Avvir.

**CONTRACTOR:** First, let's take a broad view of 3D modeling software use in the construction industry. Do you still see a reluctance for construction professionals to use this technology?

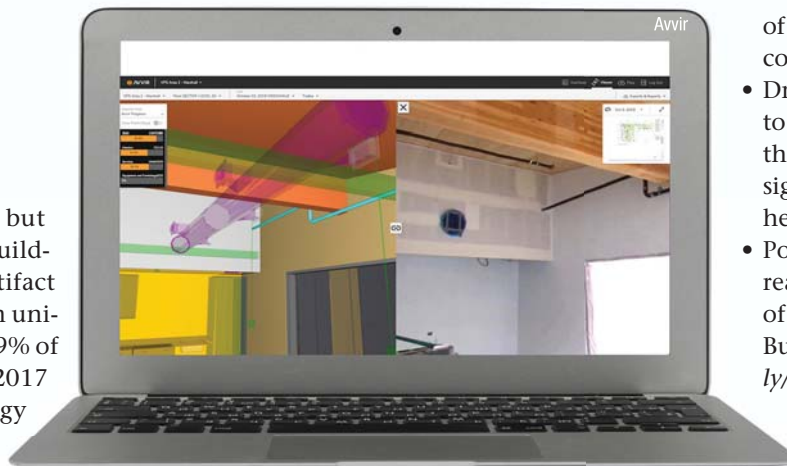
**Matt Curry:** Yes, I see some reluctance but less than five years ago. While adoption of building information modeling (BIM)—the key artifact of 3D modeling—has grown, it still hasn't seen universal adoption. To give you some numbers, 79% of US projects used BIM in 2015, according to a 2017 study in the Journal of Information Technology in Construction (<http://bit.ly/4032sZm>).

We see that BIM becomes more common as project complexity increases. This also bears out in the numbers, according to a 2022 American Institute of Architects survey—architects use BIM on 100% of large-sized projects (<http://bit.ly/3yXXm4G>).

**CTR:** Going to the subcontractor level, how comfortable are MEP contractors—specifically plumbing and mechanical contractors—using such software on their projects?

**MC:** For large construction projects, MEP contractors are generally comfortable using BIM on their projects. It's a capability many MEP contractors have built up in-house to remain competitive when bidding. This comfort shows up in the overall industry adoption rates.

**CTR:** What about the adoption of AI and reality capture technology in the construction industry?



**BIM modeling and federation can help ensure MEP designs have fewer-to-no conflicts with other trades, reducing the amount of field coordination and possible rework.**

**MC:** Let's break this down:

## 1. AI

- AI powers robots such as drones and Boston Dynamics' Spot (<http://bit.ly/3FHANoV>) to navigate the jobsite, but this is often opaque to trades.
- Explicit AI use cases where the contractor is aware of the results are much lower than 3D modeling; it often requires a form of reality capture to already exist on the project.
- During design phases, MEP trades can use general AI/algorithms to automate the drawing and calculating of pipe runs and ductwork

## 2. Reality capture

- Adoption of 360-degree or 2D photos, a form of reality capture, is much higher than 3D modeling. Almost all projects use some form

of photo documentation, as it's a typical contract requirement.

- Drones have gained adoption in the last four to five years as prices have come down and the software and skill required to run them significantly increased. These technologies help automate reality capture.
- Point clouds from LiDAR, another form of reality capture, are less adopted: about 48% of projects use them, according to the 2022 Builtworlds Preconstruction survey (<http://bit.ly/3JXkr4f>).

Avvir is on the cutting edge of this adoption as we use AI to analyze photos and point clouds against BIM to provide automated schedule tracking, cost and earned value analysis, installation issue detection and updated as-built BIM.

**CTR:** How can the industry convince reluctant MEP contractors to take a chance on this technology?

**MC:** We've seen the highest adoption when forced from the general contractor (GC) or specified by the owner in the contracts. Beyond that, the best way to convince MEP contractors to adopt BIM is to demonstrate how it will reduce their risk—from planning to execution—and then use it to prove it will reduce costs.

Beyond proving it, the industry can help MEP contractors adopt 3D modeling by making the process easier and quicker. Two of the biggest adoption barriers are the skills required to do the modeling work and the upfront time required to get it done. Some



startups are trying to tackle this problem but don't have widespread adoption.

**CTR:** *With high construction costs, how does 3D modeling technology save MEP contractors money?*

**MC:** 3D modeling can help MEP contractors save money during the design and construction phases of the project.

To elaborate, in the planning phase, BIM modeling and federation (the process by which all subs models are "collected" into a single source of truth) can help ensure MEP designs have fewer-to-no conflicts with other trades, reducing the amount of field coordination and possible rework. This process reduces the back-and-forth required to coordinate complex work across multiple trades.

During construction, modeling design changes in the BIM can reduce the amount of coordination around change orders or other field coordination issues. Many projects keep their BIM current when fieldwork diverges from the design plan. Coordinating around an up-to-date BIM makes coordination quick, easy and effective, allowing trades to focus on actually building and staying on schedule.

**CTR:** *Productivity issues are always a concern on construction jobsites. Can these high-tech software products help keep workers efficient and accurate?*

**MC:** BIM by itself can improve productivity by making it easier for trades on-site to be efficient and accurate. It does this by helping improve the planning and coordination processes. Think of the adage, "Measure twice, cut once." BIM enables you to build the project virtually to uncover mistakes before you get into actual construction.

Real productivity comes when you combine BIM with point clouds from a LiDAR scanner. This analysis can improve productivity by catching mistakes before they become too costly (i.e., quality control). To find mistakes, a project team scans an area of their project, loads the point cloud into software on a computer, and analyzes the point cloud to detect issues.

A skilled virtual design and construction team, or users of Avvir's software, can identify when walls aren't plumb, concrete isn't flat or if contractors made installation mistakes—without having to inspect the site in detail. Automating this process yields massive efficiency gains.

**CTR:** *Can this technology identify safety issues?*

**MC:** Yes, it is one of the primary use cases! You can identify safety issues during design and construction phases.

During design, you can use BIM to identify potential safety issues by finding code violations or catching poor planning. While certain parts of the permitting process are out of your control, BIM can



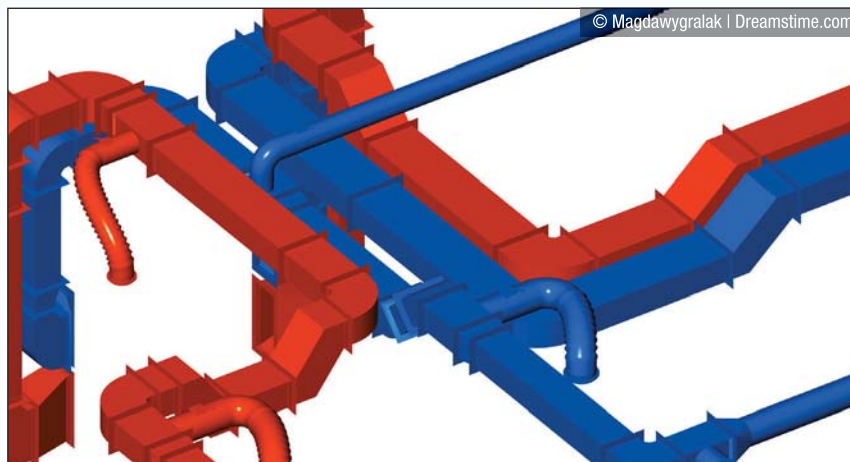
Software such as Avvir connects BIM to reality capture and uses advanced AI to automate processes and give the project team more control.

automate a baseline adherence to code. This automation drastically reduces the permitting review process.

For example, a product called ComCheck automates and speeds up the process of confirming energy code compliance checking for commercial buildings.

BIM allows for more careful, detailed planning and coordination before a project breaks ground, which leads to improved on-site safety.

Similarly, during construction, you can compare the BIM to other forms of reality capture (e.g., 360-degree photos or LiDAR) to remotely monitor your jobsite's progress. Remote monitoring reduces



BIM ventilation system design.

the number of people on-site, which reduces the possibility of safety issues.

Beyond this, remote monitoring often results in weekly documentation and visual issue identification used to encourage and manage safe, clean working conditions.

**CTR:** *What about risk analysis?*

**MC:** BIM by itself can reduce the risk of schedule delays and project overruns by improving planning. However, to truly manage risk with BIM, it needs to be connected to a form of reality capture with advanced analysis on top of the data.

Avvir helps with this by connecting your BIM and reality capture into a single point for insights and context. It connects pre-construction design data (schedule, work breakdown structure, quantity

takeoff, BIM) to construction data (360-degree photos and videos, LiDAR point clouds).

Combined with advanced AI on top of this data, Avvir gives project teams control and insights with automated schedule tracking, cost and earned value analysis, installation issue detection and an updated BIM with as-built conditions.

**CTR:** *What are the top three issues most overlooked on construction projects? How can 3D technology help resolve them?*

**MC:** First is data overload: 96% of captured data on-site goes unused, which adds noise to an already chaotic jobsite (<http://bit.ly/40swOUO>).

This leads to confusion and increased headcount—someone has to wrangle the data to make it actionable!

Second, data silos. When data is created and used, it often sits in a silo. You do one task (e.g., status your BIM manually to determine what is built and not built, using BIM as the canonical truth for design to calculate building progress), but follow-on tasks are frequently done independently. For example, it is common for a project to status its BIM but still use the super's estimate for calculating progress when updating schedules.


Third, data mistakes. Not only is there too much data living separate from other data but there is a human element to enter, synthesize and make sense of the data. Humans are great problem-solvers, but anything done manually introduces potential human-created errors.

3D modeling can reduce these problems by centralizing all data into the model, creating a canonical, always up-to-date repository of project information. This requires time, dedication and skill of the GC and the trades.

Avvir simplifies connecting, synthesizing and acting on this firehouse of data with an accessible, friendly user interface that encourages total team interaction.

