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SMAC NEWS

AI at Work

AI is transforming how contractors manage, plan, fabricate and build. Success requires balancing aggressive innovation with prudent risk management.

SMACNA®

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CEO UPDATE Aaron Hilger

Progress, Partnerships and Possibility

When I took on this SMACNA leadership role back in 2022, the world was a different place. We were still navigating the global pandemic, and there was uncertainty regarding the overall construction marketplace. Since then, SMACNA has evolved into an association that is actively growing and changing to advance our renewed mission of serving our members effectively.

Marketing

The Marketing & Communications Department, led by Susannah Forde, launched a new, user-focused website. We also introduced National Career in Trades Week, our first national public relations campaign aimed at raising awareness of job opportunities in the trades. The campaign received strong local and national media coverage, including a front-page feature in *The Wall Street Journal*. Next year, we will expand this initiative through industry partnerships. Our collaboration with SMART continues to advance shared priorities. We have also strengthened our social media and video content to showcase member achievements and thought leadership on key issues.

Markets / AI / Education

The market sector councils and task forces have also been busy under Linda Jennings' direction. They are creating new programming at every opportunity. Some examples include the work being done by the industrial market sector task force on productivity and safety, the architectural task force's efforts to leverage trade shows to increase industry awareness, and the residential group's work to use new media tools to expand market footprint.

In a similar vein, the AI Task Force, led by Travis Voss and Hugh Seaton, is working diligently to help our members navigate the rapidly evolving AI landscape. Through their informative webinars and other materials, we hope to answer the questions our members have on this complex topic.

We recognize that traditional white papers may not be the most accessible format for our members. To address this, we have converted many of these resources into podcasts and infographics, and we will continue to develop on-demand videos for greater accessibility.

Our education programming continues to evolve. SMACNA now offers 40 to 50 web-based courses annually and has expanded chapter education opportunities. Core programs such as PMI and BMU are scheduled more frequently and are available to interested chapters. Erykka Thompson is leading an education task force focused on expanding field leadership, supervisory and project management offerings.

Ultimately, the FAB Forum exemplifies our programming. Fabrication remains at the heart of our industry, and it is more important than ever that we keep our members on the cutting edge of the technologies and best practices emerging in this arena. Linda's team has done a tremendous job in building a program that gives contractors the tools and best practices they need to succeed.

Technical

Our technical standards remain one of the key assets produced by our association. Eli Howard and his team continue to consistently produce tools of maximum value to our members. We have produced several technical videos to increase the exposure and utility of these items. This is just the beginning of our push to make our standards as accessible as possible. We are working to translate select manuals into Spanish, ensuring that all contractors deliver work aligned with our top-of-the-industry guidelines.

Government Relations

Stan Kolbe and the rest of the Government and Political Affairs Group have been highly effective in advocating for our members and our industry in Washington. The 118th Con-

gress witnessed Stan's group skillfully lobbying for the enactment of key provisions to advance modernizing airport Infrastructure, Nuclear Power Financing-Permitting Reform and reforms for project labor agreements. As we work through the 119th Congress, we were already successful in enacting the extension of our top tax priority provisions and we will press our lawmakers on key items, including change order reform and the SAFER Banking Act.

Labor Relations

Labor relations and local bargaining support have long been core services of SMACNA. Jason Watson has expanded the department's work and is actively working with Chapters to create stronger relationships with labor. He has also held additional training programs and is building a new trustee training program for 2026.

Our association exists to advance the industry and support our members. The team's ongoing efforts reflect this commitment, and we remain vigilant in addressing emerging needs and trends. ▼

Aaron Hilger
SMACNA CEO

FROM THE PRESIDENT

Tom Martin

A SMART Partnership

Every one of us clearly understands that our industry is only as strong as the bonds we build in the labor/management relationship. Having an attitude of collaboration, not confrontation is key to success. We are lucky to have partners in SMART who share our core values. We aim to advance our industry, collaborate on projects that meet our customers' needs and build a workforce of the highest quality. To meet these goals, it helps to have someone on the other side of the table who shares these values — and we have such a person in that position in SMART General President Mike Coleman.

Many of you may know that Mike and I go back a while. He was a long-time member of the T.H. Martin team, working his way through the ranks of our company until he became foreman and leader within our company. Mike was what everyone looked for in both a leader and an employee. He is hard-working, always looking out for the folks under him, and is consistently a straight shooter. Mike is committed to bringing the best out of everyone around him. It was these attributes that have made him such a strong labor leader. Mike was tough but fair and never let minor disagreements override our joint vision of how we wanted our relationship to work. When it came to our partnership, we kept it productive by building a climate of trust, ensuring constant communication, and believing both of us had the best intentions. This foundation has led to collaborations on numerous critical matters, including efforts to achieve fair and amicable resolutions in collective bargaining, developing a robust talent development framework, and addressing shared legislative challenges. I can't tell you how many local labor events, fundraisers and other get-togethers we have attended together during our time in Cleveland. We are both big-picture guys — balancing this critical relationship building while also serving the best interests of our core constituencies.

To this end, we have also been partners in business matters. These include efforts to build enhanced market share and highlighting the value of signatory contractors as we work to reclaim market sectors that we may have lost to our non-union competitors. It is this commitment to the industry that made Mike such a phenomenal partner as we both built our careers in the Cleveland area.

This focus continues to guide us in our current roles. When Mike became General President, I was excited to see my friend's hard work and commitment be justly rewarded. However, in addition to that, SMACNA contractors now have someone on the labor side of the table committed to a collaborative approach that achieves results for all. During my service as a national leader, Mike has been more than advertised. As we have interacted throughout my term, Mike has not changed from the individual who worked his tail off inside the walls of T.H. Martin. I won't kid you, though; Mike will fight for the best interests of his members and make sure that they are treated fairly and equitably. However, he remains a good listener who gathers all the perspectives around him and works toward solutions that benefit everyone. He understands very clearly that everyone prospers from working together. These are all the same traits I witnessed the first time I met my friend Mike Coleman. I am proud not only of our friendship but also of the fact that we can work together to advance our shared interests and promote prosperity for all. ▼

Tom Martin, SMACNA President

Crafting a Custom Vision in Steel

Thompson Solutions Group brought Plan Architecture's wood-look steel façade to life at Little Priest Tribal College, combining precision, speed and SMACNA-backed expertise.

This project incorporated a unique look that combined a wood-grained texture and prefinished steel.

Plan Architecture tapped Thompson Solutions Group (TSG) of Sioux City, Nebraska, to create the exterior of the new Lab and Students Center at the Winnebago Nation's Little Priest Tribal College, about 30 minutes south of Sioux City. "We have a great relationship with Nathan Kalaher of Plan Architecture in Sioux City," says James Olson, TSG's Executive Vice President and SMC-Iowa Chapter President. "He'll bring us into some of these projects early on to help select a product that's going to hit his budget as well as be functional and give the look that he's after."

Olson relishes the creative opportunities of starting a project during the design phase. "It's listening to the architect and figuring out how we can help create the vision that he has for this building, to make it look as beautiful as the initial renderings and bring it to life."

TSG keeps SMACNA Standards handy while making design decisions. "We use the Architectural Sheet Metal Manual often when we're giving advice on how to build these and make them perform with the intent that the architect wants," Olson says. "We reference the appropriate gauges and heights of these panels before we put in expansion joints so that they will perform and stay flat and not oil can."

For the Lab and Students Center, Plan Architecture chose a one-of-a-kind look that translates a wood-grain texture into prefinished steel. "These are really unique materials that we're working with," Olson says. "We probably won't ever use this color of material again. It's going to be its own, unique project, and then we'll move on to the next one."

A custom coil manufacturer printed the wood grain finish onto the steel, then TSG bought the steel from them and fabricated the panels in their Sioux City shop. "This was a product that we were able to fabricate in our own facility, without having to work with a major manufacturer," Olson says. "We can coordinate that much, much faster and control the schedule, bringing it in at a lower price point than if we had been dealing with a national manufacturer for metal panels."

TSG hit an unplanned obstacle when the supplier took longer than expected to produce the custom coil.

Thompson Solutions Group fabricated and installed 10,000 square feet of custom wall panels on this project.

"It was a very detailed process to get it manufactured the way that the architect and owner wanted for the building," Olson says. Multiple runs delayed the work by about six months. "We bid this project in July of 2023, and completed it March 1, 2025," though the actual fabrication and installation only took about four weeks. "It compressed our schedule toward the end of the project, so we were finishing this up as they were looking to occupy the building. The biggest challenge was working in a compressed schedule to get this building open while still maintaining the quality. We never would have been able to hit the schedule had we not had total control of the fabrication."

