THE LEADING BUSINESS MAGAZINE FOR CONTRACTORS

JUNE 2024 | CONSTRUCTIONBUSINESSOWNER.COM

# CONSTRUCTION BUSINESS OWNER®

## COMMIT TO A CULTURE OF SAFETY

EVALUATING YOUR APPROACH TO RISK & EMPLOYEE EMPOWERMENT



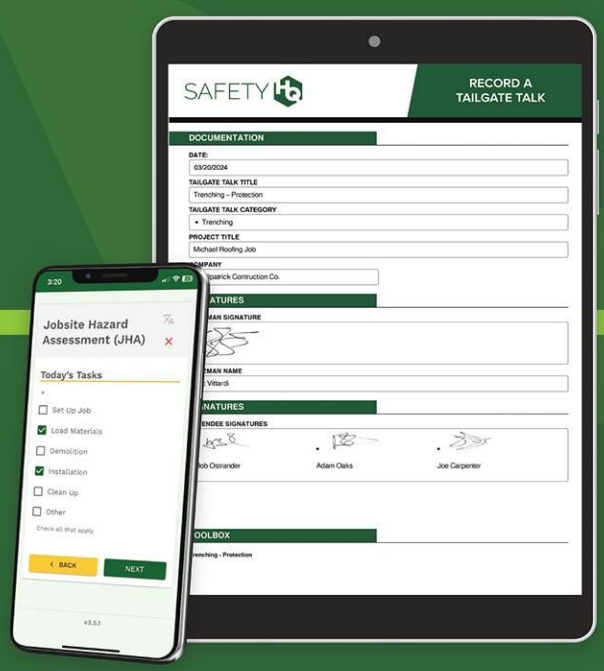
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# FROM THE EDITOR

**MEGAN BEAM**



CBO Editor
Megan Beam

Construction safety is not just a matter of compliance — it's also a matter of culture and commitment. It is not new information that jobsites are among the most hazardous workplaces, with falls, struck-by incidents and electrocutions being leading causes of the most dangerous (and in some cases, fatal) injuries and making up three of the Focus Four Hazards the Occupational Safety and Health Administration (OSHA) has identified industrywide.

In this issue, our features bring you key aspects of safety management to help you elevate your safety standards and protect your workforce. Beginning on page 28, "Who's Who in Your Fall Protection Program?" explores the importance of establishing authorized, qualified and competent persons in your safety operation plans. By identifying and empowering individuals with the necessary skills and knowledge, you can enhance the effectiveness of your fall protection measures and minimize countless other potential dangers.

"Commit to a Culture of Safety" (page 30) urges you to evaluate your approach to safety across your business, emphasizing employee empowerment and risk assessment. Cultivating a culture where safety is ingrained in every aspect of your operations fosters a diligent stance toward mitigating hazards and preventing accidents.

As we anticipate the heat of summer in this hemisphere, it's still essential to plan for the colder months. "Ready Your Workforce for the Coming Winter" (page 34) underscores the importance of understanding cold stress safety and protection. Planning for winter amid summer not only keeps businesses ahead of the curve but demonstrates a proactive commitment to safety year-round.

As we produced this issue, Associated Builders and Contractors (ABC) released their 2024 Safety Performance Report, highlighting that construction companies implementing best practices can be nearly six times safer than the industry average. And because readers like you are staying informed about new methodologies, empowering your workforce and planning ahead, we can create safer workplaces and ensure the industry continues to be highlighted for commitment to an ever-safer future on the jobsite.

Thanks for reading,



BPA WORLDWIDE MEMBER


CONSTRUCTION BUSINESS OWNER

**EDITORIAL**
Editor
Megan Beam
mbeam@cahabamedia.com · 205-314-8264
Managing Editor
Carmen Capoccia
ccapoccia@cahabamedia.com · 205-961-3391

**CREATIVE SERVICES**
Art Director
Andi Shepard
Digital Production Designer
Matt Hodges
Web Developer
Greg Caudle

**PRODUCTION**
Client Services Coordinator
Sonya Crocker
scrocker@cahabamedia.com

**CIRCULATION**
Subscription Management
constructionbusinessowner@omeda.com
800-256-2785

**ADVERTISING**
Senior Account Executive
Van Imbragulio
vimbragulio@cahabamedia.com · 205-314-8263
Account Executive
Andrew Arnold
aarnold@cahabamedia.com · 205-961-3384

CAHABA MEDIA GROUP

Publisher
Matthew G. Conroy
VP of Sales
Greg Meineke
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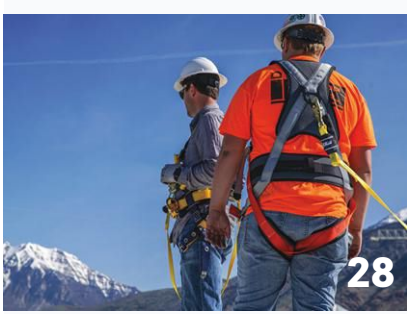

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Photo Credit: Diversified Fall Protection

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## Construction worker safety: How to prevent falls and accidents

The demand for building projects is at an all-time high, and there's no hint that it's slowing down. Keeping up with this "building boom" is a good problem to have, but job site safety is critical. Data from the Bureau of Labor Statistics1 shows that falls were the leading cause of construction deaths in 2022. According to Mark McGhiey, Senior Associate Vice President of Loss Control Services at Nationwide®, many of these accidents were preventable.

In early May, the Occupational Safety and Health Administration held its annual National Safety Stand-Down to Prevent Falls in Construction. To support these efforts and ensure you're providing a safe environment for your workers, schedule time to complete safety equipment inspections, discuss job specific hazards and conduct employee training. Focus on these key areas:

**Injury prevention for less-experienced workers –** Nationwide claims data shows that construction workers with less than 2 years of experience with a company account for more than half (53%) of all reported construction fall claims since 2020. Builders should ensure that all workers, especially those new to their company, are properly trained on equipment usage and have the necessary safety gear.

**Create a "safety focus" culture –** Companies should prioritize safety in all aspects of their operations. This includes conducting regular safety inspections and implementing safety protocols and procedures that align with regulatory requirements. By creating a work environment that prioritizes safety, construction companies can reduce the likelihood of incidents occurring, improve their overall safety record and reduce workers' compensation claims.

As your partner in protection, Nationwide has developed Toolbox Talks, an online destination where you can find relevant safety and risk management articles for you and your employees.

Visit **nationwide.com/toolboxtalks** to view our recent talks, jobsite forms and checklists.



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### Tenna Partners With Boom & Bucket

Tenna, a construction technology platform for equipment fleet operations, and Boom and Bucket, an online marketplace for buying and selling heavy machinery, have announced a strategic partnership and integration for enhancing a construction business's ability to manage the life cycle of its owned fleet. This partnership involves the integration of Boom and Bucket's market valuation and data tools into Tenna's equipment operations platform. This provides contractors with insight and convenience in the end-to-end management and sale of their high value, heavy construction equipment. This integration eliminates the need to navigate between platforms for equipment management and sales, consolidating both into one seamless experience. This integration will be available in the summer of 2024 at no additional cost to all Tenna users (accessible based on permissions within each asset's financial section). Visit tenna.com and boomandbucket.com.

### KAI Adds Jim Duckwitz as New Controller



Jim Duckwitz

KAI Enterprises announced the hiring of Jim Duckwitz, CPA, as its new controller. In his new role, Duckwitz will oversee KAI's accounting functions, internal and external financial statement reporting, monthly close activities and cash flow forecasting, plus provide oversight of the professional services project accounting team. Duckwitz has spent the last 17 years of his 25-year-career in the architecture, engineering and construction (AEC) sector as an accounting manager, controller and vice president of finance. His track record of providing critical financial reports, participating in board meetings and playing a pivotal role in policy recommendations and risk management will benefit KAI on multiple levels. Duckwitz is a certified public accountant (CPA) in Missouri. He is also a member of the American Institute of Certified Public Accountants and the Missouri Society of CPAs. KAI Enterprises is a national design and build firm providing delivery-oriented building solutions with a diverse portfolio of experience, in-house multidiscipline professionals, and expertise in both design and construction delivery. Founded in 1980, KAI has grown into one of the largest minority-owned firms in the AEC industry. Visit kai-db.com.

### 75 Years

Pettibone Traverse/Lift LLC is celebrating the 75th anniversary of the Cary-Lift, which became the world's first forward-reaching, rough-terrain material handler upon its invention by Phil LaTendresse in 1949. Shortly after its origin, the Cary-Lift product line was acquired by Pettibone, and it remains an industry solution for pipe, pole and log handling to this day. The Cary-Lift overhead lift arm design gives the operator full front visibility, and its solid steel body frame allows the machine to take full loads into sharp turns without sacrificing stability. Visit gopettibone.com.

### Blastcrete Announces Distribution Partnership Forming Mecbo America

Blastcrete Equipment LLC, a manufacturer of concrete pumps, shotcrete and gunite equipment and accessories, announced a distribution and service partnership with Italian concrete equipment manufacturer Mecbo Srl. The alliance forms "Mecbo America: a Division of Blastcrete." This partnership will provide customers in North, Central and South America access to Mecbo products, enhance the Blastcrete offering with new models designed around Mecbo pump technology, and ensure a solid parts and service support network throughout North America. Blastcrete will incorporate Mecbo pump technology into their trailer-mounted pump designs to meet customers unique needs in pool installation, deep foundation installation and other high-volume applications. Both models allow customers to choose between an electric or diesel engine, with a soundproof option for diesel. Each also contains a work and maintenance station, water tank and radio control for handling. Visit blastcrete.com.

### 3A Composites USA Announces Team Player & Sales Professional of the Year



Mike Marushka

3A Composites USA named Mike Marushka as the recipient of both the 2023 Team Player of the Year and Sales Professional of the Year awards for the architectural division. Known for his technical expertise and superior customer service, Marushka is being celebrated for his exceptional contributions to the company. The ALUCOBOND Team Player of the Year award is determined by a cross-functional group of peers who honors a member of the architecture sales team who embodies the company's core values of integrity, accountability, value creation, customer focus, team, continuous improvement, humility, and respect and drive. In addition to his recognition as Team Player of the Year, Marushka has also earned the title of Sales Professional of the Year. This distinction acknowledges his outstanding performance in driving significant year-over-year growth in volume and fostering strong relationships with clients across his territory, which includes Washington, D.C., Delaware, Maryland, New Jersey, Pennsylvania, Virginia and West Virginia. 3A Composites is a producer of materials for the metal facades market. Visit alucobondusa.com.

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# Keith Kothmann

## Founder & Vice President, Construction Cost Management

*Seeing the big picture & setting up a company for lasting success*

BY CARMEN CAPOCCIA

In 1979, McDonald's launched its first Happy Meal, the Sony Walkman arrived on the music scene and CompuServe introduced a dial-up service for consumers — a precursor to today's online world. During this time of creativity and innovation, Keith Kothmann founded Construction Cost Management (CCM) in Fort Worth, Texas. CCM has provided construction estimating and consulting services for the last four decades. Below, Kothmann reflects on building his company and staying successful in the construction industry for more than 45 years.

### What drew you to construction? Why did you decide to open an estimating firm?

My first job wasn't in construction cost estimating — I was a soda jerk at a drugstore, and I loved it because I got free soda and ice cream. My second job wasn't in construction either. But just a few months into my third job, where I worked with general contractors (GCs) to develop the estimates they would pass on to their clients in the bid phase, I had completed estimates for well over 200 construction projects. I used that experience to become a vice president at Estimating ORR, which was a leading international firm at the time. My job was to crisscross the U.S., teaching people to use their computerized estimating system, which was the only one of its kind. Estimating ORR was acquired by a French firm for its proprietary software, so at age 33, I had a choice: move to France, or stay in Texas and start my own company. I didn't really want to exchange my cowboy hat for a beret, so in 1978, Construction Cost Management was born, and it's been in Fort Worth ever since.