**CTR:** *What advice would you give MEP contractors considering adopting this type of technology?*

**MC:** I think the most important advice I can give is to accept that you will make mistakes at first. 3D modeling is a skill that requires practice to become competent. It's easy to try it once, make a mistake, and give up on the technology and process. It'll take a few tries to fully master the skill and integrate the modeling into your progress.

Luckily, many resources are available to get started and the technology is more accessible than ever. There are good, publicly available "how to" guides and step-by-step videos online for a motivated subcontractor to increase skills and prepare for the future. The more sophisticated GCs are eager to partner with advanced MEP subcontractors and will eagerly collaborate on 3D modeling. 



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by Patrick Linhardt

HYDRONICS MANAGER AT CORKEN STEEL PRODUCTS CO.



## Last Chance

It was an unusual problem with old cast iron radiators that were piped for gravity circulation back when the house was built. I had met the contractor before at the house to help him size the replacement high efficiency boiler and decide how to pipe it to the old system. High efficiency hot water boilers work great with cast iron radiators and large pipes.

It's a perfect mix of the old and new. All that cold water coming back to the boiler creates a lot of condensation—the sign of high efficiency. The more it condenses, the more latent heat is transferred to the water, which results in less heat from the burner escaping up the flue.

It is a single zone system, as most gravity systems are, so the piping would be full flow through the fire tube type heat exchanger. Just one pump to move all that water around. Heck, the water moved around on its own when the house was new, some ninety years ago.



One of the unusual flow control fittings.

### The Problem

After the homeowner signed the contract and the energy saving boiler was installed, the problem started. Of course, the system worked fine with the old boiler. The homeowner was complaining that some radiators weren't getting as hot as the others. I agreed to meet the installer at the job to help get the system back to working fine.

The main culprit was in the room they use the most. Go figure. The homeowner also knew the owner of the company, since they were close neighbors

for years. So I also got a call from him. (Side note: he was the only person older than me at this year's local heating association Holiday Dinner.)

Turns out, it wasn't just one or two radiators. It was every radiator on one side of the house. The piping was originally laid out with two supply/return mains, which is pretty typical of this size house. One main distributes to one side of the house while the other main distributes to the other side. Sometimes it is split front to back.

The new boiler's supply pipe was toasty warm past the pump, past the branch tee to the problem main, and past the transition from copper to the existing large steel pipe on the working main. The water temperature on the problem main quickly dropped from toasty warm to not warm at all before its connection to the original piping. Radiators weren't going to heat without circulation.

### The Mystery Deepens

This system was converted from gravity to forced circulation some years ago. As I was searching for a reason why the water didn't want to go where it used to, I found some strange fittings. There were four of them. One each as the pipe changed from 2" to 1". They had labels that were hard to read, but I could make out "flow-control." Since I hadn't seen them before, I suspected that they might be the problem.

As part of the troubleshooting, I slowly closed the valve on the working main to slow flow on that main and hopefully increase flow to the problem main. The more I closed it off, the quicker the boiler cycled off on temperature. It was like the problem main wasn't getting any flow. It is hard to imagine that the original 2" pipes had a clog or restriction, so I concentrated on the 1" pipe.

On that 1" pipe was that strange fitting, which looked like a reducing coupling. It was 1" on the inlet and 2" on the outlet. The same fitting was on the supply main that was working. I told the installer that we would have



Say, what could that be?



Old shop towel looking much the worse after its travels through the system.

to open up the 1" copper pipe on the problem main before the strange fitting to see what it looked like and if through the years some kind of build-up inside was obstructing the flow, my only plausible explanation.

Fortunately, the old ball valves on the existing copper supply lines were leaking at the stem and the homeowner wanted them replaced. That would provide the access I requested, but it was going to be a few days before they could schedule the repair. I told him I wanted to be there. Of course the owner called to check progress. I told him what I suspected, without any confidence that I was right.

### Out of Chances


By the morning I returned, I convinced myself that this was the last chance. If there wasn't an obstruction, I didn't have a clue. I like to have options, some type of backup. In the words of a retired service manager, I was "nervous and excited."

The installer drained the system while my tension grew. The homeowner was right there to watch. The installer then cut the pipe on both sides of the leaky ball valve in the problem main. Water poured out of the side connected to the strange fitting. Immediately, I realized that it must not be clogged if water was pouring out. It soon stopped. If that wasn't the clog, where was the clog? I'm thinking I'm out of chances.

The other side didn't have any water coming out, which made some sense since the system was drained. I shined my light into the pipe to look at the inside of the strange fitting. As you can see in the photo, no buildup or obstruction. Then I went to shine my light into the other side, but as you can see in the photo, light wasn't necessary.

Right in the branch of the tee to the problem main was the obstruction, a shop towel. It was so close to the pipe cut, the installer was able to reach in and pull it out. Immediately, he declared that it is a blue shop towel and that he uses white shop towels, so it wasn't left by him. The towel also showed a certain amount of age, and this job was only a week old.

I was relieved that we found the problem, but a question remained. If the towel was there previous to this install, how did the system work fine before? The towel was in the portion of the pipe that was re-used. It could have been loosely lodged in the common 1-1/4" pipe before the branch tee, letting enough flow to each supply main to allow the radiators to heat.

Then, when the new pump turned on and started moving water, the rag moved and got caught in the branch connection, blocking flow to one side. I can't make this up. 

*Patrick Linhardt is a thirty-seven-year veteran of the wholesale side of the hydronic industry who has been designing and troubleshooting steam and hot water heating systems, pumps and controls on an almost daily basis. An educator and author, he is currently Hydronic Manager at the Corken Steel Products Co.*



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WATER HEATERS





## Design Envelope Pump Delivers Energy Upgrade for Toronto Hotel

■ SPECIAL TO CONTRACTOR

TORONTO, ONT — The Park Hyatt Toronto is located in the city's Yorkville neighborhood, home to museums, art galleries and swank cocktail bars. The luxury hotel recently underwent a four-year renovation, the largest facelift in the property's 85-year lifespan.



The Park Hyatt Toronto, following its four-year renovation.

The renovation included major structural changes to the original towers, designed by architects Peter Dickinson and Hugh Gordon Holman, as well as refreshed restaurants and amenities. All 219 guest rooms—including 40 suites—have been entirely revamped, as have the rooftop bar (the Writer's Room), boardrooms and ballrooms. The ground-floor podium that connects the hotel's two towers received a complete overhaul, as did the entrance, which is now adorned by an abstract bronze sculpture by artist An Te Liu.

### Don't Forget the Mechanicals

When planning the renovation, managers at the Park Hyatt wanted to improve heating efficiency and reduce energy use. Armstrong Fluid Technology—a leader in demand-based control, digitalization, fluid flow, and heat transfer technology for the last 80 years—



A view of the mechanical room at the Park Hyatt, Toronto.

The new Design Envelope pump from Armstrong reduced energy usage by 60%.



A partial view of the pipe-mounted UL 778 pumping unit

recommended replacing 1 of 2 existing pumps with a Design Envelope DEPM pump, to provide a head-to-head efficiency comparison.

In addition to offering 24/7 service and support, Armstrong was able to provide comprehensive assistance during the design and specification phase.

Installation, set-up and commissioning all proceeded smoothly. The pump's vertical In-line design eliminated the need for inertia bases, housekeeping pads, and flex connectors while reduces piping requirements, greatly simplifying the installation process. Integrated intelligent controls eliminated the need for separate mounting of the variable frequency drive (VFD) as well as procurement, installation (including wiring), calibration and upkeep of the differential pressure sensor.

The pipe-mounted UL 778 pumping unit features:


- Ductile iron e-coated casing
- Stainless steel impeller
- Sintered silicon carbide mechanical seal
- Split-coupling design

Flow requirements were 600 GPM at 75 ft. of head.

### Results Matter

The performance of Design Envelope DEPM technology, with high-efficiency motors, meant that the pump could provide the required output using a smaller motor - just 15 HP. The smaller pump (and motor) selection helped to reduce capital costs.

All told, kWh consumption was reduced from 1.66 to 0.66, an energy savings of 60%, with an annual cost savings of more than \$17,000 (USD). Average annual CO<sub>2</sub> emissions were reduced from 96,283 kg. to 80,831 kg.—a savings of 16,442 kg. And the efficiencies don't stop there.

Armstrong maps each individual pump's hydraulic, motor and inverter variations at the factory to achieve exceptional accuracy throughout the flow range. With this calibration, Armstrong Design Envelope pumps also serve as flow meters, providing reliable system flow data (+/- 5%). The testing ensures optimal performance efficiency at start-up, while Armstrong's Pump Manager works via an Internet connection to enhance reliability and sustain peak performance over the life of the pump. 



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## Rheem Earns Third Consecutive Energy Star Partner of the Year Honor

ATLANTA, GA – Rheem®, a leading global manufacturer of water heating and HVAC products, has received the United States Environmental Protection Agency's 2023 ENERGY STAR Partner of the Year–Sustained Excellence Award. This marks the third successive year that ENERGY STAR has recognized Rheem as a Partner of the Year.

The ENERGY STAR Partner of the Year Award honors companies that demonstrate an unwavering commitment to saving energy and protecting the environment. Award winners lead their industries with energy-efficient products and services to provide substantial savings in homes, buildings and facilities.

Rheem offers an extensive line of high-efficiency and ENERGY STAR certified heating, cooling and water heating products that help homeowners and



businesses reduce their energy usage and greenhouse gas footprint. Rheem's *A Greater Degree of Good™* initiative ensures that sustainability is embedded in every facet of the organization—from Rheem's products to its people and manufacturing processes.

### Historic Efforts

"As we accelerate historic efforts to address climate change, public-private partnerships will be essential to realizing the scale of our ambition," said EPA Administrator **Michael S. Regan**. "I applaud this year's ENERGY STAR award winners for working with EPA to deliver a clean energy future that saves American consumers and businesses money and creates jobs."

"Receiving this honor for the third consecutive year is a testament to Rheem's genuine commitment to sustainability," said **Mike Branson**, president, Rheem Global Air. "Innovating energy efficiency into our products' DNA is a top priority for improving our global environmental impact. Today and every day, we are proud to be an ENERGY STAR partner."