Fortunately, TSG has the expertise they needed to meet their high standards while coping with delays. "Our architectural sheet metal crew is roughly 16 to 18 people, which is a good size for our area of the country, and our people have significant experience in doing this sort of work," Olson says. "We get to an installation standpoint of maybe modifying a detail so that it can functionally work the way that the architect and owner wanted it to." The shop foreman and the foreman who led the Little Priest Tribal College installation each have over 20 years of experience. "These specific foremen understand how to get these panels to perform, to be weather tight, and to be as flat as possible." They used all the tricks of the trade and successfully aligned the panels from top to bottom across the three-story walls, as if they were actual boards.

TSG fabricated and installed about 10,000 square feet of custom flush wall panels and trim for the three-story, 135,000 square foot building. The 22-gauge prefinished steel panels are 12 inches wide with V grooves at 4 inches and were printed with a Siamese Quarter Sawn wood grain pattern. The fabrication took two men about 300 hours in the shop, and on-site installation took a crew of four about 900 more hours, for a total of 1,200 work hours. ▼

Welded With Precision, Driven by Purpose

MechOne builds more than ductwork as it shapes the future of Colorado's HVAC industry.

MechOne uses advanced machinery to fabricate spiral and rectangular ductwork specific to job sites.

In the heart of Colorado's booming construction and industrial sector, MechOne stands out as a leader in commercial HVAC and sheet metal fabrication. Founded in 2000, the company has built a reputation for technical expertise, innovation and a deep commitment to customer satisfaction.

MechOne's journey began with a clear vision. "We just wanted to concentrate on our core strength, which is sheet metal. We work all throughout the state of Colorado, so a lot of our work is out of the Colorado Springs area; either in the mountains or extending north of Denver and south of Pueblo," says Roy Jensen, President of Operations at MechOne. Their focus on specialized projects and high standards quickly set them apart in the competitive Colorado market.

BUILDING A LEGACY IN HVAC

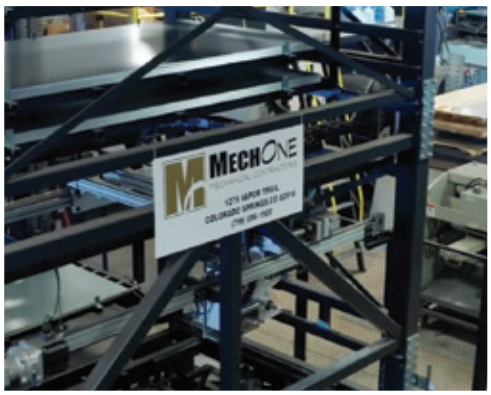
From the outset, MechOne's founders, both with backgrounds in large mechanical firms, aimed to create a company that excelled in both fabrication and installation. "We'll take a document and create CAD/BIM coordination drawings. We fabricate directly from these files (drawings), install the systems specified and approved, and can even maintain and service all the equipment and the products that we provided in the future" Jensen explains, highlighting their integrated approach.

MechOne's 60,000-plus square foot Colorado Springs facility is a testament to their investment in technology. "We use a windows-based digitized estimating software system, AutoCAD, Revit & CAMduct for coordination drawings," Jensen says. "We integrate those CAD files directly into fabrication by downloading into our fully automated fiber laser, as well as a complete coil line and spiral tubeformer. We often are able to incorporate the use of laser welders during this controlled fabrication process" This seamless workflow ensures the highest quality, precision and efficiency on every project.

The company's commitment to innovation is evident in its use of advanced machinery. "Using cutting-edge technology, we will manifold spiral and rectangular ductwork. We'll make it specific to the job site and project specifications and create lengths up to 30 feet. We label all of our ductwork during the CAD/BIM process and renumber it specifically to how it will be installed; so it gets installed more like an erector-set," says Michael Daugharty, MechOne's President of Business Development, emphasizing the company's attention to detail and customization.

CUTTING-EDGE TECHNOLOGY AND EXPERTISE

MechOne's portfolio spans educational, government, semiconductor, healthcare, office, retail and manu-



facturing facilities. “A lot of our work is in the medical and school sector of construction, and we use a lot of specialized equipment to ensure both quality and productivity,” Jensen says. The company’s ability to adapt to different environments and requirements has made them a trusted partner for clients across Colorado state.

Safety and quality are at the core of MechOne’s operations. MechOne has an active safety program that has won several awards, including the Pinnacol Assurance Circle-of-Safety Award and the SMACNA Zero Injury Safety Award.

At MechOne, employees are more than just workers. They are the backbone of the company’s success. “Our people stand out for their dedication to our trade. We have the ability to perform throughout the state of Colorado (three facilities throughout our state) because of the willingness of our workforce to work wherever and whenever needed,” Jensen says. The company’s culture of honesty, experience and teamwork is evident in every project they undertake, according to its management team.

As the demand for efficient and reliable HVAC systems grows in the Colorado market, MechOne is poised to remain a leader in the industry, driven by innovation, advanced techniques, integrity and its dedicated team. ▼

MechOne services educational, government, semiconductor, healthcare, office, retail and manufacturing industries in Colorado. Bottom center: Roy Jensen, President of Operations. Bottom right: Michael Daugharty, President of Business Development.

Leading the Charge

Toronto Sheet Metal Contractors Association member Black & McDonald installed HVAC systems and duct for Ontario's first electric vehicle battery plant. The work required extensive communication with numerous trades.

An aerial picture of the NextStar Energy plant in Windsor, Ontario. Toronto Sheet Metal Contractors Association member Black & McDonald installed the HVAC systems and duct for the facility, Ontario's first electric vehicle battery plant.

While the electric vehicle revolution may not be on the rapid timetable the industry originally predicted, SMACNA members are constructing the infrastructure EVs will need. This includes installing HVAC systems in the factories where the batteries powering the electric vehicles of today and tomorrow are built.

In 2022, Toronto-based industrial, commercial and institutional construction contractor Black & McDonald was awarded a CA$550 million ($397 million USD) contract to install the HVAC, piping, plumbing and mechanical wiring for the main cell building of a 4.5 million-square-foot EV battery complex in Windsor, Ontario. Located across the river from Detroit, Windsor is the heart of the Canadian automotive industry. Numerous auto parts suppliers, as well as manufacturing plants for Ford Motor Co. and Stellantis N.V. are located in the city. Black & McDonald, one of Canada's largest contractors, is a CA$2.7 billion ($1.9 billion USD) company with 6,800-plus employees, more than 40 offices and projects across North America.

A MULTIBILLION-DOLLAR PROJECT

The new plant, officially known as NextStar Energy, is a CA$6 billion joint venture between Stellantis and LG Energy Solution. When fully in operation, the plant will have the ability to produce enough batteries to power 450,000 electric vehicles per year. It's scheduled to be completed in late 2025.

Black & McDonald Project Manager Stephen Payton is overseeing the HVAC work on the battery plant project. The job required him and several other key employees to relocate from the Toronto area to Windsor, about four hours away, for several months. He said it was his first time on a job of this size.

The cell building uses 254,000 linear feet of duct, made from about 5 million pounds of metal. Duct sizes ranged from 26 to 16 gauge. It was mostly galvanized, Payton says. The company also installed stainless steel breaching and "a good amount" of fabric duct — about 50,000 linear feet, ranging from 8 to 64 inches in diameter.

Black & McDonald fabricated some metal ductwork at its main 20,000-square-foot sheet metal shop in Toronto. Payton estimated that at the peak, about 30 Black & McDonald employees were working on ductwork for the EV battery plant. The company also used a smaller sheet metal shop in Windsor to make some components and subcontracted with another Toronto fabricator for a large portion of the materials.

> **"THERE'S NO SUCH THING AS 'PERFECT CONSTRUCTION' IN MY MIND. THIS JOB HAS DEFINITELY HAD ITS FAIR SHARE OF HURDLES."**

"Block ends, Ductmate frames, spiral — there's a bunch of different items that we did there," Payton says, adding "most of our fabrication was done between a third-party company that we contracted with in Toronto and our main shop in Scarborough (Ontario)."

AN 'INTERESTING' PROJECT

He estimates that about 60 workers fabricated duct for the project. Installation was fully handled by Black & McDonald workers — about 325 of them, Payton says. In early 2023, work on the plant was briefly halted over a funding dispute regarding tax incentives between Stellantis, LG and the Canadian and Ontario governments. An agreement was reached and work resumed by summer. Work on the cell building was unaffected.

The project has been an "interesting" adventure, according to Payton. "If a job goes too smoothly and never has a single hiccup, something's wrong," he says. "There's no such thing as 'perfect construction' in my mind. This job has definitely had its fair share of hurdles."

Among the biggest hurdles, Payton says, was getting used to interacting with trades workers from across the country. Workers from provinces such as Saskatchewan, Alberta or British Columbia may have a different way of approaching tasks.

"All these people have their way of doing things," he says. "When you try and standardize a process, a lot of very prideful workers want to do it their way. They have a hard time taking direction. We tried to create a standardized process so that way everything was done the same way."

And that led to some long meetings: 10-hour days with nine hours spent in meetings was a common occurrence. "That left very little room to actually get work done," he says.