One of the first things I did was buy a mainframe from IBM. It was a huge financial risk, but looking back, CCM would probably not have become an industry leader. During this era, only organizations like NASA or the Department of Defense wrote their own code, but since I didn't have to learn French, I mastered several computer languages and created my own software. Forty-five years later, I'm still doing what I love, and am still learning new things every day.

### PRO specs

**Founded:** 1979

**Services:** Cost estimating, cost segregation & construction cost control

**Projects Estimated:** 8,000-plus

**Dogs on Staff:** 2 (Sunny Mae is chief snuggles officer, and Piper is chief security officer)

### You founded CCM in 1979. How have you noticed the industry changing over the last 45 years?

When I started the business, most architecture and engineering (A&E) firms didn't use professional estimators; instead, they simply tallied up the estimates their subcontractors gave them. The estimates the subs gave were free, so I'm only partly joking when I say that they got what they paid for. Kidding aside, clients weren't used to paying for professional cost estimating, so we had to make them see that "if you estimate it, it gets managed." During this time period, all tax-supported projects were required



Photo Credit: Construction Cost Management

to provide estimates that substantiated the owner's budget. For projects that bid substantially over (or under) the owner's budget, the AE would be contractually obligated to redesign the project to meet the budget. Redesigning was a real train wreck in terms of AE fees.

One thing that has really changed is the pace of business. Forty-five years ago, it was really, really, really slow. Using a hand-cranked calculator was time-consuming, but much better than longhand. The government's giant mainframes, which were state-of-the-art at the time, improved the pace, but not by much. This was because takeoff data had to be coded before it was input, and if it was a government project, it had to be sent to a data center in Maryland. Response time to every inquiry was often 24 hours, so the real-time dialogue that we take for granted today was impossible, even with the most sophisticated players. In the 1970s and 1980s, estimators would extrapolate scope of work and materials needs from the hard copy plans they received from A&Es, then input that data into the mainframe using a system called CACES. That system was replaced with the Micro-Computer Automated Estimating System, or MCACES. The most important development in the industry is the speed at which we work. Today, all design data and estimate submittals are digital.

## What industry changes would you like to see?

Actually, I don't see much change in the estimating industry, and I don't think artificial intelligence (AI) is going to have an impact. There's just too much human interpretation involved with determining a scope of work that can be priced.

## How has CCM aligned itself with sustainable construction over the years?

Since we're not the ones who design the projects, we can't really control the types of materials used, but we do have some impact on how a build will manifest on the ground. We do this by being aware of environmental impact and by making sure our estimates accommodate environmental concerns. For example, we're still producing estimates for a massive project in the Grand Canyon. Because of the environmentally and culturally sensitive nature of the Colorado riverbed, all men and some material had to be hauled down the canyon in a two-hour (each way!) mule ride. All of this was built into the estimate to protect the environment — except, of course, estimating the cost of hauling up the mule droppings, which thankfully were considered "natural" to the area. We've built this type of thinking into our estimates and continue to be sensitive to these things wherever we work.

## What is your greatest career achievement, and why?

I think my greatest career achievement is still being here, doing what I love, 45 years after I started the firm! It's not easy to have to work in the business while you also work on the business, especially in a field where every development in technology — from the way things can now be automated, to improvements in materials, to the speed of communication — can impact a cost estimate.


Photo Credit: Construction Cost Management

## What's the most memorable project you've worked on?

In nearly 50 years, I've led quite a few remarkable projects, but a few really stand out. One was when CCM was tasked with estimating a runway in a remote Pacific Ocean island that had no infrastructure — not even fresh water. It was really just a speck of land in a vast blue ocean, with no port or even a deep-water lagoon. That meant our estimates had to include bringing in all the men and materials on a mother ship, then transferring everything to small boats each day. If the seas were rough enough to prevent the small boats from landing or getting back to the ship, a day's work would be lost, and we had to build those kinds of variables into our estimates.

Another project was the Elwha River relocation in a national park, including river tunnels, two water treatment plants, extensive electrical facilities and something called a fish trap, which sounds simple but is extraordinarily complicated. This was a vast and incredibly complex project, but the estimate was right on the button, and gave a huge credibility boost to the estimating industry in general and to CCM specifically. The Grand Canyon project that I mentioned previously is still ongoing, but it is certainly one of the more memorable ones because of the complexity, and because it's such an honor to be working on a project that will help preserve one of the most beautiful spots on the planet.

## What's the biggest lesson you have learned?

Gosh, there are so many, but one of the most important is that if you want to be successful in this industry — and probably in life in general — you really need to be broadly curious. When your purview is every trade and every facet of the build — including things that can't be controlled but have to be accounted for, like weather and tides — it's critical to be interested in basically everything. These days, fluency in computer languages is a must, but so is the temperament to handle the bureaucracy that is inherent in the kind of estimating projects we tackle, many of which are related to the military or other U.S. government agencies. Another thing I've learned is that because any project built with tax dollars literally takes an act of Congress to greenlight, budgets are my reality. Much as I would like to wish it were not so, I have learned to accept it: There's no avoiding the budgets in the construction estimating business.

## Tell me about some career highs and lows you've experienced.

This might not be what you were expecting, but it's what immediately comes to mind when you say the words "career high" for me. About 10 years ago, I sold CCM to my daughter (Katy Abraham) so that I could be free to focus on doing the estimating, instead of also having to spend so much time growing and managing the business. Honestly, if I had known how much fun it was to just be an estimator instead of also being a business owner, I would have sold it to her 10 years earlier — I love being an employee! Right now, I lead a team of eight seasoned estimators and I'm having fun training a few hand-picked young engineers. While I know the idea is to pass on my knowledge and

eventually step down from active duty, I still love it when I hear someone down the hall say, "Let's ask Keith," because nine times out of 10 I've encountered the same situation or something really similar. But my daughter Katy is doing a fantastic job managing the company. She's got a plan and it's working, so I'll keep coming to the office for as long as I'm adding value — or for as long as the "boss" will let me!

### What is the culture like at CCM? How did you help cultivate a workplace that has healthy teams?

Each estimating product that we develop is a team effort. No one is left to produce an estimate independently. I think that sharing roles and questions on an estimate with all team members is key to cultivating a camaraderie that is really successful.

### Do you have any advice for our readers in similar roles?

I think one of the key things to remember is that construction cost estimating has two inherent — and often dueling — challenges. The first, of course, is to provide an accurate depiction of the labor and materials costs of a build. The second is to provide those estimates in a way that can be fully understood by several audiences. Even though they're all lumped in the "construction" category, contractors speak a different language than engineers or designers; owners often need extra scope description as they are often not well versed in construction lingo; and, of course, banks need to understand our estimates so they can use them to determine loan requirements. And since we aren't getting paid to write an estimate twice, we have to make sure it can be broadly understood. Making sure your team understands that will save a lot of time, money and headache down the road.

### What would you say to someone considering a career in the construction industry?

I will encourage anyone to enter the construction industry because as long as there are people on the planet, structures will be built. There are so many ways to be successful in construction: You can be a creative type who does design, a person who researches new and better materials, all the different types of engineers and, of course, the tradespeople who are the true backbone of the industry. There's always a need for skilled businesspeople to hold it all together, and computer scientists have their hands in everything now. If someone is interested in cost estimating specifically, I would tell them that estimating for prime contractors is very, very different from what we do. Some estimators use data that they receive, then aggregate the numbers that roll in from subcontractors, and maybe add a thing here and there. We build our estimate from the bottom up, line-by-line, to provide a fully comprehensive package. I like to say that our job starts with an idea drawn out on a napkin … and includes the price to demo it 50 or 75 years later.

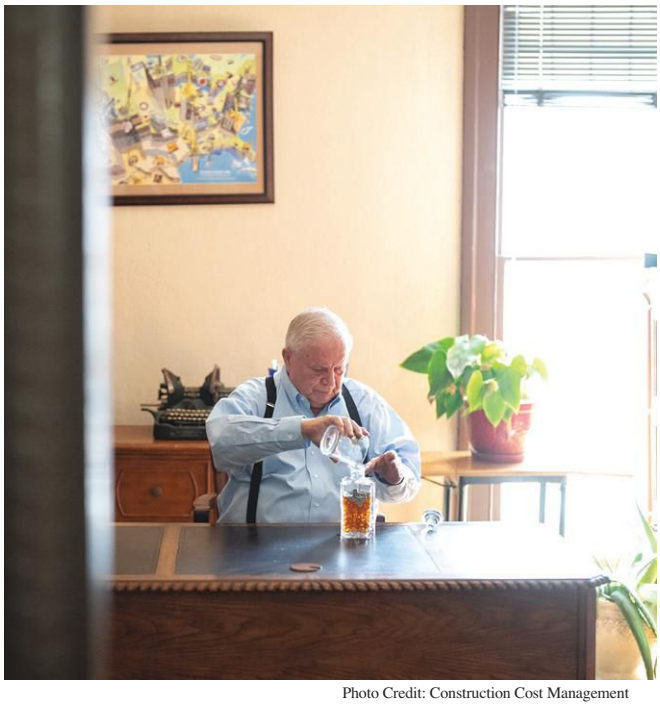


Photo Credit: Construction Cost Management

### Given your career path and experience, what is your perspective of the future of the industry?

AI gets lots of airtime these days, and for good reason: It's amazing. That said, there are real limits to what AI can do in our industry. Being an estimator is not just about crunching numbers and creating documents: It's about understanding the total project. I like to tell young estimators that they need to develop 3D vision so they can mentally build a project in their mind. One of our estimators actually tried an interesting experiment where he loaded parameters into an AI portal to build an elevator in a school. The AI did nicely on some of the line items but missed huge chunks of what it would actually cost to install, including things unrelated to materials or machinery, like extra building security and increased air filtration during construction. Thinking about what the kids would need is just not something that AI can do — yet. One of the things I tell young estimators is that if they can, they should try to spend time in many silos: the architect, the owner, the GC, even the banker dispersing the loan money. Now, I recognize that few people will be able to do this, but I also know that AI will never be able to do it, so the need for the human brain will continue for a long, long time, at least in the construction cost estimating industry. ▲

*Carmen Capoccia is managing editor of Construction Business Owner Magazine & Digital Media.*

# Selling Change

How to drive change when the old way feels just right



GREGG M. SCHOPPMAN is a partner with FMI Corporation, management consultants and investment bankers for the construction industry. Schoppman specializes in the areas of productivity and project management. He also leads FMI's project management consulting practice. Prior to joining FMI, Schoppman served as a senior project manager for a general contracting firm in central Florida. He has completed complex construction projects in the medical, pharmaceutical, office, heavy civil, industrial, manufacturing and multifamily markets. He holds a bachelor's degree and master's degree in civil engineering, as well as a Master of Business Administration. Schoppman has expertise in numerous contract delivery methods, as well as knowledge of many geographical markets. Contact Schoppman by email at gregg.schoppman@fmicorp.com. Visit fmicorp.com.

Leadership's charge can be referred to as "change for better results." Leaders identify an aspect of their organization or business and understand that change must occur. Whether it is a process that isn't working or a market that isn't yielding results, something has to give. One of the most dangerous things a leader can do is nothing at all.