"We take the ENERGY STAR Partner of the Year award seriously at Rheem, because it affirms our belief that *sustained excellence*, indeed, will make a major difference for our contractors, consumers and most importantly, the next generations to inhabit our planet," said **Rich Bendure**, president, Rheem Global Water. "Not only are we designing ENERGY STAR certified products, we are also refining our manufacturing processes—end to end—to ensure we are leading the decarbonization revolution from the workplace to the marketplace. We are thrilled to have trained over a quarter of a million plumbers and contractors over the past four years on sustainability and high-efficiency products and applications."

### Groundbreaking Products

Innovating with intent and engineering environmentally friendly solutions has set the course for Rheem to bring groundbreaking products to market. Rheem has been recognized for designing for decarbonization by developing heating, cooling and water heating products that use alternatives to fossil fuels to reduce carbon emissions. In addition, Rheem showcases the benefits of ENERGY STAR certified products to plumbers, contractors, consumers and end-users across the nation through its training, marketing and product guides.

Award recipients are selected from a network of thousands of ENERGY STAR partners. For a complete list of 2023 winners and more information about the ENERGY STAR awards program, visit [energystar.gov/awardwinners](https://energystar.gov/awardwinners).

## Uponor Announces New VP Role for Integrated Supply Chain

APPLE VALLEY, MN — Uponor North America (Uponor) recently announced **Jon Sillerud**, Vice President, Operations, has agreed to accept the additional responsibilities of leading the Supply Chain function for the company, effective immediately. He has been filling the Supply Chain leadership role on an interim basis for several months, proving his experience and extensive knowledge make him the ideal person to lead both functions. His new title is Vice President, Integrated Supply Chain, Uponor North America.

Since 2017, Sillerud has led North American Operations, a critical function that includes manufacturing, maintenance, quality, process engineering, real estate, security, and safety. In his newly expanded role, he will also guide the Supply Chain strategy and team, building partnerships with suppliers and leading continuous improvement initiatives that cover supply planning, production scheduling, distribution, transportation, and inventory.



Jon Sillerud

"Under Jon's leadership, our business will accelerate its lean manufacturing journey and ensure we continue to drive our growth trajectory under the priorities of safety, quality, delivery, productivity, and continuous improvement," says **Andres Caballero**, President, Uponor North America. "I am thrilled to have Jon expand his leadership role and look forward to the success he will bring for the Integrated

Since 2017,  
Sillerud has led  
North American  
Operations,  
a function  
that includes  
manufacturing,  
maintenance,  
quality, process  
engineering, real  
estate, security,  
and safety.

Supply Chain functions in North America."

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by Patti Feldman  
COMPUTER AUTHORITY



# E-commerce, Field Service, and Load Calculation Apps

**Click To Buy Services** ([www.clicktobuyservices.com](http://www.clicktobuyservices.com)) is a flexible e-commerce platform that gives home services companies the ability to accurately estimate and sell their services online. It can connect to any website and allows customers to click on various services, view accurate pricing and flexible payment options (e.g. monthly, semi-monthly, quarterly, and annually), accept it, and then pay upfront by credit card before work begins. The format allows homeowners to buy services 24/7/365.

To help ensure customers are a good fit and to accurately calculate services before committing, Click To Buy provides qualifying and disqualifying questions and validates that customers are within your service boundaries.

Service companies can also use the platform to supercharge marketing initiatives by allowing direct linking to service checkout pages, use of coupon codes, and automatic discounting when select services get adding to a shopping cart.

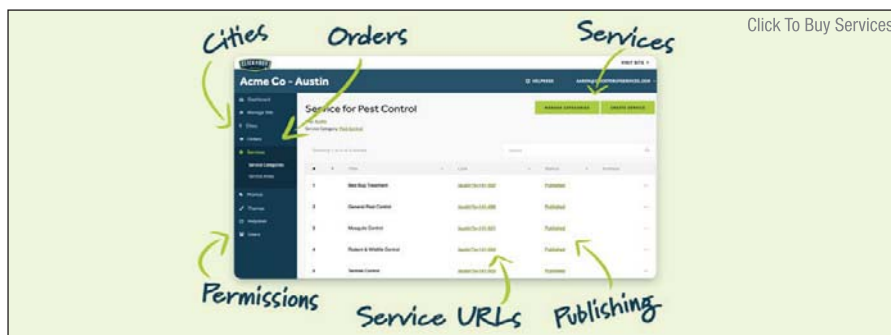
Click To Buy is also integrated into Zapier ([www.zapier.com](http://www.zapier.com)), which allows businesses to build simple yet sophisticated workflow automation with their favorite online software. For example, when a service is purchased online it can automatically trigger events like sending customers information directly to CRM tools, populating spreadsheets, and even creating more complex automation that includes text messaging and QuickBooks invoicing.

Each location in Click To Buy has its own centralized dashboard for tracking such data as best-selling services, average monthly purchases, and annual current revenue.

**Pricing:** one-time custom set-up cost + a monthly fee scaled by number of locations and services offered.

## Kickserv

**Kickserv** ([www.kickserv.com](http://www.kickserv.com)) is field service software that enables companies to create professional estimates, schedule one-time and recurring appointments and, through its



A shot of the Click To Buy Services admin page from their company web site.

## Reviews of Click To Buy Services, Kickserv and a bundle of load calculating apps.

mobile app, invoice clients in the field, capture signatures, and collect payment through an integrated payment platform.

You can set up multiple service locations under one parent account. When you request a payment from the Kickserv mobile app, the customer's mobile device is sent a text or email.

A planner tool lets you see which technician is where for efficient scheduling. Technicians can create estimates and invoices and request payments from clients' mobile phones by text or email.

Through the integrated Customer Center, clients can request an appointment, leave notes for the technician and pay an invoice. Kickserv has incorporated Karna, an installment plan payment option enabling customers to "buy now and pay later" which transfers funds, upfront, into Stripe account (a payment processing platform) with fees collected and Karna collecting the payments from your customer.

Kickserv also integrates with QuickBooks Online, Stripe (payment processing), and MailChimp ([www.mailchimp.com](http://www.mailchimp.com)), a marketing platform for small businesses.

**Pricing:** Kickserv has a 14-day free trial, a free plan (for up to two users) and four paid plans scaled by number of users and other limitations/allowances.

All plans include estimates, CRM, customizable tags, Customer Center. The paid plans include automated email and text reminders, 20+ business reports, and time tracking. Three of the four paid plans also include dispatch mapping and GAPS check-in, custom reports, and the ability to add (for a fee) integration with QuickBooks Desktop.

## HVAC Load Calc Bundle Plus

**HVAC Load Calc Bundle Plus** ([www.carmelsoft.com](http://www.carmelsoft.com)) packages together six of Carmelsoft's HVAC iOS apps, all optimized for the iPad and/or iPhone.

*HVAC ResLoad J* performs peak cooling and heating load calculations per ACCA Manual J8 for residential and light commercial buildings and uploads your projects to the cloud for sharing with other authorized technicians.

*HVAC Psych HD* plots HVAC and other psychrometric processes on the iPad screen while in the field, saving the (customizable) graph and emailing the graph and results to yourself and clients.

*HVAC Duct Sizer* sizes one HVAC duct run or a range of duct sizes. Users can specify in CFM (or L/s), the aspect ratio, and either the total velocity of air or the friction loss per 100 feet. The results include the exact and rounded height and

width (or diameter) dimensions and the calculated velocity and friction loss. The app uses slider controls to quickly increment or decrement the input values and immediately observe the calculated results.

*HVAC Pipe Sizer Plus* includes three pipe sizer apps, for liquid, steam, and gas (low and high).

*HVAC Ref Charge* is a refrigerant charging calculator for performing superheat and subcool refrigerant calculations on the fly. It includes pressure/temperature data for 100+ refrigerants including both dew and bubble versions of many azeotropic refrigerant types.

*Steam Tables* calculates 23+ different combinations of input parameters for saturated and superheated steam. *HVAC Equipment Locator* (also embedded in most of the above apps) enables tracking of customer equipment, nameplate, and maintenance data, including photos and spec sheets and allows you to upload the information to the cloud for sharing with other technicians.

The bundle also runs on all new Apple MacBooks with the M1 and M2 chips.

**Pricing:** downloadable at the App Store, one-time fee includes free updates.

## Update

**ServiceBox** (covered in January 2023 column) recently added ServiceBox Purchasing, enabling a user to import (from QuickBooks Desktop, QuickBooks Online, or Sage 50 Canada) or create vendor lists, send purchase orders to any vendor, track what is received, and push results into inventory or accounting. The new feature enables ordering from mid-job and having the items added under the "Time & Materials" tab once you designate the items are received. **C**

*Patti Feldman writes articles and web content for trade magazines and manufacturers of building products. She can be reached at [productpad@yahoo.com](mailto:productpad@yahoo.com).*



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by Matt Michel  
MARKETING AUTHORITY



# Do You Need a Business Coach?

**T**op performing athletes, no matter the sport, share one thing in common: they are all coached. What athletes understand is that even though you are elite, you can always improve and unless you continue to work on your game, your game will suffer. It is true in sports and it is true in business.

## What to Expect from a Coach

A coach is not someone who will parachute in and take over your job or one aspect of your job. A coach will not run your company for you, just like a football coach will not take the field. The coach's role is limited to game preparation and the sidelines. You are the one playing the game.

Thus, coaches focus on personal improvement. They focus on helping you improve your game. The role of the coach is to help you become better so that you know what to do and how to do it.

## Identify Where Your Game Needs Help

Even at the high school level, the typical football program has a coaching "staff." Why more than one? It's simple. Different coaches focus on different positions. Different coaches will even focus on different areas of improvement.

The coach who helps you improve your leadership skills may not be the same coach who works with you on, say, public speaking. First, you need to identify what you want to improve. Is it your human resources management, your financial management, your focus, your emotional intelligence, or some other area? Until you know what part of your game you want to work on, you cannot begin searching for a coach.

## Finding a Coach

An old proverb states, "When the student is ready, the teacher will appear."