As of mid-May, Black & McDonald's work is approaching its end. "We still have, construction-wise, about a month and a half to two months worth of work left," Payton says. "Just buttoning everything up, deficiencies, finishing some change orders, installations, things of that nature."

Payton says he learned a lot working on the NextStar EV battery plant project that will help him with future projects, whether in automotive or other industries. "A lot of the things learned on jobs like these are transferable to almost any project," he says. "Whether it's for design of HVAC, design of piping systems, electrical, stacking work, managing labor and power or quality control documentation. There's so many facets to it that it's almost like it writes its own book on how to run future projects."

Top: Thousands of trades workers from across Canada have worked on the CA$6 billion battery plant project.

Bottom: Rectangular duct at the NextStar Energy plant, a CA$6 billion joint venture between Stellantis and LG Energy Solution. The battery facility will be able to produce enough batteries to power 450,000 electric vehicles per year. It's scheduled to be completed in late 2025.

How Zipf-Air Boosted Profits by Going Residential

By flipping his business model and focusing on customer service, high-end brands and Indoor Air Quality, John Zipf turned a commercial-heavy HVAC company into a thriving residential operation.

Residential work is about customer service and offering financing options more than it is about just fixing the air conditioner, according to Zipf-Air Inc.

"We're more profitable than we used to be, because we went from doing 85% commercial and 15% residential to doing 15% commercial and 85% residential," says John Zipf, President of Zipf-Air Inc. in St. Louis, Missouri. "The margins are better in residential, you get paid quicker, and it's a happier place to work."

Changing his business model from commercial to residential required learning a new skill set. "You have to master soft skills first," Zipf says. "It's not about fixing the air conditioner. It's about customer service and offering financing. You need to be more of a retailer and less of a contractor. You have to be attentive. People don't care how much you know until they know how much you care. They have to know that you care about them and their family and their house."

One way to show concern for customers is by improving their Indoor Air Quality. "People are in tune with indoor air quality (IAQ) for their house because they spend half their life inside their house, and they want to be healthy," Zipf says. "We sell air scrubbers, which are ionizing units that generate hydrogen peroxide molecules. They put a steady strip of peroxide down the duct work, which kills things that are growing in there. We offer HEPA filters, which are important to good filtration." IAQ options improve Zipf's bottom line. "By the time you put the filtration on, and the humidifier and the air scrubber, you're looking at 20% of the job. So contractors who aren't looking at IAQ are dropping the ball. They're leaving 20% on the table, plus they're not allowing the customer to make up their own mind about whether they want to buy it. If you don't offer it to them, they can't buy it."

As Zipf grew in the residential market, his biggest shift was learning not to worry about having the lowest prices. "The typical commercial industrial contractor is used to doing construction work, where the lowest price

> **"THE MARGINS ARE BETTER IN RESIDENTIAL, YOU GET PAID QUICKER, AND IT'S A HAPPIER PLACE TO WORK."**

gets the order," Zipf says. "If a commercial contractor is going into the residential market, he has to lose that mentality. Would you want the lowest price guy in your house? If it's replacing the air conditioner at my manufacturing plant, maybe choose the lowest guy there, but not when they're coming to somebody's home. Most of the time in the residential market, the winner is the guy who shows the best value."

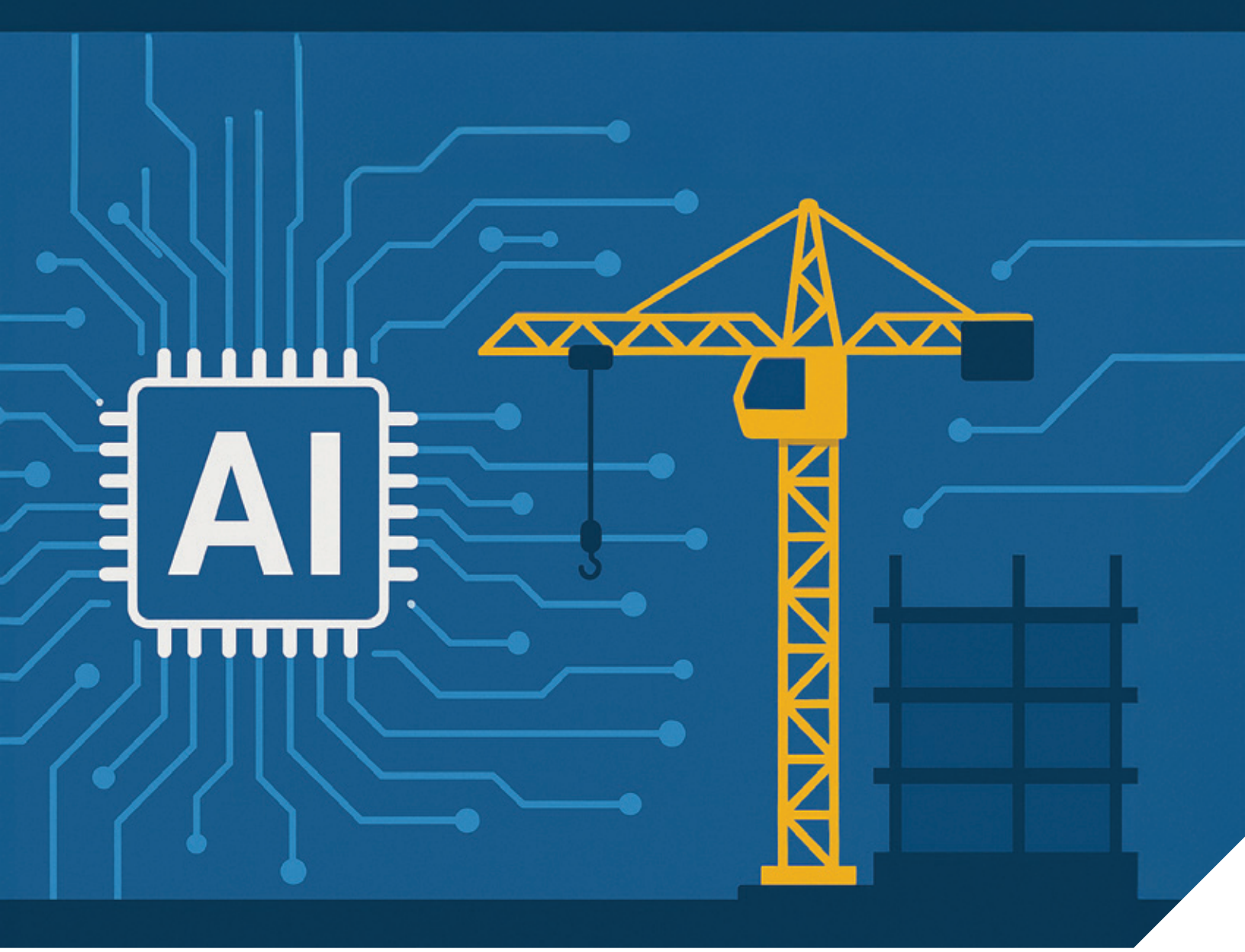
Providing the best values begins with high-quality equipment, which gives Zipf another advantage. When he started working in St. Louis, he and many of his competitors offered upper-end HVAC systems. That changed after most of the other residential contractors were bought out by a private equity firm. "Their prices went up significantly," Zipf says. "These guys have to show investors a larger return on investment than I do." The equity firm dictates what types of equipment they can offer because it has a national account with a lower-cost brand. Zipf still carries the higher-end brand, which lasts over twice as long as the brand his competitors are required to sell. "It's worth more because it'll last longer and it's better."

Zipf's customers are very sensitive to the difference in brands. "A guy that owns an office building has probably never been on his roof before and never looked at his air conditioners," Zipf says. "But a guy who lives in an affluent area not only looks at his air conditioner, he also probably polishes it. Even people who are not affluent are brand specific."

Customers who demand higher-value equipment can find Zipf because he uses search engine optimization (SEO) services to let them know that he carries the brands they prefer. "For every furnace I sell, 2% of the price goes into an ad fund," Zipf says. "If you choose to be part of the ad fund, they'll hook you up with a national search engine." He also uses a local advertising company. Between them, the two SEO services ensure that his business appears in the results every time someone searches the web for the brand Zipf carries or pulls out their phone to google 'Air conditioning repairs near me.'

Financing options are essential for Zipf's success. When a customer is surprised by the final price of a new HVAC system, he explains financing options. "It's one way to overcome an objection," Zipf says. Fewer than 2% of his customers use financing, but it's available for every job. "Even in an affluent neighborhood, there might be a young couple getting started that doesn't have that kind of money laying around, so you offer them an affordable way to pay."

Zipf's customers know their brand names, so he provides a variety of products to meet their needs. He also uses search engine optimization to improve Zipf's ranking in search results when potential residential customers in his area are searching for repair companies.



COVER STORY

Artificial Intelligence: An Introduction

Since late 2022, when ChatGPT was introduced, we've been hearing more and more about AI, usually with more hype than explanation. In this article, we'll explain AI from the ground up, so you can be armed with a solid foundation of understanding as more and more products and pitches come your way.