It appears logical to decide to make monumental changes when things aren't working, but what if everything appears to be normal? Sure, conditions are favorable now and the organization is making money, but it is incumbent upon leaders to anticipate the future hurdles. How does leadership instill a sense of urgency while avoiding feelings of changing for change's sake, or simply sounding like Chicken Little? There are plenty of leaders who appear more like a Baskin-Robbins, engaging in the "Flavor of the Month" club. They read the latest business bestseller and quickly make it the firm's dogma. However, a new book becomes gospel the next month, leading to confusion and frustration. So how does a leader make real, sustainable change when doing it the old way feels so good?

## Selling the Upside

Whether the reason for the change is immediate or long-term, leadership needs to address the "why." Interestingly enough, the "why" may be different for different team members. For instance, it is easy to discuss a change being made to generate higher profitability. That sounds like a compelling enough reason for any audience. However, if the leader is creating wholesale change to a rank of superintendents who will see a drastic change in the way they need to perform there may be blowback: "Great, I have to change the way I've been doing it so the firm can make more money." Consider the examples and the potential variations in messaging in Figure 1.

There is no shortage of reasons why

| Potential Change | Overarching Why | What the Team Hears | Direct Why |
|---|---|---|---|
| **Creating a new planning system** | Improve profitability and lower labor costs | "More busywork ... " | Superintendents — Fewer headaches; materials when you need them |
| **Introduction of a new estimating software** | Accuracy in project costing and improved tracking | "I've been estimating this way for X years, and I have MY way ... " | Estimators — Less time doing busy takeoff and more time on project strategy; accurate historical costs to take the guesswork out |
| **Introduction of a CRM system** | Determine the right customers and devote the right energy to them | "More busywork when I should be selling ... " | Business development — Improve the individual hit rate; reinforce the work of business development |

Figure 1. Examining the "why"



Photo Credit: Nuthawut - stock.adobe.com

success or failure can be rooted in the messaging. Many people despise change. Humans adapt and develop behaviors that allow them to maximize performance. Ultimately, there is a comfort that comes from that mastery, and when someone then tells them to "stop and do it differently," it creates frustration. The right message is: "Continue, but tweak and refine."

## Selling Collaboration

Once the "why" has been sufficiently answered, there needs to be a game plan and follow-through. Another area that is often overlooked is the need to involve the people who will be impacted by the change to be strongly involved in the implementation of the change. For instance, one of the gravest mistakes in software selection is to not involve the right teams in the process. Far too often, a system is selected in a vacuum by an information technology team that will not use the system. A team of project managers, field leaders and administrators should have a voice in the selection process and customization of that solution. This does not mean that every project manager should be on that committee, but rather a fair representation of the practitioners who will objectively evaluate and contribute to rollout.

One of the greatest reasons to involve practitioners in any change initiative is the creation of evangelists. Sure, leadership and IT want to see a new software be a success. It cost a fortune and the salespeople promised the world. When they talk about it being the "right choice," it is easy to scoff at their remarks. However, when a fellow project manager talks about how they used the new tool, software, process, etc., and how it provided value, it seems to have a different feel or sentiment. Creating buy-in with fellow members of the team helps drive long-term success.

## Selling the Overhaul

Some changes seem hygienic in nature. Rolling out a new software platform, while never easy, is somewhat expected. Upgrading the toolkit is part of the job. However, what if the change is much more dramatic, like opening a new office, adding a new service or even discontinuing an offering? More importantly, how does one drive this change when the current market conditions are favorable and it means potentially shorting a group that is riding those favorable conditions? Consider this case:

An organization has operated in the commercial space for its entire existence. It is current market, it has decent market share currently in its operating geography, but it also sees a decline in commercial offerings in the next three to five years. It is considering opening up a division or group that will operate in the public or municipal space. However, this will potentially require several managers, estimators and superintendents to shift away from the commercial space.

Leaders have to immediately recognize the litany of questions that they will be peppered with a formulate a response that is both realistic and forward thinking (Figure 2).

Presenting effective counterarguments is never an easy proposition. There is also a fine line to maintaining a strong argument and also being an effective listener. For instance, there may be contrary themes that are not only factually correct but also serve as a suitable rebuttal. Leaders avoid idea fixation at the right times but allow enough conversation to allow people to get comfortable with the change in the right time. ▲

| Question | Potential Arguments to Validate/Support |
|---|---|
| **"But we're making money. Why would we take people away from making money on a low-margin opportunity?"** | • We may be making money now, but the facts show a potential downturn, so we have to hedge against that downturn.<br>• The supply on the commercial side will be down, leading to potential margin decline, so this new market may end up been higher margin long-term. |
| **"We know nothing about that market. How will we make money?"** | • Exactly, that's why we need specialists to learn the market.<br>• We may need to invest in finding talent that knows the market if we don't have that market intelligence. |
| **"Why don't we just add more resources to the commercial side and stay in our lane?"** | • Our market share is already high, and we've reached capacity.<br>• Adding more specialists to a potential down market is a losing proposition. |
| **"Why can't we just let our people do both — why do we need a separate group?"** | • Having a team that is forced to constantly change approaches or mindsets is potentially maddening.<br>• Can a project manager or superintendent that has operated in the commercial space be successful in a hard-bid public space? |

Figure 2. Types of questions leaders face during change

# Fortifying America With Preemptive Seismic Infrastructure Upgrades

Fixing faults: Explore top upgrade projects & opportunities



Mary Scott Nabers is President and CEO of Strategic Partnerships, Inc. She has decades of experience working in the public-private sector. A well-recognized expert in the P3 and government contracting fields, she is often asked to share her industry insights with top publications and through professional speaking engagements. Visit spartnerships.com.

Damage repairs from earthquakes in the U.S. typically cost taxpayers nearly $15 billion a year. Considering that, funding to stabilize or prevent as much damage as possible is a good and prudent effort. According to the Federal Emergency Management Agency (FEMA) and a recent geological survey, the cost of post-earthquake repair can be as much as three times higher than the cost of investing in earthquake-resilient infrastructure upgrades.

Local government officials are regularly encouraged to enforce up-to-date building codes with seismic guidelines. The need to address the vulnerabilities of older construction is critical because these are the structures most vulnerable to earthquakes.

Seismic retrofitting is often used to address the vulnerabilities of all types of structures. This process involves using modern engineering techniques to reinforce and fortify structures so they can withstand the tremors of earthquakes. Reinforcement components include improving foundation stability and strength and adding seismic retrofits. Then, damages are reduced, and citizens' safety is upgraded significantly. The upcoming projects described in this column are similar to those currently being readied for nationwide launch.

The Guadalupe Dam Seismic Retrofit Project is a $75 million initiative that will be overseen by the Santa Clara Valley Water District. The project will be designed to improve the seismic resilience of the Guadalupe Dam, which is located in San Jose, California. An independent engineering study revealed that in the event of a large earthquake, the dam could face substantial damage, and there is danger of an uncontrollable release of reservoir water. To mitigate that risk, the California Division of Safety and Dams has imposed restrictions until corrective measures can be taken.

The project will include reconstructing and thickening the dam, building new outlets and improving emergency access. The improvements will also increase the dam's capacity and remove the reservoir's operating restrictions. Normal water supply will be restored. The project is currently in the design phase, but the permitting process has not started, which may delay construction until 2028.

Another seismic retrofit project will involve the Center Street Bridge in Salem, Oregon. This $100 million project is part of a statewide transportation investment program, and the Center Street Bridge was deemed to be a prime candidate for seismic improvements. Situated over the Willamette River, the bridge serves as a vital link between West Salem and downtown for approximately 50,000 motorists daily. The retrofitting measures will ensure continued accessibility and connectivity across the river.

The project is currently in the design and right-of-way acquisition phase, with construction anticipated to start in 2025. The Oregon Department of Transportation allocated $200,000 for the


Photo Credit: Nadiia Ganzhyi - Unsplash

initial investigations and will be involved in oversight of the large project.

City officials in Pasadena, California, are developing a plan for an earthquake retrofit of its Central Library. With an estimated cost between $175 million and $195 million, the project will focus on improving the building's seismic performance and ensuring its stability during a significant earthquake. A critical component will be to guarantee that occupants will be able to exit the building safely in the case of an earthquake. Another component will include preserving the historical exterior of the facility while updating, upgrading and fortifying the structure. The full design for the project is set to be finished by the summer of 2025, which will immediately prompt bidding and awards for construction.

The Arkansas and Tennessee Departments of Transportation are collaborating on a major replacement project for America's River Crossing (I-55) bridge, aiming to increase the bridge's resiliency and earthquake resistance. The project's cost is estimated at about $1 billion, and the two states will split the cost. The remainder of the necessary funding is currently being applied for through the U.S. Federal Bridge Investment Program. The project will replace an existing 75-year-old bridge and equip the critical connector with features to safeguard against earthquakes and other disasters. The new bridge's design will upgrade the safety and resiliency and lower the upkeep costs. It will enhance local and regional freight movement, provide improved linkages and rerouting opportunities, increase environmental sustainability and allow for future growth. Construction is scheduled to begin in 2026 and will be ongoing for approximately a decade.

The city of Orem, Utah, has embarked on a significant project to strengthen its aqueduct infrastructure against seismic threats. The project, led by the Central Utah Water Conservancy District, will be focused on the critical upgrade and realignment of Alpine Aqueduct Reach 1. The project will mitigate the repeated structural damage created by seismic activities. Damage includes hillside erosion, interrupted water supply to essential treatment plants and unplanned repair costs to other facilities. Components of the project will consist of the installation of an advanced, aboveground pump station and a complete redesign of the pipeline. The redesign will incorporate adaptive features, allowing the pipeline to manage expansion, contraction and fault displacement effectively. With the project design currently 30% complete and construction bids expected by August 2024, the project cost has been estimated at approximately $90 million.

These are large-scale projects, and they will be abundant over the next several years. There will be no scarcity of opportunities related to sustainability, and those related to seismic damage will call for all kinds of industry expertise, equipment and technology. ▲

# Complying With the Department of Labor's Independent Contractor Rules

How construction companies can reduce growing risks tied to contractor classification

BY DEBORAH EDNEY, JENNA MCGEE & AMANDA WILLIAMS

Misclassification of workers has increasingly become a target of the U.S. Department of Labor, the National Labor Relations Board, and plaintiffs' attorneys who believe that many companies incorrectly use and identify employees as independent contractors. The construction industry, particularly in the South, has been flagged by the Department of Labor, and the former head of the department's Wage and Hour Division has written that "the problem has been long entrenched" in the industry.

Whether a regulator takes action or an independent contractor sues, claiming to be misclassified, these cases pose significant risks for companies. In late 2023, two national companies paid $55 million and $30 million to settle misclassification claims. In most cases, the settlement is just the start of the impact to the bottom line: fees and penalties — including criminal penalties — are possible, and reclassifying independent contractors as employees results in substantial increases in labor expenses going forward.

These disputes are likely to continue to rise this year after the Jan. 9 release of the Department of Labor's final version of a new rule that is considered "employee-friendly" in how it approaches classification.

From our experience litigating these kinds of disputes and advising clients on independent contractor agreements, construction companies can take several steps to limit or avoid these types of cases. They include ensuring the use of clear and up-to-date contracts, training employees at all levels of the company (top to bottom) on how to interact with independent contractors, and navigating potential joint employer issues that arise in the construction industry.



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## An "Employee-Friendly" Rule

The Department of Labor's final rule, which took effect on March 11, may result in more independent contractors being classified as employees under the Fair Labor Standards Act. In turn, that will increase compliance and cost burdens on companies — even those using legitimate independent contractors.