**You can always improve and unless you continue to work on your game, your game will suffer. It is true in sports and it is true in business.**

This is somewhat true when it comes to finding a coach. When you begin actively looking, you will find the right coach, but maybe not right away.

Look for potential coaches at industry meetings, chamber of commerce events, or even your service club. Talk with your network. Ask your banker about coaches. Talk with successful people and you will increase the odds of encountering a successful coach.

Some coaches are formal, professional coaches. This is what they do for a living. Others might be more like mentors who take an interest in you and agree to help you improve. The latter type can even be peers, such as older plumbers who are looking for ways to pay it forward to others in the trade.

## Be Coachable

When a coach gives you his time, whether for compensation or not, you owe it to him to be coachable. You must

listen, openly to suggestions. You must ponder thoughtfully, any questions.

Good coaches will speak truth and sometimes you will not want to hear the truth. It can be painful. Just remember, you need truth. You will not get better from flattery.

## Alternatives to Coaches

As noted, the right coach may not come along immediately, but once recognized, the need to improve is pressing. You do not want to wait, nor do you need to wait to make improvements. Here are a few steps you can take in the interim:

- Get involved with your local trade association chapter. Not only is this a good source of coaches, it will also offer programs that you can benefit from immediately.
- If you are not already a member of the chamber of commerce and a service club (e.g., Rotary, Lion's,

Kiwanis, Optimist, or Civitan), get involved. These organizations will benefit you and your business in a myriad of ways.

- Attend every seminar and conference you can manage. This includes conferences with a plumbing focus and more general small business conferences. Lack of time and lack of money are no excuses. If you attend the seminars and pay attention, you will pick up new ideas or business practices that will either make you enough money or save you enough to cover the cost of attending.

- Invest in the membership in a business alliance. This may be the best way to find a coach since most alliances have coaches on staff and others who are affiliated. Alliance memberships are generally the fastest path to business and personal improvement. Most plumbers find these to be a sound investment.

- Finally, do not overlook the value of business books. If you are reading this you are off to a good start. Read *CONTRACTOR* every month. Read great business books written by people who have run small businesses and it is almost like you are receiving their coaching. If reading is not your thing, many are available as audiobooks.

Above all, if you seek personal improvement, get started. Nothing will happen until you *make* it happen. Get started! **C**

*A good starting point for a business alliance is the Service Roundtable. While largely self-service, it is the largest and most affordable alliance serving the plumbing profession. Buying group rebates will usually cover the cost of your membership. Learn more at [www.ServiceRoundtable.com](http://www.ServiceRoundtable.com) or call 877/262-3341.*



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by Sean Comerford  
APPLICATIONS MANAGER AT OATEY CO.

# An Overview of Water Supply Pipes and Joining Methods

The behind-the-wall framework of a home contains a vital plumbing system that keeps it running efficiently and safely. Within every residential plumbing system you have subsystems that include water-supply pipes, drain pipes, vent pipes, and gas lines.

Each subsystem acts as a key component in the complexity of water supply, waste removal, and more. The water coming into the home (potable water)—either from a well or from a public utility company (water purveyor)—is called the water supply.

From a master bathroom shower to the basement toilet, the water supply system circulates water throughout the home efficiently by the touch of a button or a simple turn of a handle. A structure of pipes, ranging from  $\frac{1}{4}$ " to 1- $\frac{1}{4}$ " inches in diameter, supports the distribution of this water.

Whether you're a new pro entering the industry or a seasoned plumber in need of a quick refresher, this article will provide an overview of the types of piping responsible for routing water supply. It will also help you select the most effective and efficient pipe-joining methods and products for each pipe job.

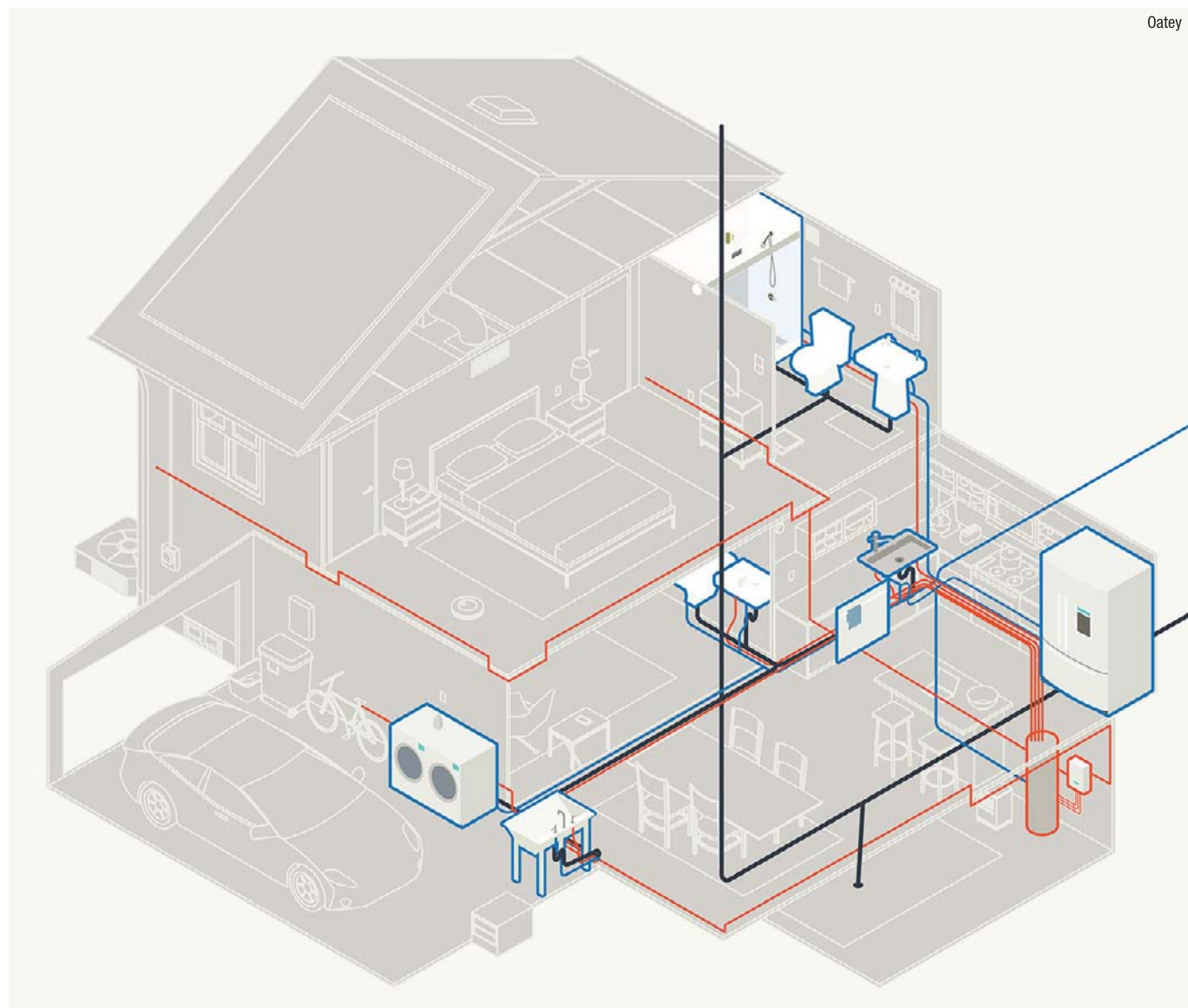
## Copper

Commonly used, copper pipe offers a lightweight portability that can be easily transported to and within a home. With their high thermal conductivity and durability, copper pipes provide long-term reliability to homeowners.

Although the properties of copper pipe offer some corrosion resistance, corrosion can manifest over an extended period of time. We recommend advising homeowners to conduct annual inspections to locate any leaks that can occur over time and avoid corrosion-related health hazards.

Copper-sizing options range from  $\frac{1}{2}$ " to 8". For residential applications, the most commonly used copper pipe is Type L.

This durable metal contains formable properties that allow the pipe to



Oatey

**Whether you're a new to the industry or a seasoned pro in need of a quick refresher, this article will provide an overview of the types of piping responsible for routing water supply.**

bend and form to your liking; however, when copper tubing requires connection, you can easily solder these pipes and fittings.

Soldering (or sweating) is a critical step in the copper-installation process. Solder is a metal or alloy that

historically consisted of lead (known as lead-based solder) and tin in various proportions. Today, due to the Safe Water Drinking Act and lead-free restrictions, solders that contain more than 0.2% lead are not permitted for use in potable water systems.

Solders that are safe to use on potable water systems contain a percentage of tin and a combination of other nontoxic metals. The melting point of solder is lower than copper, and when heated, solder melts and fuses the piping together once completely cooled.

In addition to choosing the proper type of solder for your application, you will need to select the right type of copper pipe and flux, a compound that promotes the flow of molten solder between the pipe and fitting through a process known as capillary action.

Flux is also formulated to remove any oxidation from pipe and actually etches pipe surface in preparation for the



soldering process to be successful. Important variables, such as pressure and temperature, local code guidelines and any job-site time limitations, should all be considered prior to purchasing your soldering supplies.

Learning how to solder copper pipe can seem daunting at first, but by applying proper techniques and avoiding typical errors, it becomes much easier to execute a leak-free pipe joint.

Some common mistakes professionals make during the soldering process include using the wrong products, skipping prep, applying too much flux, overheating the joining, and neglecting cleanup.

Below are some brief product guidelines to keep in mind for your next copper pipe project.

#### Types of Copper Pipe

- **Type K:** This type has the thickest wall and strongest durability. It is commonly used for commercial plumbing, such as underground water mains for potable water supply and HVAC lines.
- **Type L:** Wall thickness falls between Type K and M. Typically used for interior hot and cold-water distribution.
- **Type M:** Has the thinnest wall and is the most popular choice for domestic plumbing systems due to its light weight, decreased rigidity and affordability.
- **Copper DWV:** Commonly used in older homes for vents and drains, it is no longer a popular choice among modern-day homeowners, as there are more cost-effective options available.