WHAT IS AI?

First things first: what is AI?

You've probably heard a few explanations, and they often trip over themselves trying to explain this or that model or algorithm. AI isn't actually one technology. Think of it as a collection of approaches that seek to create machines that can think. We haven't been able to do that completely, but along the way AI has enabled very useful tools, like recognizing email spam, understanding normal language, automating some tasks and more.

AI is still just software though, not magic, not an 'digital brain.' A useful definition that'll help you think about AI is: **AI is software that can do unique and useful things because it learns from data.**

AI represents a fundamental shift in how software systems operate and make decisions. Unlike conventional software that follows predetermined rules, AI systems learn from data, adapt to new situations and improve their performance over time without explicit programming for every scenario.

Today's most advanced AI systems include Large Language Models (LLMs) like GPT o3, Claude and Gemini, which can understand context, engage in complex reasoning and even tackle multi-step problem-solving tasks.

In a construction context, AI shows up in various forms: everyday chatbots that summarize documents, draft emails and can do research, and proprietary systems like computer vision systems that monitor job sites for safety violations, natural language processing tools that analyze contracts and specifications, predictive analytics that forecast project delays, and autonomous equipment that performs specific tasks with minimal human intervention. Since late 2024, we've seen more and more of a move to introduce "agents," which are AI tools that automate workflows, especially the tedious day-to-day tasks that involve documents.

HOW IS IT DIFFERENT TO "NORMAL" SOFTWARE?

Traditional software operates on instructions, in the form of code. Developers write clear and complete instructions: if X happens, do Y, and the software does exactly that and only that. Every possible scenario must be anticipated, programmed and tested. This approach works well for predictable tasks but breaks down when dealing with the complexity and variability inherent in the real world. It is impossible to write enough rules to recognize a face, let alone millions of faces, yet AI does this all the time.

AI makes software work in three main ways. First, AI systems learn from examples rather than following rigid rules. This is why we often hear so much about 'data' in the context of AI. It takes a lot of data for AI to learn anything useful, often hundreds of thousands of labeled, organized data points.

Where a traditional software system might need thousands of lines of code to identify safety violations, an AI system can learn to recognize them from examples, generalizing to new scenarios it hasn't seen before.

Second, because of this learning from data vs. instructions, AI is much better at processing unstructured data: the messy, real-world information that makes up most of what we encounter daily. Things like images from job site cameras, handwritten notes, voice commands, architectural drawings and natural language in contracts all represent unstructured data. We call it "unstructured" because it isn't neatly in rows and columns, like excel data or a database. These examples would be impossible to process at any scale with traditional programming. AI can extract meaning from these natural, messy sources, turning chaos into actionable insights.

Third, and perhaps most importantly, AI systems improve over time through continuous learning. As they process more data and receive feedback on their predictions, their accuracy and capabilities expand. This adaptive quality means AI solutions can evolve with changing project conditions, regulations and industry practices without requiring manual reprogramming. A safety monitoring system, for instance, becomes better at identifying hazards as it analyzes more incidents and near-misses across multiple job sites.

WHAT IS AI GOOD AT?

We find in industry after industry, AI is good at things that make up for limitations that humans often have. Because AI can quickly recognize patterns, processing documents at lightning speed, modern AI systems can process millions of data points, from historical project records to real-time sensor readings, identifying trends and correlations that would take human analysts months to uncover. More realistically, AI can do things contractors just wouldn't do because of the investment in time and money. Because it is software, the cost to do these

things drops, and suddenly they become possible. In fact, that is the core of what we see AI changing in the near term: allowing contractors to control risk more completely because they can automate more of the tedious, time-consuming work that goes into analyzing, error checking and summarizing documentation that can so often be a huge source of risk.

To expand on that, here's a quick list of some of the things AI excels at:

- **Natural language conversation:** At the heart of the current AI wave is the ability for people who are not software developers to work directly with AI. We can ask it questions, get web searches summarized, get images created, and receive a growing list of everyday tasks that are now at our fingertips.
- **Document processing and analysis:** AI can analyze contracts, specifications, RFIs and change orders at superhuman speeds, automatically extracting key information, identifying conflicts and flagging potential issues. AI-powered systems

can review thousands of pages of project documentation in minutes, ensuring nothing falls through the cracks.

- **Safety monitoring:** Computer vision systems powered by AI can continuously monitor job sites through existing cameras, detecting safety violations in real-time. This includes things like workers not wearing proper PPE, unsafe behaviors like working too close to moving equipment and so on. Predictive safety analysis, where AI analyzes historical safety data from previous accidents, near misses and safety observations, can identify patterns that predict future risks.
- **Quality control:** AI-powered image recognition can identify construction defects, measure installations against specifications and track progress with unprecedented accuracy. Drones equipped with AI can survey entire job sites, comparing actual construction against BIM models and identifying deviations before they become expensive problems.
- **Automation of repetitive tasks:.** AI can automatically generate quantity takeoffs from drawings, analyze and create optimal construction schedules considering countless variables, match invoices to purchase orders, and even draft routine correspondence. These time savings compound across projects, dramatically improving productivity.

In all of the above instances, it is important to point out that no system is perfect, and we too often expect AI to be better than a human would or even be as good as an experience professional would be. In reality, AI systems are still just software, and they are good at automating parts of the work, supporting the professionals, but there are definite limits that users encounter quickly when they trust AI with too much, too fast.

WHAT IS AI NOT GOOD AT?

Despite its impressive capabilities, AI has serious limitations that contractors must understand to use it effectively. The core of these limitations is that AI doesn't think like humans do, in fact under the hood, AI is nothing like the human mind. The fact that it can produce coherent, intelligent responses sometimes misleads users, but never forget it is software. Here's a list of some of the limitations to watch out for:

1. **Made up information:** Sometimes called "hallucinations," AI will provide answers to questions even when it doesn't know the answer. It does this with complete confidence, so it can be difficult to spot. This behavior is because AI, specifically LLMs like ChatGPT, are built from the ground up to provide answers. If they don't know the answer, they'll make one up that seems right.

a. This can be almost entirely avoided by pointing the AI at real data, like a document or website, and asking better questions, but it is still a problem to be aware of.

2. **Understanding of the project:** AI does not understand the world, so it will have no idea what certain things imply or what should be included or not. This is another place where AI being fundamentally different to human minds is important. You cannot ask AI a very high level question like, "Show me all the risks in this project manual" and get a good response, it's just beyond the AI's capability.
3. **Creative problem solving:** While AI can generate variations on existing solutions or combine known approaches in new ways, it cannot match human creativity when facing new challenges. When a unique structural problem arises on a job site or when coordinating complex trades requires innovative sequencing, human expertise and creativity are essential.
4. **Complexity:** AI can handle messiness much better than any other software, but it is nowhere near as capable as even an untrained human. This is why robotics is still limited to situations where the site has been cleared (like layout robots) or otherwise simplified. This is true also concerning what you ask AI to help with — involve too much complexity and you get a response that is not useful.

WHAT SHOULD CONTRACTORS KNOW?

First and foremost, AI is a powerful tool, but it is not a replacement for human expertise. AI will not replace the fundamental need for a skilled workforce, expertise or lived experience. Successful implementation requires viewing AI as a partner that handles routine analysis and monitoring, while humans focus on complex decision-making, relationship management and creative problem-solving.

For many applications, data quality serves as the

foundation for AI effectiveness. These systems are only as good as the information they're given. Start with areas where your documents and data are in good shape, then move from there.

Where quality data is a struggle, start where the stakes of failure are lower and are likely to be caught, like marketing and sales, where AI can automate everything from proposal preparation to images and emails. The efficiency gains for these chronically understaffed functions are often significant.

Implementation requires strategic planning and patience. Rather than attempting wholesale AI adoption across all operations, successful contractors start with pilot projects in specific areas. Common starting points include marketing, safety monitoring, document analysis or predictive maintenance for equipment. These focused implementations allow teams to learn the technology, demonstrate ROI and build confidence before expanding to other areas. While nearly all companies are investing in AI, only 1% of leaders call their companies "mature" on the deployment spectrum.