The rule replaces a 2021 rule that never went into effect but that emphasized two factors in determining whether workers are employees: the nature and degree of control the workers had, as well as their opportunity for profit and loss. The 2024 rule focuses on six factors that "do not have a predetermined weight and are considered in view of the economic reality of the whole activity." They are:

1. The worker's opportunity for profit or loss
2. The worker's financial stake and investment in the work
3. The degree of permanence of the work relationship
4. The degree of control the potential employer has
5. Whether the work is essential to the potential employer's business
6. The worker's skill and initiative

These factors should be familiar as they essentially reinstate the Obama-era "totality of the circumstances" rule. Examples of what will be considered include:

- Whether workers can determine or negotiate the pay or charge for work

provided, or choose the time the work will be performed
- Whether investments are capital or entrepreneurial in nature or simply imposed unilaterally on workers
- Whether the relationship between the company and the worker is exclusive or whether the worker is engaged in projects for other companies
- Whether the worker maintains control over the method and manner of the work performed
- Whether the work is critical, necessary or central to the potential employer's principal business.

It remains to be seen how these factors will continue to evolve in the courts — which is where they were initiated in the first place. But we expect to see more cases brought by workers seeking to shift from the independent contractor column to that of an employee with the attendant benefits.

## Lessons Learned for Construction Companies

So, how can construction companies avoid such a monumental shift? Our experience tells us that to come out ahead of this rule and misclassification claims, companies need to do the work upfront. It is critical to have contracts that clearly demonstrate, both in words and actions, that workers are independent contractors. It is also critical to make sure everyone in the management chain understands the legal distinction and basis for it.

When crafting contracts, it is important to understand that the test for independent contractor status also varies depending on what state you are in and whether you are looking at classification under the Fair Labor Standards Act (FLSA), the Internal Revenue Code, the National Labor Relations Act or the Employee Retirement Income Security Act (ERISA). Thus, one size may not fit all. For a construction company working with a lot of independent contractors, looking at each contract anew can be time-consuming and difficult, but the "bones" of the basic contract should be adaptable and flexible enough to meet different issues appropriately in each signed agreement. Each agreement should also have a well-crafted arbitration clause consistent with cases in that area of the law, including language waiving class actions.

The contract is not the end of the story. Courts look at the economic reality of the relationship, including the six factors the Department of Labor laid out in its "new" rule, and ask questions such as:
- Do the independent contractors control their own work environment?
- Can they hire people to work for them?
- Do they get to decide prices?

Not every answer has to be "yes" or "no," but the totality must suggest that the worker is running their own business and not simply working for the company.

Often, we see issues in litigation where a lower-level manager or new member of the team makes comments or behaves in a way that makes the relationship look more like an employee relationship. Thus, in addition to ensuring an up-to-date contract, it is important to train everyone who is an employee, from senior managers to those on the frontline, on what is required for nonemployee workers to remain independent contractors.

A simple example that has come up in court is senior managers telling independent contractors, "If you don't do what I'm asking, I'm going to fire you." That kind of language can provide a strong argument that a worker is really an employee and not "independent" at all.

Training employees on what it means to be an independent contractor and how they should interact with independent contractors is vital. Employees should have an arsenal of phrases such as: "You are an independent contractor, so you are able to make your own decision on that," and they should repeat those phrases often, so they stick in both the employees' and the independent contractors' minds.

## Navigating Potential Joint Employer Issues

Whether a company counts as a joint employer under federal labor laws is a related issue that can come up for construction companies. Some courts and agencies have found the prime contractor on a project, for example, is a joint employer of a subcontractor.

This is another area that will likely lead to additional disputes, as the National Labor Relations Board issued final rules in October broadening the definition of joint employers. Specifically, prime contractors need to be careful in their dealings with subcontractors not to maintain complete authority over essential terms and conditions of employment, or they may invite legal risks as a joint employer. Importantly, the 2023 standard focuses not on whether a prime exercises this control, but whether they have the authority to do so. The same tips and training from above apply in these cases.

## Final Takeaway

Companies that win misclassification fights are the ones that have a clear internal understanding of their independent contractors' roles, that support their flexibility, and that avoid taking or exerting too much authority over them. Companies can accomplish these goals by investing on the front end to develop contracts and provide training on how the independent contractors should — and should not — be treated. ▲

*Deborah Edney, Jenna McGee and Amanda Williams are attorneys at Parker Poe in Washington, D.C., and Charleston, South Carolina. They can be reached at debbieedney@parkerpoe.com, jennamcgee@parkerpoe.com and amandawilliams@parkerpoe.com. Visit parkerpoe.com.*

# Data Democratization & Digitization: The Way Forward in AEC

Creating seamless processes & frictionless collaboration

BY KIPP IVEY

Success on complex and sizable construction projects requires more than just hard work, cooperation and trust in your team. In today's digitally charged work environment, leveraging technology as your catalyst toward greater profitability is seen as a necessity rather than a luxury.

Yes, some of us might still be lugging around hard copies of site and project documentation just in case something happens to the digital copies. Some see it as a way to democratize information with teammates and partners by showing them actual sketches. However, just like technology inspires exponential performance gains in other industries, solutions aiming to digitize entire jobsites are catapulting construction firms and their project partners to greater heights without experiencing difficult operational changes or downtimes.

## Key Data Types Used on Construction Projects & Their Applications

As you add tools to your digital jobsite kit, you will notice several data formats, processes and platforms are more widely used than others.



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*1. 3D Models (BIM Data/CAD Files)*

3D modeling data for architecture, engineering and construction (AEC) comes in various formats, and many see it as a prerequisite for success. In today's building information modeling (BIM) landscape, construction firms often rely on computer-aided design (CAD)-compatible data to develop, analyze and manipulate digital models of projects before any foundation is set. That data is leveraged throughout a project, with contractors and trade partners relying on it as a digital blueprint for design and dimensions. BIM data operates as an extension of CAD models, as the process enables the visualization of parametric, generative and operational data used throughout a structure's life cycle.

*2. 3D Point Clouds/Lidar Site Scans*

Obtained through terrestrial, mobile and handheld scanners, point cloud data provides construction teams with a 3D representation of jobsites. Teams leverage point clouds to measure, analyze and compare as-builts against design models, saving countless hours otherwise spent on manual measurements. The millimeter-level accuracy of terrestrial point cloud data, paired with its compatibility to integrate with other datasets, provides the ability for deep-seated analysis to support quality control, prefabrication, floor flatness, steel deformation as well as the generalized BIM process. Mobile site scans using simultaneous localization and

mapping (SLAM) technology provide the balance of speed and accuracy for large areas both interior and exterior where spatial context is needed, while iPhone lidar enables quick capture where speed is of the essence, and ease of use allows anyone to capture 3D data to provide visual representation and context.

*3. 360-Degree Site Photos*

360-degree photos are usually taken with 360-degree cameras that can capture the surrounding area in one photo and are often used to document entire jobsites quickly. Construction progress tracking software aligns 360-degree photos captured on-site with the existing floor plans, providing teams with an up-to-date visual twin of current project conditions. This enables teams to document, identify and address issues fast, mitigating costly mistakes.

*4. A Platform to Process & Visualize Data*

At the crux of data democratization efforts is the ability to manage, leverage and disseminate information to relevant stakeholders. Usually called digital jobsites, these robust tools enable the seamless sharing of reality capture and 3D model datasets by unifying them into a single platform.

The cross-compatibility of digital jobsites with documentation and scheduling tools like Navisworks and Bluebeam enables greater alignment across project delivery teams. Ultimately, this creates a single source of truth for your project's operational and administrative aspects, making coordination a breeze. Conversely, poor execution of a digitization strategy results in scattered and misplaced communications, making it challenging to stay on top of things.

## How Data Democratization Contributes to Success

A comprehensive digitization strategy has phased out archaic paper-based workflows. In its place today, we have digital and technologically advanced tools that bring in immeasurable gains in terms of speed, productivity and accuracy on projects, pushing the boundaries of success.

## How Things Are Done on the Job: Then vs. Now

To illustrate the immediate benefits data democratization brings to your firm, we detail how these optimizations impact everyday work on jobsites.

## Communication & Collaboration

As illustrated in Figure 1, communication through digital jobsites gets the message across within seconds. Relevant stakeholders and trade partners will be notified about issues within a digital jobsite, enabling quick decision-making. The compatibility of these cloud-based platforms with multiple data formats enables information and context to be easily understood by those in different functions throughout the project hierarchy.

In addition to communicating instructions and recommendations quickly, digital jobsites allow for frictionless collaboration between teams and external stakeholders, keeping everyone on the same page. Integrated permissions within digital jobsites enable relaying cascading instructions, notifying partners only when required.

Timelines usually considered vague completion dates can now be established through digital rendering of upcoming work before installation of fittings, roofing or flooring. This allows for more efficient use of human and material resources based on what is required at specific points in time instead of aspirational scheduling. Digital workstations also enable remote monitoring by project owners and decision-makers, which helps to reduce

| Task | Traditionally | Now |
|---|---|---|
| Drafting project designs, drawings and sketches | Penciled sketches on thousands of paper blueprints<br><br>Duration: Several hours to several days | Digital sketches and drawings created with CAD and BIM software<br><br>Duration: Several hours |
| Communication — relaying information, updates and requests for information (RFIs) | Phone calls, personal emails and text messages, file folders and physical site visits<br><br>Duration: Several minutes to days, depending on teams' location and reactiveness | Personalized in-platform notifications and automated emails received on smart devices<br><br>Duration: Within seconds |
| Democratizing information with external stakeholders | A round trip by dispatch teams transporting physical drawings to multiple locations before returning with recommendations<br><br>Duration: Several days to weeks depending on spread of stakeholders | Enabling stakeholders' online access to project visuals, statuses and details<br><br>Duration: Several seconds to minutes, depending on stakeholder reactiveness |
| Keeping track of project progress | Regular physical site visits to witness each project phase as it's built; record discrepancies to be physically relayed to other teams<br><br>Duration: Several days to resolve issues requiring repeated traveling between office and jobsites | Accessing digital visualizations of up-to-date project progress and relaying information on discrepancies immediately to the relevant functions<br><br>Duration: Message and responses that can be delivered within seconds |

Figure 1. Traditional vs. current communication methods




Photo Credit: Ravil Sayfullin - stock.adobe.com

head count and the risk of untoward incidents from overcrowded jobsites.

## Accuracy on Projects

With communication and collaboration now a seamless process, other aspects of your project will also improve accuracy and efficiency through democratization.

## Vendors, Suppliers & Fabricators

Giving vendors, suppliers and fabricators access to a digital jobsite provides everyone with a single source of truth, facilitating smoother collaboration by providing exact information for purchase orders on materials and supplies needed. Gone are the days of suppliers delivering 8-by-8-foot monstrosities instead of 8-by-8-inch frames.

## Delivery Teams & External Stakeholders

On-site and remote teams are empowered to collaborate effectively. Ensuring that construction is completed according to contractual requirements can be done remotely, along with quality inspections, installation verifications and work approvals. Deviations and discrepancies are detected ahead of time through virtual assessments, allowing immediate remedial work to take place before these issues exacerbate.

## Profitability

Workflow optimizations using data democratization, bottom-line performance, and return on investment (ROI) from these digital tools will scale toward more prominent projects. Improvements of speed and efficiency outweigh and justify the financial commitments needed, eventually "paying for themselves."

Democratization of data helps avoid cost overruns, inaccurate purchase orders, change orders and erroneous installations. Firms with an effective democratization strategy today are no longer experiencing bell-curve-styled cost impacts that strain resources midway through a project. Cost implications are instead experienced in a more linear and gradual ascent thanks to planning and corrective measures undertaken earlier, making it easier to manage financial resources.

In today's competitive landscape, it's imperative for firms to keep focus on efficiency, productivity and accuracy by leveraging today's technology. Unifying all your project data in a digital jobsite will become a baseline instead of a luxury both now and in the future.