#### Types of Flux

- **Petroleum-based Flux (or Petrolatum Flux):** Flushing is required with this flux, which is designed to provide superior wetting properties for better solder flow. It is compatible with all common plumbing solder alloys, such as copper, copper-coated metals, brass, zinc, galvanized iron, lead and tin.
- **Hot Weather Flux:** Specially formulated for hot weather climates, this flux will not separate in temperatures up to 135°F.
- **Water-soluble Flux:** Water flushable, this flux is compatible with all common plumbing solder alloys.



(Left) A tech soldering a copper joint. (Right) A technician applies flux to the end of a piece of pipe.



#### PEX (plastic)

Cross-linked polyethylene, or PEX, pipe, has gained popularity over the past three decades among professionals, DIYers and homeowners. Why?—fewer pipe connections, alleviated installation labor, and less potential leaks.

This flexible plastic material can bend around corners and through walls and floors, connecting to a PEX manifold that is itself connected to the main water supply, thereby eliminating the need to make a pipe connection every time there is a change in direction.

PEX is also corrosion-resistant and can expand, offering resistance to cracks as temperatures drop to freezing. Often marked with a lacquer finish—colored red or blue to distinguish between hot and cold supply lines—PEX can be connected to existing metal supply lines using the appropriate fittings, eliminating the need for soldering completely.

PEX pipe and fittings range from  $\frac{1}{4}$ -inch to 1- $\frac{1}{4}$  inch copper tube size (CTS) in both inches and metric diameters, with hydrostatic pressure ratings of 160 pounds per square inch (psi) at 73°F and 100 psi at 180°F.

#### CPVC (plastic)

Chlorinated Polyvinyl Chloride, or CPVC, contains properties resistant to corrosion and damage by highly chlorinated domestic water. This lightweight thermoplastic material can withstand

➔ **Turn to Overview, page 42**

- **Tinning Flux:** Available in both water-soluble and petroleum-based formulas, this flux is enhanced with tinning powder particles to pre-tin piping and improve the flow of solder, as well as enable even heating of a fitting. The latter is necessary when soldering larger diameter piping systems. This flux is compatible with all common plumbing solder alloys.

Although petroleum-based fluxes are safe to use, they are required to be flushed with a chemical solution from the piping system due to their water insolubility. However, water-soluble fluxes become self-cleaning and flush away once water enters the system. Refer to manufacturer instructions for product-specific application and safety guidelines to ensure proper use.

#### Types of Solder

- **Tin-antimony Solder:** Contains 95% and 5% antimony, this solder

is lead-free and safe for water supply lines. Designed for use in plumbing applications where frequent extreme temperature changes and vibrations occur (refrigeration, cooling equipment and heat ducts); can also be used to solder electronics, tin-antimony solder has a melting range of 450°F to 464°F. Has an unlimited shelf life.

- **Copper-tin Solder:** Contains 97% tin and 3% copper. Lead-free and safe for water supply lines. Designed for sweating copper and brass plumbing joints. Melting range is 440°F to 572°F. It has an unlimited shelf life.
- **Silver-bearing solder:** Contains silver, copper, bismuth and tin. Lead-free and safe for water supply lines. Ideal for low-lead brass applications. Has a wide melting range (420°F to 460°F) that enables more time for soldering joints.



by Sam Bowman  
TECHNOLOGY WRITER



# Bridging the Gap Between Wellness and Productivity

Once upon a time, business owners might have paid little attention to the lives and well-being of their employees outside of working hours. Relationships between employers and employees were largely transactional. The employees contributed their labor during designated business hours and in return, the employer provided fair compensation, good benefits (hopefully), and safe working conditions.

But that was pretty much the end of the story. How an employee lived, spent their time, and thrived (or not) outside of the office might have been of interest to the employer, but it was typically not a prevailing business concern.

In recent years, however, savvy business leaders have begun to take a different tack. They have come to recognize the profound connection between their employees' lives outside of the company and their productivity and performance in it.

This is as true for the skilled trades as it is for white-collar jobs, if not more so. And that is why, if you own or manage a plumbing company, one of the best things you can do to enhance your workers' productivity is to prioritize their wellness.

This article describes the connection between wellness and productivity in the plumbing industry. It also provides actionable strategies to optimize the physical, mental, and emotional well-being of your team as a tool to promote overall productivity in your plumbing company.

## Wellness and Productivity

Any good business owner knows that employees aren't automatons. They can't simply turn off their troubles when they walk through the company door. Whatever is happening in their personal lives off hours will, inevitably, bleed into their work performance to some degree.

And while you certainly can't control what employees do or experience off campus, you can provide resources



**Savvy business leaders have come to recognize the connection between their employees' lives outside of the company and their productivity and performance in it.**

to help your team live their best lives both on the job and off. This includes giving your employees tools to ensure total wellness, from enhancing physical health to promoting mental well-being.

In return for your efforts to support your employees' health and happiness, you can expect not only higher productivity, but also less absenteeism and turnover and more engagement.

## Supporting Work/Life Balance

In the face of an ongoing labor shortage, particularly in the trades, maintaining a healthy work/life balance can be a formidable challenge for your employees. Not only may they feel that it's logistically impossible for them to take a needed vacation day or even to refuse to work overtime, but they may fear the repercussions of doing so.

However, if you want to keep your workers healthy, focused, engaged, and

motivated, it's imperative to create a workplace culture that truly supports work/life balance. Providing ample opportunities for paid time off and instituting restrictions on overtime work can help your team feel comfortable in taking the time they need to rest, recharge, and rejuvenate themselves for the next workday.

## Supporting Workers' Extracurriculars

Extracurriculars aren't just for students. In fact, helping your employees cultivate a physically, intellectually, emotionally, and socially rewarding lifestyle outside of the office is a great way to enhance their work performance.

For instance, regular engagement in a hobby such as gardening, hiking, painting, playing an instrument, or dancing, can significantly improve your employees' memory and concentration. The good news is that there are

many things you can do to incentivize your employees to engage in extracurricular activities. You might, for instance, offer discounted memberships to a health facility where they can engage in exercise classes, sports, dance, yoga, or physical activities.

You might also host recreational events for your team and their families. This might include anything from starting up a company bowling or softball team to less structured activities, such as biking, hiking, swimming, or camping once or twice a month.

## Supporting Financial Wellness

Promoting your employees' productivity and performance is, to be sure, predicated on the optimization of your employees' physical, mental, and emotional well-being. But there's another element: financial wellness. When your employees are stressed out, anxious, and worried about their finances, not only will their work performance be compromised, but so too will their physical and mental health.

However, by offering financial literacy courses, you can help your team cultivate the sense of financial security they need to thrive. This might include education in budgeting and investing, college and retirement planning, and medical and personal debt management.

## The Takeaway

Supporting your employees' wellness isn't a mere kindness. It simply makes good business sense. When your team is healthy in body, mind, spirit, and finances, your plumbing company will thrive. The key is both to cultivate a company culture of wellness and to provide your team with the tools they need to create a healthy lifestyle. **C**

*Sam Bowman writes about people, tech, wellness, and how they merge. He enjoys getting to utilize the internet for community without actually having to leave his house. In his spare time he likes running, reading, and combining the two in a run to his local bookstore.*



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# Work Truck Week Sets Record Attendance

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Summit, NTEA's full-day advanced fuels and vehicle technology conference, was sold out for the second year in a row, with nearly 1,000 attendees.

Work Truck Week, which includes The Work Truck Show®, Green Truck Summit and Ride & Drive, has been produced annually by NTEA—The Association for the Work Truck Industry since 2000. The event was held virtually in 2021.

New Exhibitor Pavilion, returning for the first time since 2020, and the Work Truck Show exhibit hall were packed with new commercial vehicles, equipment and technology from 507 companies. As the industry's transition to electric power accelerates, much of the news coming out of Work Truck Week was related to electric vehicles, including the launch of eight commercial EVs, as well as associated auxiliary power solutions, bodies and equipment. Eager to give potential customers the opportunity to experience their technical advancements, 19 companies participated in Ride & Drive, offering attendees the chance to drive a variety of all-electric and internal combustion engine commercial vehicles.

## Looking Back, Looking Ahead

"The work truck industry has a long history of evolving and innovating to keep the world moving," says **Steve Carey**, NTEA president & CEO. "This was clearly demonstrated at Work Truck Week 2023 where we had some exhibiting companies marking business milestones of a century or more while others were just getting started. Attendees were able to reflect on where we've been while looking to the future through exhibits and educational programming featuring the movement toward electrification, as well as the latest developments in vehicle equipment and components emphasizing productivity and safety."

Isuzu Commercial Truck of America and Hino Trucks both chose Work Truck Week 2023 to announce their first all-electric trucks, Isuzu's N-Series EV and Hino's M5e and L6e. Mack Trucks unveiled its first electric vehicle in the medium-duty segment, the Mack®



Green Truck Summit, NTEA's full-day advanced fuels and vehicle technology conference, was sold out, with nearly 1,000 attendees gathering to hear from industry experts.



Isuzu Commercial Truck of America announced its first all-electric production model, the N-Series EV, with a Work Truck Week 2023 press conference on March 8.

MD Electric. Shyft Group revealed the new Blue Arc Class 5 All Electric Crew Cab, while Ideanomics and VIA Motors introduced the VTRUX® electric work truck. Workhorse Group pulled the silk from its new W56 zero-emission step van. JB Poindexter & Co business units announced several new products and developments, including Project ZEVX, an EAVX, Reading Truck and ZEVX electric concept, and an all-electric C250 postal truck demonstration vehicle developed by Morgan Olson for Canada Post. Ram Commercial showcased its new Ram 1500 Battery-electric Vehicle Concept, and Bollinger Motors provided up-dates on its new B4 all-electric fleet truck. Meanwhile, Ford Pro marked the

one-year anniversary of the Ford E-Transit all-electric van.