Like all technology, training and change management will be crucial for AI adoption success. Address fears about job displacement directly and emphasize how AI augments rather than replaces human workers. The change management playbook is pretty well understood:

- Invest in training programs that build both technical skills and confidence.
- Create champions within your organization who can demonstrate AI's benefits and support their colleagues.
- Align incentives to allow for time to adopt

Security and privacy demand serious attention in the AI era. AI systems often require access to this data to function effectively. Contractors must understand how their data is being collected, stored, processed and protected. Key considerations include:

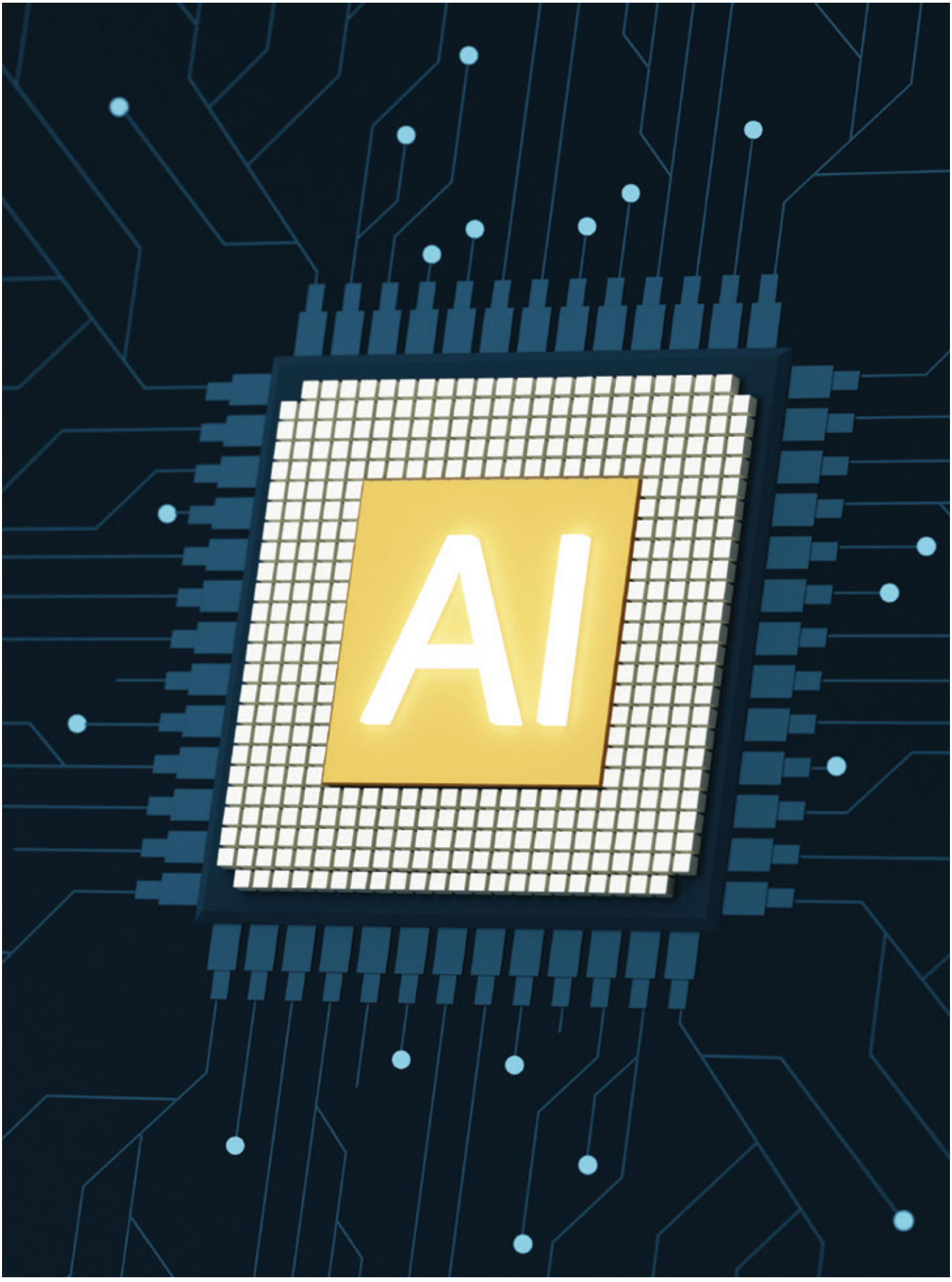
- Where is data stored?
- Who has access?
- How is it encrypted?
- What happens to data after project completion?
- Can competitors potentially access insights derived from your data?

Vendor selection requires careful evaluation. The construction technology market is flooded with AI solutions, but not all deliver on their promises. Look for vendors with specific construction industry expertise, proven track records and verifiable case studies. Because of the hallucinations, and security issues mentioned above, require that vendors show how they evaluate their AI for accuracy and explain it in non-technical terms, it should not be rocket science. Similarly, require they explain data security, including if contractor team members leave.

Future-proofing your AI strategy means staying informed about rapid technological advances while maintaining focus on fundamental business needs. In 2025, models will do more, and they will do it even better, with capabilities expanding monthly. However, avoid chasing every new feature or trending technology. Instead, maintain a clear vision of how AI serves your core business objectives: completing projects safely, on time and within budget.

Finally, remember that AI adoption is a journey, not a destination. The technology continues evolving rapidly, and best practices are still emerging. Maintain a learning mindset, regularly reassess your AI strategy and be prepared to adjust as you gain experience. Connect with peers using AI in construction to share lessons learned and avoid common mistakes. The contractors who thrive in the AI era will be those who thoughtfully integrate technology while maintaining their focus on the fundamentals of good construction practices. ▼

FUTURE-PROOFING YOUR AI STRATEGY MEANS STAYING INFORMED ABOUT RAPID TECHNOLOGICAL ADVANCES WHILE MAINTAINING FOCUS ON FUNDAMENTAL BUSINESS NEEDS.


AI

COVER STORY

Making AI Work: Tips & Tricks for Contractors

We are in the midst of another technology revolution, one as important as the internet or mobile phones, with artificial intelligence (AI) tools becoming increasingly accessible and practical for contractors of all sizes. From drafting proposals to managing complex Excel spreadsheets, AI can transform how contractors work, if they know how to use it effectively. For most modern AI users, this means understanding how to "talk" to AI, otherwise known as "prompting." This guide will explain and demystify AI prompting and provide practical examples to help contractors harness these powerful tools while addressing common security concerns.

UNDERSTANDING PROMPTING: THE KEY TO AI SUCCESS

At its core, prompting is simply the art of communicating with AI tools. Think of it as giving clear directions to a highly capable assistant who needs specific instructions to deliver the best results. Just as you wouldn't tell a subcontractor to "build something nice," you can't expect AI to read your mind. The quality of your output directly leads to the quality of your input.

In the beginning, when ChatGPT was introduced, most users were excited to just get plain English responses; this was a very new experience. As we've grown more comfortable with these tools, we want them to perform better and to actually be useful. And that's where more careful prompting comes in. As you'll see, many of the drawbacks that AI has can be handled, or at least minimized, by good prompts.

For contractors, mastering this skill means the difference between generic responses and tailored solutions that actually save time and money. The good news is you don't need a computer science degree to write good prompts, just a little understanding and some practice.

BACKGROUND: WHAT HAPPENS WHEN YOU ENTER A PROMPT

Modern AI is based on Large Language Models (LLMs), and these work by accepting everything you've entered, and based not just on what you've entered, but also where various items are in the paragraphs, and how you've marked things, creating a probability for what is the best response. This means AI is sensitive to everything you've included, as well as what's in the beginning, how you end the prompt, whether you've been clear on outputs and more. Below we outline these details and suggest best practices.

ANATOMY OF A GOOD PROMPT

A well-crafted prompt contains several essential elements that work together to produce the results you want. Understanding these components will help you construct prompts that consistently deliver valuable outputs.

1. **Start with clear context and role:** Provide context about your situation. For example: "I'm a general contractor preparing a bid for a commercial renovation project" gives the AI crucial information about your role and task.
2. **Tell it what you want done:** Be clear and complete. Instead of "Help me with a proposal," try "Create an executive summary for a commercial renovation proposal highlighting our 20 years of experience and focus on sustainable building practices."
3. **Provide your desired output format:** Specify how you want the information presented. Do you need bullet points, paragraphs, a formal letter or a table? The AI will follow your formatting preferences when clearly stated.
4. **Include constraints and requirements:** Include limitations or specific requirements. For instance: "Keep it under 500 words" or "Use terminology appropriate for municipal government clients."
5. **Provide examples if you can:** For many requests, giving the AI an example of what you're looking for can dramatically improve results. This is particularly useful when you have a specific style or format in mind, or if you have a form you want filled out (e.g., RFI).

Example 1: Drafting Proposals and Documents

One of the most time-consuming tasks for contractors is creating professional proposals and documentation. AI can streamline this process when prompted correctly.

Poor Prompt: "Write a proposal for construction work."

Effective Prompt: "I need to write a proposal for renovating a 10,000-square-foot office space. The client is a law firm that values professionalism and minimal disruption to their operations. Create a two-page executive summary that includes:

- Our company's 15 years of commercial renovation experience.
- Commitment to completing work during off-hours.
- Our bonding capacity and insurance coverage.
- Timeline showing eight-week completion.
- Emphasis on our previous work with professional services firms.
- Please use formal business language appropriate for legal professionals."

This detailed prompt provides context, specific requirements and clear formatting instructions, resulting in a polished, professional document that requires minimal editing. You can reasonably save two to three hours per proposal using this approach, allowing you to bid on more projects without sacrificing quality.