Consistent and efficient use and advocacy for such innovative tech only elevate your firm's reputation and profitability, attracting work with larger corporations. Digitizing your firm and project repositories can also help with legal and contractual compliance if disputes arise. ▲

*Kipp Ivey specializes in sharing his passion for the industry and technology. He has 20-plus years of experience in the world of construction technology and currently serves as senior business development manager for the AEC segment at FARO. Ivey has a breadth of professional wisdom to share, ranging from the world of estimating, BIM applications, 3D reality capture and consumption to the use of quadruped robotic solutions and beyond. Visit faro.com.*






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# Moving Beyond Task Improvement

Strategic imperatives to realize true digital workflows

BY BRYAN WILLIAMS

We as an industry have reached a tipping point when it comes to technology and its value across the construction workflow and beyond.

In years past, construction and survey firms have invested in a tool or technique to improve a task with great success. For instance, many now use a total station because it's far more efficient than using string and tape. But today's technology-immersed environment dictates a broader perspective that requires a look beyond task-oriented improvements.

The sheer quantity of data gathered by office and field solutions creates a challenge — and an opportunity to reshape productivity, efficiency and what it means to be collaborative in the construction environment.

## Foundational Solutions

It might surprise some, but building information modeling (BIM) is more than a design and modeling tool in today's projects. BIM is fundamentally all about process and collaboration — and therefore a critical piece of digital workflows. It's a forum for how digital data will be exchanged and reviewed throughout the project life cycle, from design through construction and handover/closeout.

The redevelopment of the Phipps Plaza in Dallas, Texas, by The Beck Group is a good example of the benefits of extending the value of BIM to the field. In this case, The Beck Group was challenged to convert a mall into a mixed-use, upscale property which included a 150-room Nobu Hotel and restaurant, 13-story office building, outdoor event venue and 90,000 square foot athletic facility. To redevelop Phipps Plaza, The Beck Group needed to demolish an existing department store and parking deck to create a new buildable area in roughly the same footprint, all while keeping the existing mall active.

Collaboration and data sharing between the office and the field played an important role in the project from the start. For instance, the same field data gathered by The Beck Group's field crews to lay out the new structure provided critical insight for the pile installer. In this case, they used a field layout platform with a robotic total station to pinpoint locations from the 3D model and document existing conditions. Using the field layout platform, both crews could make changes that were automatically updated and shared seamlessly across project teams — streamlining work and greatly reducing rework. It also cut the request for information process from two weeks to three days.

To make the best use of BIM for digital collaboration, contractors must have a clear process and guidelines for how digital tools and information standards will be used on the project from start to finish. It's not just about making sure that everybody has access to digital design, but also how they're going to share information. For example, "This is how we're going to sequence things. This is how we're going to review things to make sure all that sequencing gets put together."

## A Stepped Approach

Moving forward in our new digital reality will require some step changes, the first of which is accepting that technology transformation is critical to increasing productivity and efficiency, and meeting growing demand given workforce challenges that are not going away anytime soon.

Embrace digital technology more and be willing to accept that it is the way the industry is moving — and realize that a digital transformation is not an all-or-nothing endeavor. The really great thing about our current environment is that firms can take small, incremental steps to get started with digital processes rather than trying to do everything at once or diving in too deep initially.

Stutsman-Gerbaz, a multigenerational, family-owned contractor based in Snowmass, Colorado, is relying on a hardware and software subscription model to add 3D grade control systems for its dozers and excavators. Through that investment, the firm is able to expand its 3D model development, drive productivity and expand new work opportunities. On one infrastructure project, the contractor was tasked to complete below- and above-ground improvements such as water line installations. The 3D model was developed in the office and sent to

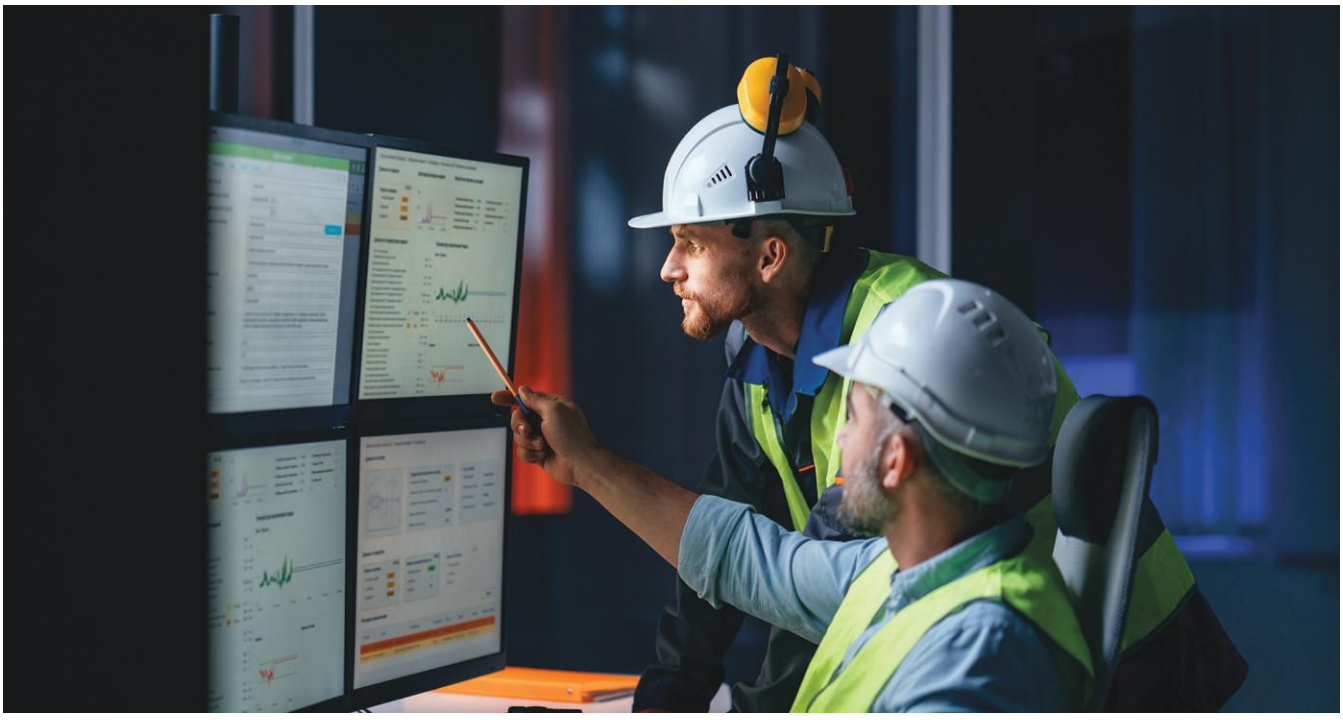


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equipment in the field, and at the end of each day, progress was automatically reported back to the office. The team is a month-and-a-half ahead of schedule because they were able to install pipes almost twice as fast — and with greater accuracy than previous methods. That digital data helped build a strong relationship of trust with the engineering and survey company overseeing the project.

## The Collaboration Incentive

The Phipps Plaza and Stutsman-Gerbaz examples bring up the third and critical piece of any digital transformation, and that's the importance of building digital bridges with project partners and owners.

In the past, there's been little incentive for contractors and trade partners to share digital information. Certainly, the advancement and ease of clash detection has broken down some of those walls — but not all. True digital workflows that drive productivity such as those documented on the Phipps Plaza could not have worked without communication and shared desire for improved processes from all team members.

It's important that general contractors and trade partners come together to understand what information they need and to look for opportunities to collaborate using technology and drive this new data-driven ecosystem.

The emergence of cloud-based common data environments (CDEs) and cloud-based platforms to facilitate these environments is also helping build these connections. In one case, a construction firm shared its BIM model with all construction related information using a cloud-based CDE. During all phases of the project, the georeferenced BIM model now forms the basis for everything from the estimating to as-built management of required materials and person-hours up to the final settlement. In the earthworks stage, the 3D model is provided to the survey team and operators via a cloud-based data hub. Finally, a mobile scanner maps the newly as-built conditions to deliver a 100% accurate digital twin of the stretch of road to use for maintenance and operation. That's a digital ecosystem that provides value to the entire project team and even the owner and a clear demonstration of technology's growing relevance in the built environment.

It's important for every construction business owner, no matter the size or service model, to embrace digital technology and be willing to accept that it is the way the industry is moving. Develop a strategic digital transformation plan that encompasses a project life cycle that considers your people, processes, partners and customers — and then build it. ▲

*Bryan Williams is segment manager, field technology group, at Trimble Buildings. Williams has nearly 30 years of international experience working in the construction industry as a site engineer, construction surveyor, project supervisor and consultant. He has spent the last 15 years developing and marketing intelligent positioning solutions for the construction industry as part of Trimble Buildings. Visit trimble.com.*



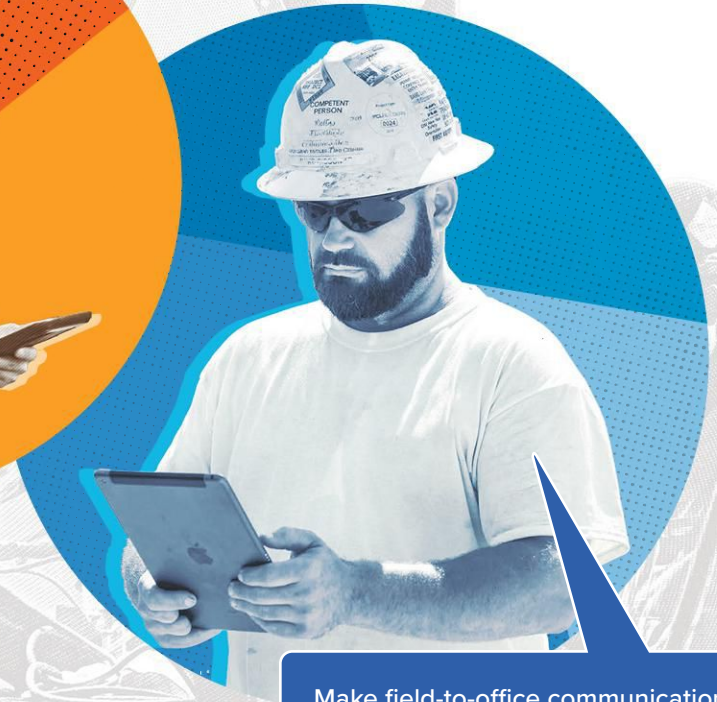
# A field-approved app for safer, more productive jobs

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As the Vice President of Safety, Eric Waterkotte is a certified safety professional with nearly 20 years in construction safety. His company, Millstone Weber, is a heavy civil contractor specializing in mass transportation. As the company expanded its working radius, the need for a stronger safety program became apparent.

"When we started branching out," Waterkotte recalls, "it was getting to be more difficult to manage these things like inspections and follow-ups and holding people accountable."

For any teams out in the field who might fear safety software is just another annoying piece of admin work to do, Millstone Weber will attest the complete opposite is true: their teams actually cut down on the amount of time they have to spend paper-pushing, and foremen and superintendents appreciate that reduced amount of work.

"From an administration standpoint, it's cleaned up the total amount of hours on my end," Waterkotte says. "Most people in at least the construction industry don't seem to be too open to change, but the way we rolled it out, it wasn't completely overwhelming and they're really liking it."

For safety managers out there who are still stuck on Excel, HCSS Product Manager Gen Simmons has some advice. "You want a tool that lets your field team enter in your inspections, your JHAs, your meetings, so in the office, your safety professionals can just say, 'Oh, I can see on this dashboard, I can see on this report, that we're getting in our required compliance items,' and allow you to see if there are any deficiencies. It's just so much easier to manage risk and compliance when it's easy to see."