Other product introductions included:

- **Viatic** — SmartPx plug-in electric genset designed to serve as an alternative to gasoline or diesel generators
- **Volta Power Systems** — 7,000W/240V inverter and Power Distribution Hub that integrate with both traditional internal combustion engine and EV chassis
- **Parker Chelsea** — e910 Series and e970 Series integrated electric power takeoffs (ePTOs) for BEV or hybrid-electric vehicles
- **Safe Fleet** — MobileMule AI dual dash cam that detects and alerts for driver drowsiness,

## NTEA Annual Meeting

At the association's annual meeting, held as a breakfast on March 9th, **David Scheitlin**, director of operations at Holman—Manufacturing & Distribution (Roanoke, Indiana), was installed as 59th Board chair of NTEA. He accepted the position from immediate past Board chair **Tina Albright**, vice president of human relations & safety at Truck Bodies & Equipment International Inc.—TBEI (Lake Crystal, Minnesota), a subsidiary of Federal Signal Corporation (Oak Brook, Illinois).



2023 Annual Meeting keynote speaker Robert Herjavec.


In his remarks, Scheitlin also introduced the NTEA's 2023-2024 Board of Directors, including the board's executive committee.

[For a full list of the new board members, as well as selections from Scheitlin's acceptance speech, visit [contractormag.com](http://contractormag.com).]

Scheitlin then welcomed the meeting's keynote speaker, **Robert Herjavec**, entrepreneur, author, and star of the TV series Shark Tank.

## WTW24

Attendees who purchased a Green Truck Summit or Work Truck Week Conference Package can access on-demand educational content through April 15 by logging in to their WTW23 Planner at [wtw23.mapyourshow.com/8\\_0/login/login.cfm](http://wtw23.mapyourshow.com/8_0/login/login.cfm) and selecting On-demand.

Work Truck Week returns to the Indiana Convention Center March 5–8, 2024. Sign up to receive email updates about the event, including when registration opens in the fall, at [worktruck-week.com/wtw24signup](http://worktruck-week.com/wtw24signup). 



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# Appointments at John W. Danforth Co.

BUFFALO, NY – John W. Danforth Company, one of the largest mechanical contractors in the northeast, recently announced the promotion of three longtime team members to senior roles with the company. Jason Rudich was named Executive Vice President of Estimating and Preconstruction, Todd Follis was named Senior Vice President of Operational Risk Management, and Rich DeLotto was named Senior Vice President of Construction Operations.

"Jason, Todd and Rich are exceptional professionals who have continuously played key roles in our success and established themselves as leaders across our operations," said Danforth President & Chief Operating Officer Patrick McParlane. "They embody the professionalism and principles upon which Danforth was built nearly 140 years ago."

## Jason Rudich



Rudich has been with Danforth since starting as an intern in 1999. He has held a number of key management roles at the company, most recently serving as Senior Vice President of Estimating. In his new role, Rudich oversees Danforth's estimating, shop operations, and virtual design & construction (VDC) departments. He is responsible for meeting business development benchmarks, maximizing modular fabrication opportunities, and developing integrated execution strategies and tactics to create sustainable revenue for the company. Rudich will

also work with the leaders of the estimating, shop operations and VDC departments to establish standardized procedures.

## Todd Follis



Follis joined Danforth in 2004 and most recently served as Vice President of Pre-Construction Planning. As Senior Vice President of Operational Risk Management, he is responsible for driving profitability through operational success and sustained growth, and mitigating risk through continual improvement. He focuses on direct job-based leadership, training and mentorship of team members across Danforth's project management, field, shop, quality assurance-quality control and VDC operations. In addition, Follis oversees the implementation of and compliance with standard operating procedures

## Rich DeLotto



Since joining Danforth as a Project Administrator in 2007, DeLotto has become one of the company's most experienced operational leaders, most recently serving as Vice President, Operations. He is responsible for the overall execution and business results of Danforth's construction operations group, leading a team of operations professionals and project executives across the company's geographic footprint. DeLotto provides leadership, guidance and oversight on all key business and project-related issues and opportunities, and is responsible for providing accurate capacity and forecasting support to the Executive team. He also works collaboratively with other members of the management team to identify opportunities to strengthen the company through training and implementation of best practices. **C**

## Staying Ahead of the Curve

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**BECK:** Our company vision and mission at Danforth completely align with MCAA. Danforth's vision is building meaningful relationships from coast to coast. Our mission is delivering industry leading experiences to our customers every day. These apply to internal and external customers. This same approach will be valid to MCAA. We will find proper balance between working on industry initiatives, as well as finding ways to continually improve our organization and the value we provide our membership.

**CONTRACTOR:** *How do we motivate and educate the younger generation about the great trade in which we work?*

**BECK:** There is no "easy" button. We must engage our newest generation through education and awareness on all aspects of our business. We must continue recruiting, mentoring, coaching, teaching and meeting the needs of our curious and bright young minds. We must make this generation aware of the immense opportunities and career paths in our amazing industry. From technology and innovation, to system installation and integration, to contract execution and many others... we have a dynamic industry with many pathways for an engaging and prosperous career... both personally and professionally.

**CONTRACTOR:** *How do you take MCAA to the next level and leave it a better place from you started your tenure?*

**BECK:** By continuing to utilize our most valuable asset, our membership. We will continue to

engage our membership's industry leaders to shape our future. Our various committees include remarkable people that educate and provide expertise to our membership. We will continue to educate our members on the current issues of today, and more importantly the challenges and opportunities of tomorrow. This will allow our companies to stay relevant, take advantage of opportunities and avoid industry threats.

Also, by remaining in lockstep with the leadership of our United Association labor partners. We will continue to work together regarding current issues, labor-management relations and increasing market share to name a few. The UA is leading the construction industry in technical training at all levels from apprenticeship to leadership. No trade trains better than the UA... period.

In addition, we will continue to utilize our MCAA staff. The MCAA staff includes talented, passionate and incredibly supportive people. Their amazing effort and service make our membership unique, and members feel special. The staff is insightful and focused on the issues at hand. This provides the highest level of support and allows our volunteer members to devote their valuable time most effectively.

We have vast momentum built by those remarkable people who served before me. Our organization is strong and we will stay the course. My job as President of MCAA will be simple... be a great ambassador of this amazing organization, bring people together and stay out of the way! **C**

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# An Overview of Water Supply Pipes and Joining Methods

## ► Continued from page 35

temperatures up to 200°F. Anything above this temperature will cause the pipe to soften and the plumbing system to fail.

CPVC sizing options range from  $\frac{1}{2}$ "-to 2" copper tube size (CTS) and pipe sizes from  $\frac{1}{2}$ "- to 2", with hydrostatic pressure ratings of 400 psi at 73°F and 100 psi at 180°F.

The chlorine present in CPVC resists bacteria from forming within the pipe before the water enters a home. It offers superior mechanical strength in residential water systems, effortlessly connecting with other pipes and fittings with easy use of solvent cements.

Some common mistakes professionals make during the solvent welding process are not choosing the right cement for the job, not preparing the pipe properly, skipping primer or applying it improperly, not waiting for the appropriate set-and-cure time, and, finally, not having adequate airflow.

Below are some brief product guidelines to keep in mind for solvent welding.

### Before selecting solvent cement, consider the following:

**Pipe Material:** First, determine if you will be joining CPVC, PVC (Polyvinyl Chloride) or ABS (Acrylonitrile Butadiene Styrene) plastic pipes before selecting the corresponding cements. For example, use CPVC cement for CPVC pipe fittings; ABS cement for ABS pipe fittings.

This is arguably one of the most critical steps in the solvent-welding process. If a cement and pipe material aren't compatible, then the pipe and fitting cannot chemically fuse together. That, in turn, will lead to joint failure and potentially damaging leaks.

**Pipe Size:** Next, consider the thickness of the pipe. Thicker pipe will require a cement with a thicker viscosity, or a heavier body. You can choose from regular, medium and heavy bodied cements.

As a general rule of thumb, our experts recommend using the following pipe size guidelines when selecting a solvent cement. You can also find the maximum recommended pipe size listed on the cement can.

Cement Body	All Schedules	Pressure	Non-Pressure
Regular		Up to 2"	Up to 4"
Medium	Up to 6"		
Heavy		Up to 12"	Up to 18"
Extra Heavy		Up to 24"	Up to 30"

\*Schedule=Wall thickness of the pipe.

**Application Conditions:** Additionally, confirm that a cement is rated for the temperature, moisture and pressure conditions of the application site. You should also consider whether you're working on a potable water system or a non-pressurized DWV (Drainage, Waste and Vent) system. Then select the cement formulated for that particular application.

where local codes permit and is more common for residential applications.

**Medium Orange CPVC Cement:** Suggested for both residential and commercial cold and hot water systems with temperatures up to 200°F / 93°C, this cement is approved for use on all schedules and classes of CPVC pipe and fitting up to 6" and requires the use of primer.

Size) cold and hot potable water pipe and fitting up to 2", FlowGuard Gold 1-Step is recommended for cold-water systems and hot-water systems up to 200°F / 93°C. This cement does not require a primer

CPVC hot and cold potable water pipes and fittings up to 2 in. diameter with interference fit.

## Galvanized

Commonly installed in homes built before 1960, galvanized pipes were made of steel dipped in protective zinc to prevent corrosion. Less costly than copper, this type contains wider diameters, allowing higher flow rates through it.


Hard water contains calcium carbonate that, when combined with zinc carbonate, forms a protective layer on the pipe, rendering it resistant to corrosion. However, this protective layer will deteriorate over time, which can lead to water-system failure.

Soft water does not contain calcium carbonate. As this type of water moves through the pipe, it damages the protective zinc layer, leaving the galvanized steel vulnerable to corrosion and rust. This shortens the lifespan of the pipes more quickly than hard water.

For all these reasons, we recommend that you replace galvanized pipes with one of the previously discussed options to ensure the home water system functions optimally and is free from health hazards.

## Conclusion

Now that you have been briefed on the various types of plumbing pipes used for water-supply systems, be mindful of external conditions that can disrupt such a plumbing system in a home. For example, use appropriate materials to secure the piping in your home, such as supply hangers

Just as importantly, remember that the efficiency of a water-supply system requires regular maintenance. This is the best way to maintain the longevity and optimal performance of a system, regardless of pipe type. 