Example 2: Figuring Out Software and Technical Issues

Construction software can be complex, and contractors often struggle with technical challenges. AI can serve as an on-demand tech support specialist when prompted properly.

Scenario: You're trying to create a Gantt chart in project management software but can't figure out how to link task dependencies.

Poor Prompt: "How do I use project software?"

Effective Prompt: "I'm using Microsoft Project to schedule a residential construction project. I have all my tasks entered but need to link dependencies so that:

- Foundation must be complete before framing starts.
- Electrical rough-in happens after framing but before insulation.
- Drywall can't start until electrical inspection passes.

Please provide step-by-step instructions for creating these task dependencies, including which menu options to use and any keyboard shortcuts that might help."

This approach transforms AI into a personalized tutorial system, providing specific guidance for your exact situation rather than generic software advice. Many contractors find this more helpful than searching through lengthy user manuals or watching generic YouTube tutorials.

Example 3: Customizing Excel for Construction Management

Excel remains a cornerstone tool for contractors, but many only scratch the surface of its capabilities. AI can help you create custom spreadsheets, formulas and automation that specifically address construction industry needs.

Real-World Application: A contractor needs to track material costs across multiple projects with automatic markup calculations and budget alerts.

Effective Prompt: "Create an Excel formula system for a construction materials tracker that:

- Calculates 15% markup on all material costs.
- Flags any line item over $1,000 in red.
- Automatically sums materials by category (lumber, electrical, plumbing).
- Includes a dashboard showing total costs vs. budget for each project.
- Works with data starting in cell A2 with columns for: Item, Category, Cost, Project Name.
- Please explain each formula and where to place it."

This targeted approach helps contractors build powerful, customized tools without expensive software or consultants. The AI can provide not just the formulas but also explain how they work, enabling contractors to modify them as needs change.

WHAT IF I DON'T HAVE TIME TO WRITE LONG PROMPTS?

One trick you can use is to write something high level, then tell the AI to ask you questions, one at a time, until it knows enough. This is great for things like agenda writing, where the prompt would be:

"Create an agenda for tomorrow's meeting. Ask me questions, one at a time, about the meeting until you have enough information to complete the task."

If the questioning goes on too long, you can always tell the AI "Please stop asking questions and draft the agenda."

AVOIDING HALLUCINATIONS

One of the big drawbacks of LLMs is that, when they don't know the answer, they'll make something up. Even worse, because they've analyzed your request and come up with a high probability answer, incorrect answers often seem plausible. One way to avoid this is by ending your prompt with a clear statement of what to do if the AI doesn't know the answer. Here's a good example: "If you don't know the answer, don't make it up. It is OK to say you don't know."

A second way to avoid hallucinations, especially when you've asked for something long, is to require that the AI provide a bulleted list of factual statements that are made in their response. Here's an example:

"After you have answered the question, add a bulleted list of all factual statements made or referred to in the answer, with links to the source of that information."

It turns out that by requiring the AI to list the facts it included, it will often correct itself. And you have an easy way to check each item.

DATA SECURITY: ADDRESSING THE ELEPHANT IN THE ROOM

One of the biggest concerns contractors express about AI adoption is data security. The good news? When used properly, mainstream AI tools from reputable providers are generally safe for business use. However, understanding best practices is crucial.

Key Security Considerations:

1. **Choose Reputable Providers:** Stick to well-known AI platforms from established companies like OpenAI,

Anthropic, Google or Microsoft. These organizations invest heavily in security infrastructure and compliance.

2. **Understand Data Handling:** Most major AI providers don't train their models on your individual conversations when using business accounts. However, always review the terms of service and privacy policies.
3. **Protect Sensitive Information:** Never input client social security numbers, credit card information or highly confidential bid strategies. Treat AI conversations like email, professional but not for ultra-sensitive data.
4. **Use Business Accounts:** Consider enterprise or business subscriptions that often include additional privacy protections and data handling guarantees.

Best Practices for Contractors:

- Anonymize project data when possible (use "Client A" instead of actual names).
- Review your company's AI usage policy or create one if it doesn't exist.
- Train your team on appropriate AI use.
- Keep records of AI-assisted work for accountability.
- Regularly review and update security practices as technology evolves.

The construction industry's digital transformation is accelerating, and contractors who embrace AI tools gain significant competitive advantages. By mastering the art of prompting, you can transform these powerful tools from mysterious black boxes into practical assistants that save time, improve quality and help you win more business.

The examples provided here are just the beginning. As you explore AI tools, you'll discover countless ways to apply them to your specific needs — from safety planning to cost estimation, from client communication to regulatory compliance. The key is to start somewhere and build your skills through practice. ▼

COVER STORY

AI in Construction: Navigating Opportunities and Risks for SMACNA Contractors

These next few years will be important for the construction industry, as artificial intelligence transforms key elements of how contractors operate. For SMACNA members, this technological shift presents both opportunities and challenges. As AI adoption accelerates across the industry, understanding its implications will be essential for growth and increasing margins, while keeping a firm grasp on the risks AI can present.

The rapid emergence of AI technologies — from machine learning algorithms that optimize ductwork design to natural language processing systems that automate documentation, is beginning to fundamentally reshape how contractors bid, build and deliver projects. This transformation brings complexities that require thoughtful consideration and strategic planning.

FIRST, THE OPPORTUNITIES

AI tools are accessible to anyone with a keyboard, and more and more people are getting used to using chatbots and other tools in their day to day. This fluency promises to spill over into the workplace, giving teams new tools and skillsets they can use to drive efficiency and control risk, as well as elevating the most critical skills by automating repetitive, time-wasting tasks.

Here are some ways AI promises to improve the lives and work of contractors:

REVOLUTIONIZING DOCUMENT MANAGEMENT

AI offers transformative benefits for document-heavy construction processes. AI technology can eliminate up to 90% of PO processing time while automatically identifying billing errors, which can save contractors 5% to 10% in material costs. For SMACNA contractors managing dozens, hundreds, even thousands of purchase orders, specifications, submittals and compliance documents, AI-powered systems can dramatically reduce administrative burden while improving accuracy.

These systems go beyond simple automation. They can identify patterns in vendor pricing, flag unusual charges, and even predict potential supply chain disruptions based on historical data.

MITIGATING FIELD RISKS

AI's predictive capabilities shine in field safety applications. Computer vision systems can monitor job sites 24/7, identifying safety violations that human supervisors might miss. These systems can detect workers without hard hats, identify improper ladder usage and even recognize fatigue patterns that precede accidents. Real-time alerts can enable immediate intervention, preventing injuries before they occur.

Environmental monitoring represents another frontier. AI systems can continuously analyze air quality data during renovation projects, ensuring worker safety and regulatory compliance. They can predict when conditions might exceed exposure limits and automatically trigger ventilation adjustments or work stoppages.

PRODUCTIVITY GAINS THAT MATTER

Construction professionals currently spend way too much of their time searching for information on projects. AI-powered search and retrieval systems can slash this waste, connecting workers with the exact specifications, drawings or procedures they need instantly. Natural language queries like "show me the rooftop unit specifications for the third floor" can instantly retrieve relevant documents from thousands of project files.

Beyond search, AI enables entirely new workflows. Generative design tools can explore thousands of ductwork configurations overnight, optimizing for multiple parameters simultaneously, airflow efficiency, material usage, installation accessibility and cost. What once required weeks of manual iteration can now happen in hours, with AI presenting ranked options that meet all project constraints.

TRANSFORMING RECRUITMENT

AI is reshaping how contractors identify and attract talent in a tight labor market. Advanced algorithms can scan thousands of resumes to identify candidates with the specific certifications and experience SMACNA contractors need, from certified welders to TAB technicians. But the technology can go deeper, analyzing patterns to predict candidate success and cultural fit based on historical hiring data.

Chatbots handle initial screening questions around the clock, ensuring no promising candidate is lost due to delayed response. They can answer questions about benefits, schedule preliminary interviews, and even conduct basic skills assessments. This frees HR teams to focus on high-value interactions with qualified candidates, improving both efficiency and candidate experience.

ENABLING PROCESS INNOVATION

Perhaps AI's greatest promise lies in enabling entirely new ways of working. Machine-learning algorithms analyzing historical project data can identify patterns that predict delays or cost overruns with remarkable accuracy. By examining factors like weather patterns, material lead times, and crew productivity across hundreds of projects, AI can flag risks that human planners might miss.

Integration with Building Information Modeling (BIM) opens even more possibilities. AI can automatically check designs for code compliance, identify clashes before installation begins, and even suggest optimal installation sequences based on site conditions and crew availability. Some contractors report 30% reductions in coordination time through AI-powered clash detection and resolution.

Many of these opportunities will take some time, as managers become more comfortable with AI and begin to explore its capabilities. In fact, what we've seen already is that once construction leaders and field professionals get to a certain level of capability with AI, they start to find ways it can help both large and small companies. The true power of AI is giving teams the ability to adapt software to exactly what they need.