For Millstone Weber, getting the data to do the work for them continues to be a massive benefit.

"The one thing I regret on my end with this is that I didn't do it years ago," Waterkotte adds. "You can break the data down now. [The software] identifies trends, identifies at-risk jobs by the types of incidents or near misses that the system is seeing. That's been really good."

Since it's always a challenge to get started with something new and realize the administrative commitment involved, Gen Simmons recommends bringing in other people within your company to have those initial discussions about the software with somewhere around 10-15 questions and concerns prepared.

On that same note, you're more than welcome to contact her directly for input. "Anyone that has questions for me on just safety software in general or HCSS Safety," she says, "I'm happy to talk through what some of the pitfalls can be so you know what to look out for."

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# Who's Who in Your Fall Protection Program?

## Establishing authorized, qualified & competent persons in your safety plans

BY PHILIP JACKLIN

Photo Credit: Diversified Fall Protection

The importance of fall protection training cannot be understated. Falls are a leading cause of injury and death for construction and general industry workers. Nearly two to three workers die every day from falling from heights, and most of those deaths occur at a height of 20 feet or less. Establishing fall protection programs with proactive measures and effective training can help prevent injury and save lives.

Fall protection programs are communicated, upheld and maintained mostly through training. The Occupational Safety and Health Administration (OSHA) requires employers to provide fall protection training to all employees who might be exposed to fall hazards. However, changes to the workplace, new equipment and new hires require continuing education to become a staple in your fall protection program. This article will explore the significance of fall protection training, highlight best practices to ensure compliance, delve into OSHA's regulations, and discuss how to choose a competent person for your fall protection program and designate authorized users of the equipment.

### The Significance of Fall Protection Training

Besides OSHA's mandate to provide fall protection training, the standard does not provide much clarity into the content of those trainings nor who is qualified to deliver these trainings. Enter the American National Standards Institute (ANSI). The ANSI Z359 code is a voluntary consensus standard that aims to keep fall protection manufacturers consistent and helps users with a more in-depth guide on implementing fall protection equipment.

It might be helpful to consider OSHA the "where, when and why" fall protection is required, and ANSI can guide the "what and how" when selecting equipment and advising proper use. It's important to remember that OSHA's mandates are law, while ANSI's mandates are voluntary guidelines. ANSI Z359 is a resource to guide the development of fall protection programs and is crucial in establishing an effective training program. It is essential to refer to both standards to create the safest work environment.

OSHA 1926.503 states that employers must provide training for employees exposed to fall hazards. This training should make authorized users aware of fall hazards and train them on procedures and practices to help minimize their risk of injury. Noncompliance with OSHA's fall protection training requirements can have dire consequences, including penalties and citations. More critically, it puts employees at risk of severe injuries or even death due to falls.

### Who's Who in Your Program?

The OSHA 1926.32 standard even defines certain roles regarding your fall protection program. But when OSHA describes an authorized, competent or qualified person, what does that mean? The code attempts to provide definitions for these roles.



According to the standard, an authorized person is approved or assigned by the employer to perform a specific type of duty at specific locations on the jobsite; a competent person is capable of identifying existing and predictable hazards in the surroundings that could be dangerous to employees, and has authorization to take prompt corrective measures to eliminate them; and a qualified person is someone who, by possession of a recognized degree, certificate or professional standing, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter.

Let's further define and discuss what these roles mean to your program and their significance.

## Authorized Person

This is a self-explanatory user title but an important one. While everyone in the company can support fall protection programs, not every employee will be trained as thoroughly, depending on how often they must work at heights. Employers must be sure that users who have been authorized to use the equipment and are properly trained are the only individuals who use fall protection equipment. It's important to recognize that the organization actively designates who is authorized to use fall protection equipment and who is not based on who receives fall protection training. As previously mentioned, only a competent person can provide this training and authorize users for the equipment. Employers must designate this competent person as well.

## Competent Person

To put it concisely, the competent person is someone specified by OSHA, designated by the employer and trained by the ANSI standard. Their importance in a fall protection program should not be neglected, as they can carry a strong influence on the effectiveness and adaptability of the program. An individual who goes through an ANSI-accredited competent person training program will learn the extensiveness of the ANSI code, discover how to meet minimum OSHA requirements and guide how to establish policies that can help minimize fall hazards in the workplace. In the spirit of encouraging continuous education, ANSI requires competent person certifications to be refreshed every two years.

Designating a competent person should be one of the first steps in establishing a fall protection program, because ANSI Z359.2 guidelines fully describe the duties and responsibilities the competent person role plays in the program. The competent person is responsible for approving equipment to use in the fall protection program, facilitating training to authorized users of the equipment, and ensuring workers are adhering to OSHA mandates and ANSI guidelines for best practices. The competent person is also responsible for the annual inspection of all fall protection equipment to ensure daily pre-use inspections are being performed. Note that construction trades are subject to biannual equipment inspection because of the anticipated greater wear and tear that can occur on equipment in construction environments.

## Qualified Person

When it comes to your fall protection program, a qualified person is simply another term for a professional engineer. A qualified person can help certify anchor points that might not meet the standard 5,000-pound strength requirement per OSHA 1926.502. Qualified persons are also required when it comes to inspecting and testing certified anchor points and designing certain overhead horizontal lifeline fall protection systems, and they are typically involved in investigating fall incidents if they occur.

## Continuing Education to Support Compliance

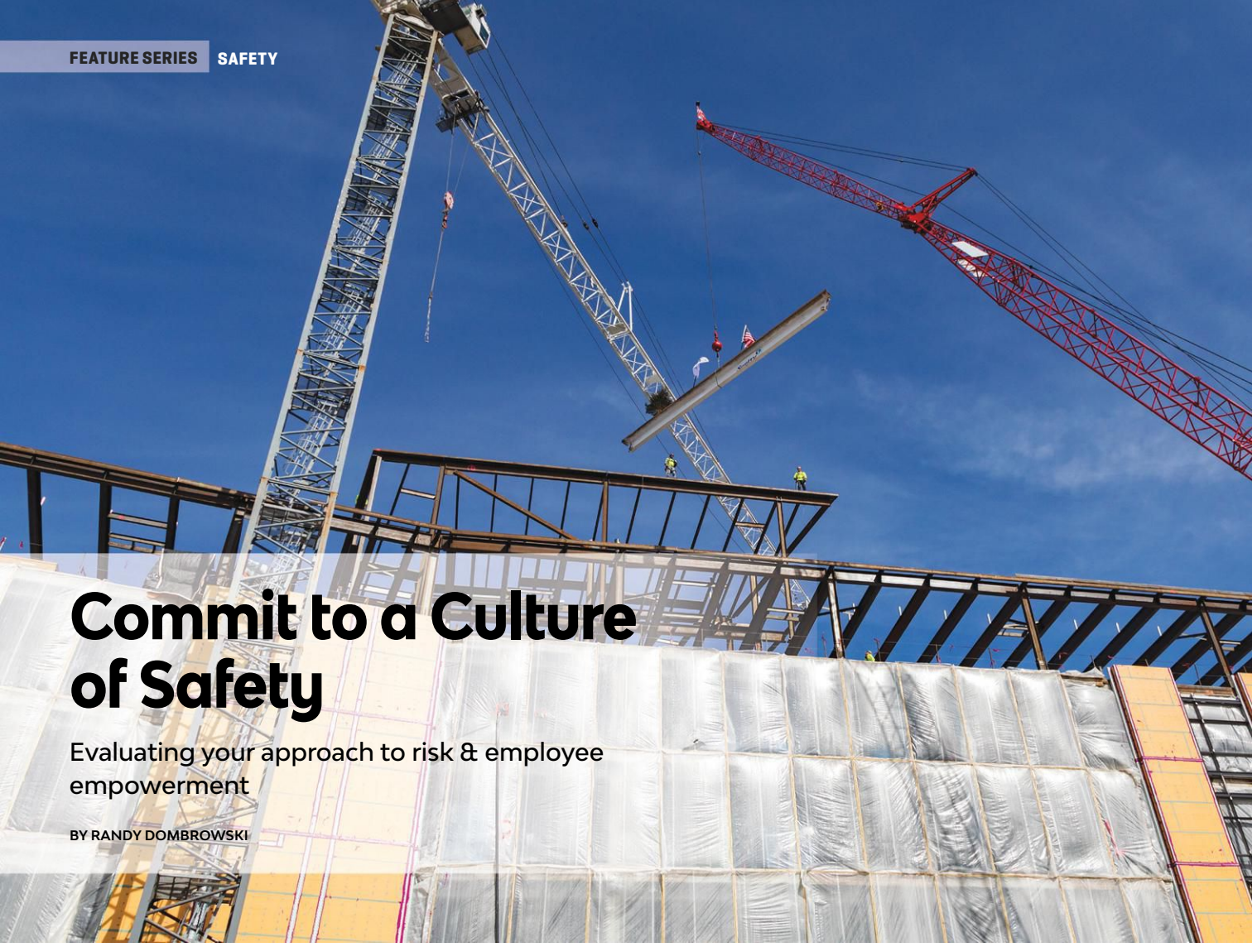
Fall protection training is an efficient method for two-way communication regarding fall hazards and regulations. During trainings, safety leadership should discuss the core principles of their fall protection program, review recent incidents or near-misses as learning opportunities and encourage participants to discuss any potential hazards they've recently experienced. This communication can provide valuable information to the safety department to proactively protect workers as hazards arise, instead of reactionary measures taken in response to a potentially tragic incident.

Establishing and maintaining a fall protection program can be an encompassing effort, and the efforts to ensure user compliance are ongoing. Reach out to a safety partner for resources to give further guidance on navigating the OSHA/ANSI relationship, building a robust safety culture and making sure your sites are meeting minimum OSHA requirements. ▲

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*Philip Jacklin is continuing education program manager for Diversified Fall Protection. Since 2018, Jacklin has been training workers nationwide on best practices when using their fall protection and advising safety managers; environmental, health and safety (EHS) leaders; plant maintenance managers and other safety professionals on how to create more efficient fall protection programs. Visit fallprotect.com.*





# Commit to a Culture of Safety

## Evaluating your approach to risk & employee empowerment

BY RANDY DOMBROWSKI

Photo Credit: Sentry Insurance

The risk of injury is always present in construction. When it comes to safety, there's always room to improve. Whether you lead a large or midsized construction business or work as a contractor with a small, trusted team, you have the power to improve the safety of your operations and how you involve each individual on your team.

You might be surprised to learn that workplace injuries are up 7.5% from 2021 to 2022, and that employees with less than one year of experience account for 28% of all injuries. That demonstrates an opportunity to double down on ensuring you establish safety protocols to stop that increase, and that your team works together to mentor new employees and instill greater accountability.

One injury can have wide-ranging effects on someone's life. It also impacts you as an employer, who may be down a worker and may face higher workers' compensation costs in the future.

Take this as a cue to assess your safety plan, your team's commitment and how you're executing your program. There's a good chance you'll identify opportunities to improve safety throughout your onboarding process and daily operations. Ask yourself this: When was the last time your team went through lockout/tagout training? Or something as simple as ladder safety?

Let's examine some fundamentals that will help your entire team refocus and recommit to safety.

### Make Safety a Part of Your First Impression

It's possible that safety can be both important to your organization and taken for granted. Ask yourself: Is safety assumed, like an afterthought, or is it a crucial part of the first impression you make with new employees? If you emphasize safety from before day one, your expectations are loud and clear. Make sure you emphasize safety in your job descriptions and interviews when hiring. Consult with your legal and human resources professionals to implement a background-check program. You should review each candidate's previous



**One injury can have wide-ranging effects on someone's life. It also impacts you as an employer, who may be down a worker and may face higher workers' compensation costs in the future.**

employment and references, and — when it's applicable to the job position — their driving records. Safety should be part of your hiring and vetting process, and communicating that helps you set a standard from the outset.