*Sean Comerford is Applications Manager at Oatey Co. He is third-generation tradesman with nearly 20 years of plumbing experience, including serving as the lead plumber for commercial/residential new construction, service and fire protection jobs. He holds a State of Ohio Fire Protection License for Sprinkler and Standpipe.*



A technician fitting pieces of CPVC pipe together with solvent welds.

Cement set and cure times should also be evaluated. For example, if you have a time-sensitive project where the plumbing system cannot be down for an extended period of time, opt for a faster-setting product.

**Local Codes and Standards:** Finally, ensure the solvent cement meets all applicable codes and standards based on application site.

### Oatey offers a range of solvents cements for joining CPVC:

**Orange Lava CPVC Cut-In Cement:** A fast-setting cement formulated for time-sensitive repair-and-cut-in work, this one-step cement does not require a primer where local codes permit. It is heavy-bodied for use on all schedules and classes of CPVC pipe and fitting up to 6".

**FlowGuard Gold 1-Step Yellow Cement:** Ideal for CTS (Copper Tube



High Contrast 1-Step All Weather Fast Set Green Cement.

**High Contrast 1-Step CPVC Cement:** FlowGuard™ High Contrast 1-Step All Weather Fast Set Green Cement is recommended for cold water systems and hot water systems up to 200°F / 93°C. Its prevention formula is designed to help protect pipes from corrosion. Its green color provides high contrast to CPVC pipe, making it easy to identify proper installation. This low VOC, fast set cement can be used to solvent weld copper tube sizes (CTS)



# ACEEE Holds 2023 Hot Water Forum

## ► Continued from page 3

and Jobs Act and the Inflation Reduction Act) has created a real opportunity for market transformation.

In addition, this year ACEEE presented the inaugural Hot Air Forum (HAF), which had as its focus decarbonizing space heating. The Hot Air Forum preceded the HWF and included a day to discuss the crossover between space and water heating.

## Plenaries

The inaugural plenary session of the Hot Air Forum (HAF), *When Decarbonizing the Air Side...Five Years from Now, Where Will We Be and Where Should We Be?* was presented by **Kandice**

*Crossover of Workforce and Equity Within States and Utilities Within Programs and Policies* discussed the “real world impacts” of policy objectives on water heating. Presenters included **Jill Marver**, Program Manager and Principle, Pacific Gas & Electric Co., **Jenna Tatum**, Executive Director, Building Electrification Institute, and **Nick Dirr**, Senior Director of Programs at the Association for Energy Affordability. Attendees heard about the impacts within programs and policies locally, within states, and for utilities. Marver led a discussion from the utility perspective on compliance work and the importance of securing the promised savings from codes and standards

**Kono**, Pacific Northwest National Laboratory; and *Empowering HVAC Distributors and Contractors: Lessons Learned from an Air-Source Heat Pump Training and Education Pilot* by presenters **Justin Margolies**, Slipstream, and **Pauravi Shah**, ComEd.

Other sessions focused on specifics of system design, on water and energy equity, and on codes and standards. The full list of educational sessions can be viewed at [www.aceee.org/sites/default/files/pdfs/Program%203-9-23.pdf](http://www.aceee.org/sites/default/files/pdfs/Program%203-9-23.pdf).

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The 2024 Hot Water Forum and Hot Air Forum will be held March 12-14. Further details will be available by Summer 2023. 

## American Council for an Energy Efficient Economy held it's annual forum—and inaugural Hot Air Forum—in San Diego.

**Cohen** of Trane Technologies, where she is Director, Electrification of Heat. The session talked about the “big picture” and what’s needed to tie together policy and programs through collaboration.

The combined HWF/HAF plenary on Wednesday morning, *A Vision of the Policy Future – Policies, Funding, and Approaches for Energy and Emissions from a Federal and State Perspective*, featured two perspectives (state and federal) on using energy efficiency and decarbonization to reduce greenhouse gas and other emissions. The state perspective was provided by **Andrew McAllister**, a long-time commissioner on the California Energy Commission. California has been a leader on how energy efficiency and decarbonization and is ranked #1 in ACEEE’s most recent State Energy Efficiency Scorecard. The federal perspective was given by **Ashley Armstrong** Senior Adviser, US Department of Energy. Part of the discussion included an outline of new funding available through the federal Bipartisan Infrastructure Law and the Inflation Reduction Act.

The Thursday Hot Water Forum plenary, *Workforce & Equity – The*

activities. Other topics included workforce development priorities and policies.

## Education

In addition to networking opportunities, both forums offered numerous education sessions.

Several focused on the new generation of heat pumps and their applications, including *High Temperature Heat Pumps and Implications for Commercial and Industrial Applications* by presenter **Kashif Nawaz**, Oak Ridge National Laboratory; *Duct Loss Implications of Variable Capacity Heat Pumps*, by presenter **Curtis Harrington**, University of California-Davis; and *Data-driven Insights into Air Source Heat Pump Installation Costs* by presenter **Dylan Sarkisian** of Energy Solutions.

Other sessions focused on developing and training the skilled workforce needed to accomplish these various policy objectives, including, *Farewell HVAC Manifold, Technicians of the Future Go Wireless* from presenter **Christian Valoria**, Pacific Northwest National Laboratory; *Training Material for Residential Heat Pump Conversions* by presenter **Jamie**

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# House Reintroduces the PRO Act

## ► Continued from page 1

It was immediately met with both praise and condemnation from opposite ends of the political spectrum.

The House bill was introduced by the Committee on Education and the Workforce Ranking Member **Robert C. "Bobby" Scott** (D-VA-03) and Representative **Brian Fitzpatrick** (R-PA-01). The Senate companion was introduced by the Committee on Health, Education, Labor, and Pensions (HELP) Chair **Bernie Sanders** (I-VT).

This marks the third time the PRO Act has been introduced. The PRO Act passed the House of Representatives in 2020 and 2021 but never reached the floor for a vote in the Senate, where the filibuster requires at least 60 votes to pass most bills.

The legislation (renamed in honor of former AFL-CIO President **Richard L. Trumka**) contains various provisions that could change the US labor landscape, including:

- Increased remedies for violations of workers' rights
- Enhanced workers' right to support secondary boycotts
- Ensuring unions can collect "fair share" fees
- Modernizing the union election process
- Facilitating initial collective bargaining agreements

In addition, the legislation would make it more

difficult for employers to classify their employees as supervisors and independent contractors, who are not covered by the National Labor Relations Act, and would require greater transparency in labor-management relations.

*the greatest middle class the world has ever known. Yet ever since its passage, corporations and their political allies have conspired to render the law toothless. In recent decades, employers have been able to violate the NLRA with impunity, routinely denying workers our basic right to join with our co-workers for fairness on the job.*

**The sweeping package of labor reforms is met with both praise and condemnation from different ends of the labor relations spectrum.**

## ABC

Associated Builders and Contractors today released the following statement from **Kristen Swearingen**, ABC vice president of legislative & political affairs, ahead of the Act's

reintroduction saying in part:

*Reintroduction of the PRO Act means some lawmakers are catering to union demands for legislation that clearly threatens the livelihoods of small business owners, their employees and independent contractors. This is an open attack on the franchise and self-employment business models that have fueled innovation, entrepreneurship and job creation.*

*The PRO Act is nothing more than an attempt to strip workers of their privacy, freedom and choice. Congress must reject this legislation and protect the rights of workers and employers across the country. Democrats in Congress are attempting to increase union membership at the expense of employees' rights to privacy, employers' constitutional right to free speech and opportunities for small businesses.*

## AGC

The Associated General Contractors of America's chief executive officer, **Stephen E. Sandherr**, issued the following statement ahead of the reintroduction:

*This anti-worker, anti-privacy and anti-growth measure will harm our economy at a time when many employers are struggling to cope with inflation, supply chain disruptions and labor shortages.*

*More broadly, the PRO Act will unleash a new era of labor unrest and strikes that the country has not seen since President Truman had to federalize the steel industry during the Korean War. Worse, the PRO Act undermines the collective bargaining process that has been the central pillar of union construction for the past half century.*

*By allowing secondary boycotts and other actions against firms that are not directly involved in labor disputes, the measure will force many workers to remain idle because of disagreements where they do not stand to benefit. The measure also makes it extremely difficult for entrepreneurial workers to establish their own businesses by discriminating against independent contractors.*

CONTRACTOR will continue to follow this developing story. **C**

For the bill text of the PRO Act, visit [https://democrats-edworkforce.house.gov/imo/media/doc/richard\\_l\\_trumka\\_protecting\\_the\\_right\\_to\\_organize\\_hr20billtext1.pdf](https://democrats-edworkforce.house.gov/imo/media/doc/richard_l_trumka_protecting_the_right_to_organize_hr20billtext1.pdf).

## Reactions From Around the Industry

### UA

The United Association of Union Plumbers and Pipefitters (UA) issued the following statement saying (in part):

*For too long, working families in this country have been denied their basic rights to organize for better working conditions by bad-faith employers and unscrupulous contractors. It is long past time that Congress listens to the overwhelming majority of Americans who support workers' rights to form a union and come together to pass the bipartisan PRO Act.*

*This legislation will fix the outdated National Labor Relations Act and ensure that more employers are not allowed to violate the rights of workers. The PRO Act will end the dangerous anti-worker so-called Right-to-Work laws that undermine workers' ability to earn fair wages and collectively bargain for better working conditions; it will ensure workers can reach timely first contracts; it will end the ability of employers to undercut striking workers by hiring permanent replacements; and it will ensure all Americans, regardless of circumstance or profession, have the opportunity to form a union should they choose to do so.*

### AFL-CIO

The American Federation of Labor and Congress of Industrial Organizations (AFL-CIO), the largest federation of unions in the United States representing more than 12 million active and retired workers, called the PRO Act, "the key to America's future." A statement on their website reads in part:

*Our basic labor law, which is supposed to protect the rights of workers to form a union and bargain collectively, is broken. The National Labor Relations Act (NLRA) of 1935 ushered in a wave of worker organizing that changed the direction of America, building*



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# ABC Honors Contractor of the Year

## ► Continued from page 3

The 33rd Annual National Excellence in Construction® Awards ceremony celebrates the best in merit shop construction, honoring the most outstanding construction projects and contractors of 2022 for their remarkable achievements.