The Double-Edged Sword: Risks AI Poses

Just like any software, AI involves some risks. Here's a good introduction to some of the bigger challenges:

DATA ACCESS POLICY VULNERABILITIES

The foundation of AI systems rests on data, documents and knowledge. For construction companies, this creates immediate concerns about data access and governance. AI systems require access to sensitive information, including infrastructure blueprints, cost estimates, client specifications and resource management plans, making them attractive targets for malicious actors. Without proper data access policies, contractors risk exposing proprietary fabrication methods, client details and competitive advantages that took decades to develop.

The challenge extends beyond external threats. Internal data access policies must address how AI systems interact with different levels of sensitive information. What historical project information can be fed into third-party AI tools? Can subcontractor data be included in AI training sets? These questions require clear, enforceable policies that balance innovation with security.

Consider a scenario where a well-meaning project manager uploads years of bid data to an AI tool for analysis. Without proper controls, this action could inadvertently expose pricing strategies, material sourcing relationships and proprietary installation methodologies to competitors if the AI platform experiences a breach or inappropriately uses the data for training public models.

ACCURACY CONCERNS AND MEETING DOCUMENTATION

AI's promise of automated meeting transcription and documentation has captivated many contractors, but accuracy remains a persistent concern. When AI misinterprets technical discussions about HVAC specifications, refrigerant requirements or fabrication tolerances, the consequences can cascade through entire projects.

The nuanced nature of construction conversations, with their mix of technical jargon, regional terminology and project-specific abbreviations, poses unique challenges for AI systems trained on general datasets. When a superintendent mentions "fishmouth" or "Pittsburgh lock," will the AI accurately capture these industry-specific terms and their implications for the project?

THE EROSION OF CRITICAL SKILLS

Perhaps most concerning is AI's potential to erode fundamental skills within the workforce. As contractors increasingly rely on AI for load calculations, psychrometric analysis and ductwork optimization, there's a risk that essential technical expertise may atrophy. Young professionals entering the field might bypass the foundational learning that comes from manual calculations and hands-on problem-solving.

This dependency creates vulnerabilities when AI systems fail or produce questionable results. Without the underlying knowledge to verify AI outputs, contractors may blindly follow flawed recommendations, potentially compromising project safety and quality. Imagine a scenario where an AI system recommends a duct size based on incomplete data, and no one on the team possesses the experience to recognize that the recommendation violates basic airflow principles.

The risk extends to field personnel as well. As AI-powered tools handle increasingly complex tasks, from automated layout to robotic fabrication, the craftspeople who built their careers on these skills may find their expertise devalued. This could create a dangerous knowledge gap where the industry loses the very expertise needed to train and validate AI systems.

CYBERSECURITY THREATS

The cybersecurity landscape for construction AI presents

unique challenges. AI systems face risks from attackers who "shift focus from stealing data to poisoning the AI models themselves." For construction companies, this represents a new frontier of cyber risk. Compromised AI models could provide access to customer information, or lead to incorrect answers.

The interconnected nature of modern construction projects amplifies these risks. IoT devices monitoring equipment performance, sensors tracking environmental conditions and integrated project management platforms all represent potential entry points for attackers. A breach in one system can cascade through integrated platforms, affecting everything from BIM models to financial systems.

THE "BRING YOUR OWN AI" DILEMMA

As AI tools proliferate, contractors face the challenge of employees using personal or unapproved AI applications for work tasks. This "shadow AI" phenomenon creates multiple risks: data leakage through consumer-grade tools, inconsistent outputs across teams and potential intellectual property violations. Without clear policies, sensitive project information could end up training public AI models, benefiting competitors.

A foreman might use a free AI app to quickly generate a materials list, unknowingly uploading proprietary assembly details. An estimator

could rely on an AI chatbot for code interpretations, receiving guidance that hasn't been verified for local jurisdictions. These individual actions, while well-intentioned, can create liability exposure and competitive disadvantages that compound over time.

Crafting Effective AI Policies

EARLY STAGE: FOUNDATION BUILDING

For contractors just beginning their AI journey, success starts with solid foundations:

Governance Structure: Create an AI steering committee combining IT, operations, field personnel and leadership perspectives. This group should meet regularly to evaluate tools, assess risks and guide implementation. Include both AI enthusiasts and skeptics to ensure balanced decision-making.

Data Classification: Develop clear schemes identifying what information can be used with AI tools. Create categories like "Public" (marketing materials), "Internal" (general procedures), "Confidential" (project specifics) and "Restricted" (client data, pricing strategies). Each category should have clear handling requirements and approved use cases.

Tool Approval Process: Establish a formal process for evaluating and approving AI tools. Consider factors like data security, vendor stability, integration capabilities and total cost of ownership. Start with pilot programs on non-critical projects before widespread deployment.

Training Foundation: Implement basic training on AI capabilities and limitations. Every employee should understand what AI can and cannot do, recognizing both its potential and its pitfalls. Include real-world examples relevant to their daily work.

MID STAGE: SYSTEMIC INTEGRATION

As AI adoption matures, policies must evolve to address more complex scenarios:

Verification Protocols: Develop specific procedures for verifying AI outputs in critical applications. For example, any AI-generated load calculation must be spot-checked by a qualified engineer. Establish clear thresholds for when human verification is mandatory versus optional. A critical point here is to make sure someone "owns" every output from the AI system.

Vendor Management: Create comprehensive assessment criteria for AI solution providers. Evaluate not just functionality but also data handling practices, model transparency and update procedures. Require vendors to provide regular reports on model performance and any identified biases or errors.

Performance Metrics: Establish KPIs for AI initiatives. Track not just efficiency gains but also error rates, user adoption and impact on project outcomes. Regular reviews ensure AI investments deliver promised value while identifying areas for improvement.

Conclusion: Balancing Innovation with Prudence

The construction industry's AI transformation is not a question of if, but how. SMACNA works to be one step ahead to ensure members have the resources and education to align with the growth curve. Success requires balancing aggressive innovation with prudent risk management.

The path forward demands a thoughtful approach. Contractors must embrace AI's potential while maintaining healthy skepticism about its limitations. They must invest in technology while preserving the human expertise that remains irreplaceable. Most critically, they must view AI as a tool to augment human capabilities rather than replace them.

For SMACNA contractors, this means developing comprehensive strategies that address both opportunities and risks. It means creating policies that enable innovation while protecting against emerging threats. It means investing in both technology and training, ensuring teams can leverage AI effectively while maintaining the skills to work without it.

The future belongs to those who can harness AI's power while preserving the craftsmanship, judgment and expertise that define excellence in sheet metal and HVAC construction. By sharing experiences, best practices and lessons learned within the SMACNA community, contractors can collectively navigate this transformation, emerging stronger and more capable than ever before.

As we stand at this technological crossroads, one truth remains clear: the contractors who thrive will be those who approach AI with both ambition and wisdom, leveraging its capabilities to enhance their work while never forgetting that construction remains, at its core, a human endeavor built on skill, experience and dedication to quality.▼


AI
ARTIFICIAL
INTELLIGENCE

CAPITOL HILL UPDATE

What's in H.R. 1, The New Tax Bill, and What It Means for SMACNA Contractors

The Congress just passed, and the President signed H.R. 1 into law. This budget and tax law is filled with significant updates and the extension of valued existing provisions for HVAC contractors, equipment suppling firms, building owners and real estate project developers. While tax policy isn't simple, this bill does include many industry tax incentives most contractors will be familiar with from the 2017 Tax Cuts and Job Act (TCJA). Other incentives will be new, representing significant changes that could impact business growth over the next few years. We are pleased that the new law brings back several SMACNA-endorsed and advocated tax incentives and extends others, some of which were on the verge of ending. Below, is outlined what's in the bill, why it matters and what each section could mean for your bottom line.