## Prioritize Safety During Onboarding

As noted, a significant percentage of workplace injuries occur when someone is in their first year with an employer. View employee onboarding as a journey to provide an ongoing emphasis on safety from day one to day 90 and beyond. Make time for your superintendent, safety manager and other experienced employees to act as mentors for new employees, providing enough time for them to discuss your safety protocols and reinforce safe behaviors.

Provide hands-on instruction for safe use of equipment, tools and procedures. For example, we often see severe injuries due to misuse from common tools like cutoff saws. This includes operating them incorrectly, using saws with missing safety guards or working without proper training. That's why it's extremely important that all workers are trained on the tools they use on the job, including the personal protective equipment (PPE) required when using them.

Go beyond the basics of rules and regulations to ensure new hires know safety is everyone's responsibility.

## Regularly Reinforce Safe Habits

Create and maintain regular reminders about safety protocols. Have supervisors lead morning meetings and shift changes with quick safety talks. Involve new employees in those talks so they understand and take ownership of the protocols. When someone is mentored and involved early and often, it helps them feel like a contributor and a key member of the team as they grow with your organization. Getting new employees involved will help them understand your safety protocols more personally and can help you reduce that injury rate among first-year employees. Make sure your senior employees lead by example. They should practice what they preach and proactively address issues as they arise. See the following examples:

- Demonstrate safe behaviors and follow safety protocols like wearing appropriate PPE and practicing safe habits with tool use and storage.
- Proactively identify safety hazards, inspect work areas and equipment, and identify potential hazards before they arise.
- Encourage reporting and feedback by promoting a culture where employees feel comfortable reporting safety concerns, and both providing and receiving feedback.

## Conduct Ongoing Assessments & Inspections

Your employees should understand their role in creating a safe workplace more than they should fear being wrong. If you approach inspections from the perspective of continuous improvement as an assessment, you can stimulate collaboration and comprehensive commitment to your safety protocols. Have experienced employees work together with new employees to assess operations and execution of work. If they spot an issue, don't wait. Remove the hazard or repair it as soon as possible. Communicate the issue to your employees. Make the expectations clear for all involved.

## Report & Review Incidents

Document all incidents, even minor ones. Report and review accidents to help identify potential patterns, including dangerous tasks or recurring problems. If you have recurring problems, make it a priority to address those problems with everyone on your team. Establish goals to create a clear road map for expectations and progress toward improvement. Include measurable safety performance indicators and monitor progress.

## Communicate Often & Celebrate Success

Share your reports with your team. After all, it's their work and their responsibility. They should know how they are contributing to developing a culture of safety. There is great power in continuous communication to help reinforce messages. When possible, focus on the positives of opportunities to improve. Positive reinforcement and feedback play a pivotal role in promoting workplace safety and helping everyone understand how they contribute to success. Recognize individuals and

teams for their safety leadership. Reward safe behaviors. Provide regular updates and reminders through email, texts and newsletters to continue to cultivate your culture of safety.

### Partner to Prevent Injuries

A theme of this article is working together to improve safety. Consider the help of your insurer, who can use their experience to help you minimize injury risks.

If you don't have a safety plan, work with them to assess your operations and develop a safety plan (it's likely to be the first thing the Occupational Safety and Health Administration asks to see if an inspection is required). If you do have a safety plan, your insurer can help you pinpoint where you might need to improve — and how it can benefit your bottom line.

Taking the time to assess your approach



Photo Credit: S 4 Girls 1 Boy- adobestock




to safety may provide long-term benefits, including improved morale and word-of-mouth recruitment, and it may help prevent significant financial losses to your business.

**If you approach inspections from the perspective of continuous improvement as an assessment, you can stimulate collaboration and comprehensive commitment to your safety protocols.**

### Be an Active Leader

In this tight labor market with inflated medical costs, it's even more critical to keep your employees safe — and to find any competitive advantage you can. Strong leadership is required to set the tone so your team understands safety is a priority. Provide it. Work with your team leaders to make sure they extend and reinforce your commitment to safety. Everyone on your team should know that if something's unsafe or could cause an injury, they are empowered to stop work immediately. That should be clearly stated in your safety policy and should be a part of all the ongoing communication outlined in this article.

### Looking Forward

This article isn't meant to be comprehensive, but it should give you an opportunity to assess your approach to safety. Review what you're doing, how you coach your team and your opportunities to improve how you've operationalized your safety plan. And if you don't have one, the time to get started is now. Instill a positive focus on continuous improvement, and your employees will feel supported, so they will support each other — and hold each other accountable to help ensure everyone's safety and well-being. Safety begins with a commitment. And it continues by involving everyone in your organization. If you have any questions, contact your local experts or insurer to discuss a plan specific to your business. ▲

*Randy Dombrowski is director of safety services for Sentry Insurance. Sentry provides insurance and risk management solutions to construction businesses. Visit sentry.com.*




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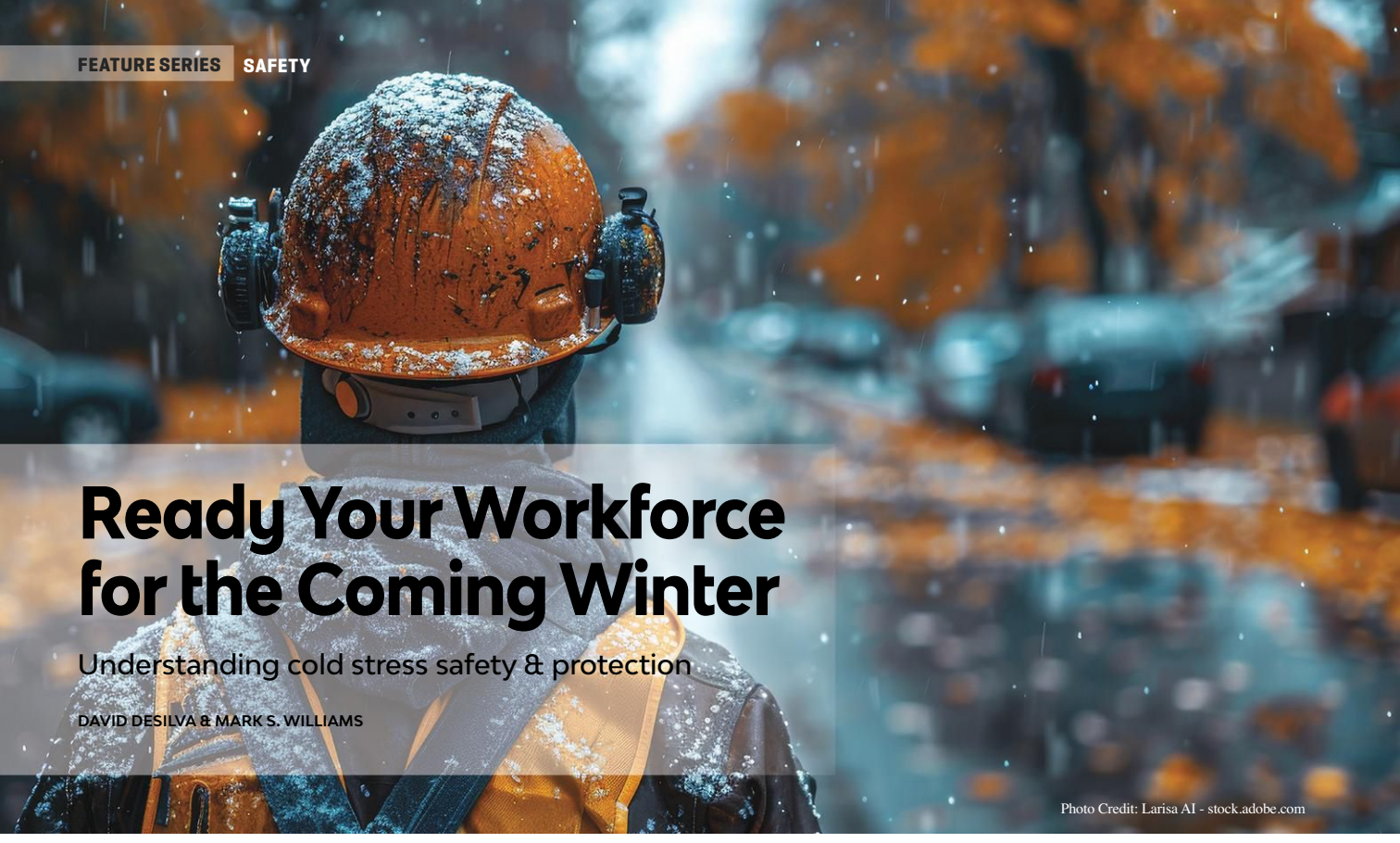



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# Ready Your Workforce for the Coming Winter

## Understanding cold stress safety & protection

DAVID DESILVA & MARK S. WILLIAMS

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The best time to think about cold stress safety isn't when it's about to snow — it's when it's still warm out. Cold stress happens when skin temperature and internal body temperature drops. If the body can't warm itself, the stress can lead to serious illnesses and injuries.

Construction superintendents may start to think about protecting workers against the cold when frigid temperatures and winter are right around the corner. Oftentimes though, that may be too late, especially if the jobsite is in the Northeast, Midwest, Rocky Mountains or parts of the upper Pacific regions of the U.S. When a person's body temperature becomes too low, it can affect their brain function and ability to move. Illnesses and conditions brought on by cold stress can also cause permanent damage. Like planning for temporary heat or building temporary enclosures, possible solutions for cold-related risks require very specific planning, equipment and materials, so it's never too soon to begin a cold-stress protection strategy to prevent serious injuries and illnesses on the jobsite.

A common misconception is that cold stress can only happen when someone is outside, but workers face risks indoors and outdoors. If a building isn't insulated adequately, it won't provide warmth or protection from cold elements, and in the construction industry, workers may be at jobsites working inside partially constructed buildings — exposing themselves to the cold. This is a unique risk present in the construction industry that field supervisors need to address.

A worker's physical fitness and condition is also an important cold-stress risk factor. Poor levels of conditioning can result in faster core temperature cooling, and preexisting conditions such as a prior diagnosis of frostbite, Raynaud's phenomenon, peripheral vascular disease and diabetes can further accelerate the risk of injury.

### What Are the Symptoms of Cold Stress?

Cold stress symptoms vary depending on the injury or illness. While there are some common symptoms across different cold-stress-related injuries and illnesses, each one can also affect the body differently. Some of the common injuries that cold stress can cause include hypothermia, frostbite, trench foot and chilblains.

When it comes to hypothermia, which can affect brain function and make a person unable to think clearly or move well, there are varying levels of severity according to "Cold Stress — Cold-Related Illnesses" from the U.S. Centers for Disease Control and Prevention (CDC). Mild hypothermia occurs when a person's body temperature is between 90 degrees and 98 degrees, and symptoms include shivering, lack of coordination, stumbling, slurred speech and pale skin. There is also moderate hypothermia, when body temperature is between 86 degrees and 90 degrees. At this stage, shivering stops but there is reduced breathing and a slower heart rate. A person may be unable to stand or walk and appear confused or irrational.

Hypothermia can become severe when body temperature is

between 78 degrees and 86 degrees, and a person experiences muscle stiffness and an irregular pulse. This is the most concerning level, as a person can also be very sleepy and have extremely cold skin.

When a person has frostbite, they lose feeling and color in the impacted area. It commonly affects a person's nose, ears, cheeks, chin, fingers and toes, damaging deeper tissues of the body.