## Contractor of the Year

Performance Contractors Inc., headquartered in Baton Rouge, Louisiana, was named ABC's 2023 Contractor of the Year. This award recognizes member companies for corporate integrity and commitment to safety, professional development and expert workforce development.

Performance Contractors continues to be a nationwide leader in large-scale, full-service industrial construction," said 2023 National Chair of the ABC Board of Directors **Milton Graugnard**, executive vice president, Cajun Industries LLC, Baton Rouge, Louisiana. "This company and its employees are committed to ABC's mission of advancing the merit shop by delivering high-quality projects safely and efficiently to contribute to the strength of our communities. It is an honor to present Performance Contractors with this well-deserved award."

Performance Contractors is an ABC Top Performer and an ABC Accredited Quality Contractor. Performance has earned the highest level—Platinum—in ABC's STEP Safety Management System as well as numerous ABC Excellence in Construction® Awards at the national and chapter levels.

Established in 1979 as a merit shop general industrial contractor, Performance has grown to a \$1.5-billion company with more than 8,000 employees offering construction, maintenance and turnaround services for clients across the United States. In addition to its Baton Rouge headquarters, Performance maintains regional offices in Lake Charles, Louisiana; Houston and


Corpus Christi, Texas; and Mobile, Alabama; along with satellite offices in Charlotte, North Carolina, and Evansville, Indiana.

Travelers is the presenting sponsor of the 2023 Contractor of the Year Award.

## Top Construction Projects

At the Excellence in Construction® Awards ABC honored 82 construction projects worth a total of \$2.14 billion. Winners of the EIC Innovation, Design-Build and Productivity

awards were also announced.

For a full list of winners, including Top Safety Leaders and the Inclusion, Diversity and Equity Excellence Awards, visit ABC's website, [www.abc.org](http://www.abc.org). 

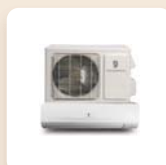
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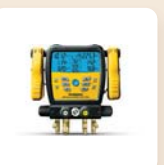
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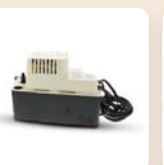
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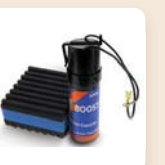
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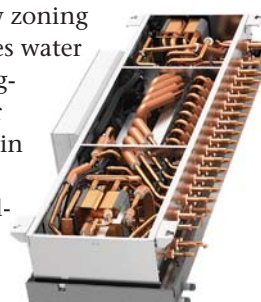
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## ► THE HYBRID VRF ZONING SYSTEM

from Mitsubishi Electric Trane HVAC US is a two-pipe, variable refrigerant flow zoning system that uses water instead of refrigerant in indoor spaces. The Main Hybrid Branch Circuit Controller exchanges heat between refrigerant and water; conditioned water is pumped to zones.

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## ► NOBLE FLOOR-MOUNT FIRE-TUBE COMBI BOILER

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# editor's Choice

**THE TMAX ALUMINUM MECHANIC TRUCK BODY** from Stellar Industries is intended for a 108" cab-to-axle chassis with 22,000- to 22,900-lbs gross vehicle weight rating, such as the Ford F600 or Chevrolet 6500. The new 13' aluminum body offers additional compartment storage and features the crane carrying reliability of the Stellar Torq-Isolator torsion box understructure and crane compartment. Aluminum extrusion compartment tops with two built-in accessory mounting rails eliminate the need to drill holes in the compartment tops.

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## ▶ THE MEN'S FORT WAYNE WORK BOOT

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## ▶ X-1 SMART HEATED VEST

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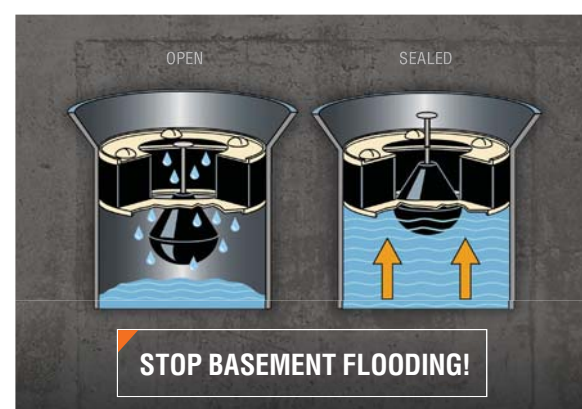


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by Steve Spaulding  
EDITOR-IN-CHIEF



# The Electrification Roadmap

If I had to pick a single word that dominated the shows and conferences I've been to so far this year, that word would be "electrification."

The big news out of this year's Work Truck Show was major manufacturers introducing new electric vehicles (our coverage begins on the cover). The ACEEE Hot Water Forum had session after session on electrification (see our coverage on pg. 3). At AHR electrification was a major topic for every water heating manufacturer I met.

Electrification is just one strategy being adopted in the fight against greenhouse gas emissions (primarily carbon dioxide). Other strategies include promoting greater efficiencies in everything that consumes fossil fuels, and carbon capture (which faces an uphill struggle due to the expense and complexity of the technology involved).

It's an unfortunate fact that the discussion around climate change—and by extension electrification—has become politicized. I've heard legislation

promoting electrification called an attack on free markets. I've even heard it called a conspiracy to surrender America's competitive advantage to foreign rivals.

I think the strongest arguments against electrification are, first, that it won't in itself do anything about carbon emissions; the electricity for that electric van or electric heat pump needs to

come from somewhere, and that somewhere is probably going to be a utility burning fossil fuels. The second argument is that the current electrical grid doesn't have the capacity to meet the added demand electrification will create.

To the first point, according to the US Energy Information Administration, in 2022, about 4,243 billion kWh of electricity were generated at utility-scale

**Electrification is just one strategy being adopted in the fight against greenhouse gas emissions.**

facilities in the US. About 60% was from fossil fuels, about 18% was nuclear, and about 22% was from renewable sources. 60% sounds like a steep mountain to climb, but I have seen two studies (one from the Office of Energy Efficiency and Renewable Energy, one from McKinsey & Co.), saying the goal is possible by 2035. It will require a huge investment, but thanks to the Inflation Reduction Act and the Bipartisan Infrastructure Law, there's a lot of money in the pipeline. A big hurdle will be rezoning land for use as wind and solar farms, but according to the National Renewable Energy Laboratory it will require less than 1% of the land in the lower 48—an area comparable to the fossil fuel industry's footprint.

To the second point, capacity will need

to grow by about 40% within the same time frame to meet the increased strain on the grid. Yet all the planning and prognosticating seems to have taken that into account. Also, it's worth noting that you don't build capacity and wait for demand to show up—you build capacity to meet demand. As demand rises it will create its own incentives.

The puzzle has so many pieces: transmission corridors, the role of nuclear energy, fossil fuel retirement, metering... I'm not an expert in anything besides putting together a magazine, but achieving a carbon-zero grid by 2035 sounds unlikely. Then again, when JFK called for a mission to the moon "in this decade" it was 1962 and most people must have thought that was unlikely. But we made it by July of 1969.

So, we'll see what happens. In the meanwhile, it's a good idea to learn all you can about heat pump water heaters—installation, operation, maintenance, and any rebates you can offer for installing them. **C**

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A large, grey industrial floor scrubber/sweeper is the central focus of the image. It is positioned in a warehouse with high blue metal shelving units filled with cardboard boxes in the background. The machine has a yellow warning light on top and the brand name 'ONILFISK' visible on its side. The entire scene is framed within a circular cutout on a dark blue background with white concentric circles.

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Call 800.UR.RENTS or visit [UnitedRentals.com](http://UnitedRentals.com)

 **United Rentals®**  
**Work United™**





# Dunkirk High Efficiency Boilers

## Keeping families comfortable.

**Save Energy and Money!** Automatically modulates the gas input and continuously adjusts to ensure safe, quiet and efficient operation.

**ECO Friendly!** Less CO<sub>2</sub> emissions and ENERGY STAR® certified with up to 95% AFUE - qualifying for utility rebates!

**Models for Every Application!** Wall hung and floor standing models fit any location. Combi models offer domestic hot water and home heating in one appliance. Venting flexibility with approved PVC, CPVC and polypropylene.



DCC-115

Type	Wall Mounted [W x H x D]	Floor Standing [W x H x D]	CH Mode Input	DHW Mode Max.	DHW Flow Rate
COMBI	DCC-115 [17 3/4" x 30" x 13 9/16"]	DCCF-115 [24 3/4" x 43 3/4" x 17 1/2"]	16.6 - 93.5 MBH	115.5 MBH	2.5 GPM
	DCC-150 [17 3/4" x 30" x 13 9/16"]	DCCF-150 [24 3/4" x 43 3/4" x 17 1/2"]	22.0 - 125 MBH	153.0 MBH	3.5 GPM
	DCC-205 [17 3/4" x 30" x 21 1/2"]	DCCF-205 [24 3/4" x 43 3/4" x 23 1/2"]	29.5 - 164 MBH	205.0 MBH	5.0 GPM
HEAT ONLY	DCB-75 [17 3/4" x 30" x 13 9/16"]	DCBF-75 [24 3/4" x 43 3/4" x 17 1/2"]	16.6 - 75 MBH		
	DCB-100 [17 3/4" x 30" x 13 9/16"]	DCBF-100 [24 3/4" x 43 3/4" x 17 1/2"]	16.6 - 93.5 MBH		
	DCB-125 [17 3/4" x 30" x 13 9/16"]	DCBF-125 [24 3/4" x 43 3/4" x 17 1/2"]	22.0 - 125 MBH		
	DCB-165 [17 3/4" x 30" x 21 1/2"]	DCBF-165 [24 3/4" x 43 3/4" x 23 1/2"]	29.5 - 164 MBH		