BILL HIGHLIGHTS FOR SMACNA CONTRACTORS AND CLIENTS:

- Bonus Depreciation (100%) Restored – Deduct 100% of qualifying property costs in the year placed in service, including past projects, to boost cash flow and tax savings.
- Section 179 Expensing Expanded – Instantly expense up to $2.5 million in equipment or property purchases with new, higher limits and inflation adjustments.
- Section 179D Energy-Efficient Deduction – Claim up to $5.00 per square foot for energy upgrades in new builds and renovations. This applies to both private owners and public building designers. The bill keeps the incentive in place but only until the end of 2026 when it ends.
- The Advanced Manufacturing Investment Tax Credit is increased from 25% to 35% for technology-related projects, often Chip plants, started by the end of 2026.
- Section 45L Home Energy Credit – The incentive survived efforts to kill it, so homeowners get $2,500 to $5,000 per unit for building energy-efficient single-family or multifamily housing until the end of 2026.
- Section 174/174A R&E Deduction Reinstated – Immediately deduct domestic R&D expenses instead of amortizing over five years, retroactive to 2022.
- Section 41 R&D Tax Credit Enhanced – Continue claiming 6% to 20% credit on qualified research while also deducting those same costs under Section 174A.
- Estate Tax Ceiling Raised – A permanent increase in the unified credit and GSTT exemption threshold from $10 million to $15 million per individual, indexed for inflation.
- SALT Allowance – Temporarily increases in the SALT cap to $40,000 from $10,000 with limitations until 2030 when the $10,000 threshold returns.
- The Section 199A deduction is made permanent at the deduction rate of 20%. Further, it limits the phase-in range for certain businesses by increasing the amount from $50,000 to $75,000 for non-joint tax returns and from $100,000 to $175,000 for joint returns.
- Excess Business Losses – The new Act makes permanent the excess business loss limitation allowed to the amount of aggregate gross income or gain attributable to trades or businesses of the taxpayer plus a threshold amount indexed for inflation ($313,000).
- Section 45U, Zero-Emission Nuclear Power PTC – Not modified; credit allowed through Dec. 31, 2032.

SMACNA ALSO APPRECIATES THE RECONCILIATION PROCESS FOR DEMONSTRATING SUPPORT FOR:

- The deductibility of employer-sponsored health insurance.
- Maintaining without changes the business state and local tax (SALT) deduction.
- Sustaining current law concerning treatment of the tax-free status of municipal bonds.

> "WE ARE PLEASED THAT THE NEW LAW BRINGS BACK SEVERAL SMACNA-ENDORSED AND ADVOCATED TAX INCENTIVES AND EXTENDS OTHERS, SOME OF WHICH WERE ON THE VERGE OF ENDING."

While there is much our industry endorses in the H.R. 1 as passed by the Congress, we regret the final version included termination after 2025 or 2026 of the highly popular and valued IRA residential market tax credits (25C, 25D, 45L) and programs necessary to boost the important consumer-oriented contractor and HVAC equipment retrofit markets. ▼

Ronald J. Eagar

Workforce Evolution Trends: What Construction Leaders Should Know

The dynamics of the construction labor workforce are shifting, fueled by a growing labor shortage, evolving employee expectations and a sizable portion of the workforce nearing retirement. To stay competitive, close the skills gap and adapt to change, the following are key workforce considerations for the construction industry today:

1. Aging Workforce and the Skills Gap

With 40% of the construction workforce nearing retirement, many experienced workers are leaving the industry at a faster rate than they can be replaced. Despite increased enrollments in trade schools and apprenticeships, contractors must directly address this significant skills gap to meet project demands themselves.

Forward-thinking companies are investing in mentoring initiatives, such as strategic partnerships with community colleges, vocational schools and apprenticeship programs, to facilitate skill transfer and enhance their talent pipelines. While some experienced professionals may initially resist these changes, viewing mentorship as "babysitting," rather than a strategic handoff of knowledge, it's essential to reframe the effort as an investment in the company's legacy.

2. Technology Is Transforming the Workforce

By 2030, it is expected that 70% of workers will require advanced skills in technologies such as artificial intelligence (AI), data analytics and robotics to remain competitive in their respective industries. To bridge the growing skills gap, contractors should invest in training to ensure that workers possess these skills and shift hiring practices to prioritize recruiting candidates who combine traditional trade skills with digital capabilities.

3. Changing Work Preferences Among Younger Workers

Across professions, younger generations, particularly Millennials and Gen Z, are prioritizing work-life balance, career advancement and a positive workplace culture. To attract and retain this talent, construction firms must look beyond traditional pay structures and consider flexible work options. Many contractors are adopting customized deferred compensation, bonus and retirement plans. Employee retention strategies should include clear career progression plans, regular feedback mechanisms and continuous training opportunities.

4. Gig Work and the Rise of Flexible Labor Models

In response to labor shortages, many contractors are adopting flexible workforce models, such as gig-style arrangements, part-time roles and project-based contracts, which are likely to become more prevalent as labor shortage problems worsen. Some firms create internal talent pools of on-call specialists and others leverage digital platforms to connect with independent contractors.

While this approach provides specialized expertise and greater flexibility to adapt to fluctuating project demands, careful management is essential to ensure project continuity and maintain quality standards.

5. Strategic Partnerships

External pressures, including impacts from tariffs, rising material costs, market volatility and supply chain disruptions, are prompting contractors to explore more collaborative business models. Contractors are forming partnerships with neighboring businesses or firms in adjacent markets to pool resources and share risks, allowing them to take on more complex projects. Many contractors are also establishing formal talent-sharing networks, enabling employees to move between companies as project demands fluctuate.

6. Alternative Ownership Structures

As retiring owners evaluate their exit strategies, succession planning has become a priority in the industry. Private equity-backed consolidations are on the rise, resulting in larger, more capitalized firms with increased resources. Many contractors are exploring alternative ownership structures, such as Employee Stock Ownership Plans (ESOPs) or gradual internal transitions, to preserve company culture and create opportunities for employee growth and development. ▼

For more information, contact Ronald J. Eagar, CPA, CCIFP Partner at Grassi, at reagar@grassiadvisors.com, through www.grassiadvisors.com or 516-336-2460.

LEGAL

Grant Collins

Trump Backs Biden-Era EO Mandating PLAs for Large Federal Construction Projects

In a surprising continuation of his predecessor's labor policy, President Donald Trump's administration announced on June 12, 2025 that it will maintain the federal requirement for project labor agreements (or PLAs) on large-scale federal construction projects in accordance with President Joe Biden's Executive Order 14063 (EO 14063).

The move, outlined in Office of Management and Budget Memorandum M-25-29, confirms and clarifies prior guidance implementing EO 14063. It preserves the requirement that federal agencies use PLAs for federal construction contracts valued at $35 million or more, marking a rare moment of policy alignment across two very different administrations.

WHAT ARE PLAS?

PLAs are a special type of "pre-hire" collective bargaining agreement governing labor relations and working conditions for all workers, union or non-union, on a single construction project. PLAs standardize wages, benefits, dispute resolution procedures, safety protocols and other work conditions for the duration of a federal project. PLAs minimize labor disruptions, ensure a consistent and qualified workforce, as well as boost project efficiency.

Though often controversial in the political arena, PLAs are widely used in both public and private construction and are endorsed by many project owners, particularly on complex or large-scale projects. Large construction projects involve numerous contractors and subcontractors, each with their own workforce performing discrete parts. PLAs provide an overall structure on a project, which applies to all contractors working in every aspect of the project throughout its entire duration, as well as facilitate coordination of these multiple parties.

PRESIDENT BIDEN'S EXECUTIVE ORDER 14063

Originally signed in February 2022, EO 14063 required all federal executive agencies to use PLAs on federally funded construction projects of $35 million or more, with three narrow exceptions:

- A PLA would not advance the government's interest in achieving efficiency in federal procurement.
- The contracting agency determines that "based on an inclusive market analysis, requiring a project labor agreement on the project would substantially reduce the number of potential bidders so as to frustrate full and open competition."
- "Requiring a [PLA] on the project would otherwise be inconsistent with statutes, regulations, etc."

TRUMP'S UNEXPECTED ENDORSEMENT

Despite President Trump's historical criticism of organized labor and union-friendly policies, the administration's June 12, 2025 memorandum not only leaves EO 14063 intact but actively encourages its continued enforcement. The OMB memo M-25-29 reaffirms the benefits of PLAs for large-scale federal projects and precludes federal agencies from blanket deviations from the PLA requirement. It also provides that "agencies should use PLAs when practicable and cost-effective" and instructs agencies to "rescind any deviations related to PLAs that were issued prior to the date of this guidance."

The 2025 memo rescinded portions of OMB's 2024 guidance and clarified the process for analyzing whether utilizing a PLA would "substantially reduce the number of potential bidders so as to frustrate full and open competition." It also makes clear that "other exceptions recognized in [EO 14063], implementing regulations, and OMB guidance remain in effect."

WHY TRUMP IS KEEPING PLAS

While Trump has previously criticized union influence in education, manufacturing and government policy, his administration appears to view PLAs through a pragmatic, pro-construction lens. The Trump administration appears to recognize that PLAs have benefits, including:

- PLAs ensure a steady supply of skilled labor during a tight construction labor market.
- PLAs harmonize work rules across multiple trades.
- PLAs eliminate delays through no-strike provisions.
- PLAs support the expansion of apprenticeships and training programs to meet future construction needs.
- PLAs improve worker safety.
- PLAs reduce worker misclassification.

President Trump's support for PLAs also reflects a strategic effort to court blue-collar union voters, particularly in battleground states. ▼

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2025

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Raleigh, North Carolina

September 17-18
Safety Champions Conference – SMOHIT
Chicago, Illinois

September 25
State of AI in 2025
Webinar

OCTOBER

October 1
Uncovering Hidden Labor Costs: Why Your Processes, Not Your People, May Be the Problem
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