Meanwhile, trench foot is caused by prolonged exposure to wet and cold. According to the CDC, symptoms include skin reddening, numbness, leg cramps, swelling, blisters or ulcers, bleeding under the skin and gangrene.

Chilblains, which are the inflammation of the small blood vessels in the skin due to cold exposure, can cause permanent skin damage and redness. If someone is repeatedly exposed to cold temperatures, the itchiness can return.

## How Do You Get Rid of Cold Stress?

To reduce injury and illness risk, workers need protection from cold exposure. Construction superintendents can take measures to protect workers by training field supervisors and workers to prevent, recognize and treat cold-related illness and injury, as well as properly monitoring jobsites in cold conditions to make sure workers are taking adequate breaks in a warm environment.

It is imperative that construction superintendents provide prompt medical attention if workers show signs of cold-related illness or injury. Creating a management and employee safety committee would be helpful and providing risk management solutions before a situation arises. This includes mitigation efforts such as encouraging breaks to warm up when needed and ensuring access to warm areas to change out of wet clothes, as well as reducing workers' time spent in cold environments and rotating workers to provide relief from the physical demands of a construction job. ▲




*David DeSilva is head of construction for The Hartford's Middle and Large Commercial division. He's an experienced construction underwriter known for his exemplary relationships with brokers. His underwriting capabilities include workers' compensation, general liability, and excess lines of coverage for contractors and subcontractors.*



*Mark S. Williams is a chiropractic physician and medical director with The Hartford. He received his doctor of chiropractic degree from Logan College of Chiropractic, his MBA from the University of Southern Maine and a bachelor's degree in human biology from Logan College of Chiropractic. He is board certified in occupational health and applied ergonomics. Visit thehartford.com.*








Photo Credit: Bobcat Company

# Defeat Decision Fatigue

Understanding the diverse range of compact loaders available on the market

BY MIKE FITZGERALD

Today's construction contractors have unprecedented options when it comes to selecting a new compact loader for their fleet. An impressive variety of sizes, options, features, benefits and attachment choices are available to fit any number of conceivable tasks and jobsite needs. While there is power in choice, decision fatigue can soon follow.

For operators looking to grow their fleet, we'll take a high-level look at the most popular compact loaders available today, highlighting their advantages, noteworthy application uses and considerations.

## Skid-Steer Loaders

Invented by Bobcat's founders just over 65 years ago, skid-steer loaders are still among the most popular and versatile compact loaders in the construction industry. Beyond construction, these productive, nimble machines are ideal for a variety of agriculture, concrete and landscaping applications — just to name a few. Key features and benefits include:

- *Attachment versatility* — Like the other loader types we will discuss, skid-steer loaders are renowned for their compatibility with a wide range of attachments, including buckets, forks, augers and hydraulic breakers. This versatility enables them to perform a wide variety of challenging tasks in applications such as material handling, utility work, road maintenance, site prep and landscaping.
- *Maneuverability* — With their compact size and agile steering, skid-steer loaders excel in confined spaces, such as urban construction sites. Their ability to perform tight turns and pivot on the spot enhances productivity in environments where space is limited.
- *Intuitive operation* — Skid-steer loaders typically feature intuitive controls, allowing operators to quickly master their operation. This ease of use reduces training time and enhances overall efficiency on the jobsite.

## Compact Track Loaders

Compact track loaders are relatively new in the construction world, but they have quickly become one of bestselling equipment categories in North America. Compact track loaders offer similar functionality to the skid-steer loader, but with the added advantage of a track-based undercarriage. This design provides superior traction and flotation, offering added benefits particularly in challenging terrain conditions. Key features and

benefits include:

- *Superior traction* — The rubber track system of compact track loaders offers greater traction and flotation than traditional tires, making them well-suited for muddy, sandy or uneven surfaces. This traction is especially beneficial in landscaping and site preparation applications.
- *Reduced ground pressure* — The distributed weight of compact track loaders minimizes ground pressure, reducing soil compaction and surface damage. This feature is advantageous when working on existing surfaces or in environmentally sensitive areas.
- *Versatility* — Like skid-steer loaders, compact track loaders are compatible with a wide range of attachments, allowing them to tackle various tasks with ease. From loading and hauling to grading and trenching, these machines offer versatility across different construction applications.

## Mini Track Loaders

Mini track loaders are smaller stand-on counterparts to compact track loaders. Despite their compact size — or perhaps because of it — they offer the "best of both worlds" with significant performance capabilities in a small footprint. Key features and benefits include:

- *Accessibility* — Mini track loaders can access hard-to-reach areas where larger equipment may not be able to operate. Whether it's navigating through narrow pathways in residential yards or accessing construction sites with limited entry points, mini track loaders pair with more than 50 attachments to serve as a replacement for manual labor in spaces where the only other option used to be wheelbarrows and shovels.
- *Cost-effectiveness* — Mini track loaders are often more affordable compared to larger machinery. Their smaller size and lower fuel consumption result in reduced operating costs, making them a cost-effective solution for small-scale projects and businesses with limited budgets.
- *Minimal disturbance* — Mini track loaders' high-floatation tracks can move across wet and muddy ground conditions, reducing ground pressure and minimizing damage to lawns or other established surfaces. Owners can also choose nonmarking tracks to prevent marks on driveways and sidewalks. These features make them suitable machines for residential construction sites where preserving the existing terrain is essential, minimizing the need for costly repairs or restoration after the work is completed.

## Compact Wheel Loaders

Compact wheel loaders are characterized by their articulated steering and bucket attachments. They offer superior lifting and loading capabilities with a compact footprint. Popular applications include aggregate and material handling, landscaping, concrete and forestry work. Key features and benefits include:

- *Articulated steering* — Compact wheel loaders articulated steering systems smooth maneuverability. Articulated steering enables the front and rear wheels to articulate independently, providing a tight turning radius and enhanced agility in confined spaces.
- *Efficiency* — Compact wheel loaders are efficient machines capable of handling heavy loads quickly and effectively. Their powerful engines and hydraulic systems enable fast cycle times and high lifting capacities, contributing to improved productivity on the jobsite.
- *Performance* — Built for maximum performance to power through your daily tasks, compact wheel loaders feature excellent pushing and loading power. These machines make fast work of tough material handling across industries.

Now that we've covered the most popular compact loaders on the market, here are some other things you should consider when adding a new loader to your fleet:

- ***Get firsthand experience.*** While looking at machine specifications is important, there is no substitute for operating the machine yourself. This is the best way to get a feel for how the equipment handles and how it performs. Talk to your local dealer about your applications and project needs and ask to compare the different models that are available.
- ***Avoid the temptation to overpower.*** It can be tempting to select equipment that can handle more than what you need it to, but consider how that may be to your detriment. For example, if you see grounds maintenance opportunities in your urban market, you may not want to select the largest loader you can find. Along with a possible loss in maneuverability in tight spaces, you may be overpaying in operating costs for an outsized machine.
- ***Think long-term.*** Outside of the upfront costs, remember to consider ongoing and preventive maintenance and enhancements (such as adding to your attachment lineup) and how that will impact your bottom line. As a business owner, you know that return on investment is key, and the faster your equipment starts making money the sooner you will realize a profit. ▲

*Mike Fitzgerald is a marketing manager with Bobcat Company. With more than 40 years of industry experience, Fitzgerald uses his vast expertise in compact equipment to help customers be as productive as possible on the jobsite. A member of the Society of Automotive Engineers, Fitzgerald holds one European and two U.S. patents. Visit bobcat.com.*





Photo Credit: Surgere

# Top 3 Transformative Trends in Supply Chain Management

Continued improvements in technology provide organizations with more control

BY WILLIAM WAPPLER

Rapid technological advances are transforming the way the world does business. In no segment of the world economy is this more evident than the arena of supply chain management. Traditionally, supply chains have been managed by people using spreadsheets to track materials around the globe — but new technology makes it easier than ever to make sure the goods produced are tracked from origin point to end user with remarkable precision.

Construction business owners can benefit from employing the latest technology to streamline their supply chains and make their operations more efficient. According to recent studies, nearly 70% of businesses that use technology to provide detailed visibility into their supply chains avoid significant disruptions. Resilient supply chains mean you will know where your building materials are at all times, which will allow you to adjust schedules as necessary to keep projects moving forward.

Access to such real-time data is essential so you can make informed business decisions quickly and efficiently. The right tech stack also allows for the automation of manual processes, which frees up employees to focus on the strategic business decisions that will set you apart. Finally, technology offers opportunities to use machine learning (ML) to create predictions about where weaknesses in your supply chains may be. The insights gained can prevent projects from being derailed by supply chain difficulties.

Here are three technological advances or trends occurring right now that can revolutionize the way you conduct your construction business.

## 1. IoT Is Rapidly Improving Real-Time Supply Chain Visibility

Before discussing how the Internet of Things (IoT) is remaking the way supply chain management is done, it's important to understand what it is and its role in knowing where your goods are at all times. IoT is simply a network of interconnected devices that communicate with each other, which allows real-time monitoring of goods as they move through the supply chain. Mission-critical data, like location, humidity, temperature, and shock and vibration, is now available in ways that

were unimaginable just five years ago. This allows construction companies to manage inventory more effectively and respond rapidly to issues before they become insurmountable problems.

Additionally, IoT sensors, when integrated with the right software programs, can alert you to maintenance needs in your equipment. Downtime decreases as a result, and machines can be fixed before breaking down completely, lowering costs and improving profitability.

## 2. Real-Time Locating Systems Keep Companies in Touch With Their Supplies

Innovations in real-time locating systems (RTLS) provide construction business owners with the ability to know where their supplies are in the warehouse so they can access them easily and efficiently. In particular, three different innovations have made RTLS more accessible to businesses throughout the supply chain.

### *Bluetooth Low Energy*

Bluetooth low energy (BLE) beacons transmit identifying information to nearby receiving hubs, which allows employees to track locations of equipment and supplies in relation to the beacons' locations. It uses triangulation algorithms to determine where the beacon is located, with information about exactly what the beacon is attached to being stored in the software that captures all of the transmissions. In many cases, BLE beacons are a cost-effective solution because they don't require new hardware installation, but they can be thwarted by radio signal interference and attenuation.

### *Ultra-Wideband Technology*

Much like sonar used in submarines, ultra-wideband (UWB) technology uses radio signals to provide general locations for where goods are located. It sends out radio signals and measures the time difference between UWB tags and anchors to locate materials. UWB can locate materials within 10 to 30 centimeters and provide reliable localization data in challenging conditions.

### *Enhanced RFID*

Enhanced radio-frequency identification (RFID) provides opportunities for construction businesses to take legacy identification technology and update it with modern tools to make it a cutting-edge RTLS solution. RFID tags have been standard inventory tracking technology for decades, but they lack the precision of modern inventory-tracking technologies. Using machine learning techniques like deep neural networks, companies can unlock its potential and improve its precision to within one meter.

The key is collecting thousands of RFID signals and allowing deep learning to pair them with known tag locations. Computer software can then map the complexity of signal patterns and positions, committing such measurements to memory. After processing the information, machines can predict precise locations using distance measurements, range measurements and location data. Unlike other solutions, using enhanced RFID is easily scalable at various locations without significant investments in infrastructure upgrades.

## 3. AI & ML Are Changing the Way Supply Chains Function

One of the most revolutionary advancements in supply chain management is the use of artificial intelligence (AI) and machine learning. Not only can it make supply-chain management more efficient and accurate, but it can also remove simple tasks like data entry, order processing or logistics operations. This allows people to focus on what they do best: decision-making and strategic thinking, which benefits construction businesses as they navigate a volatile market. Furthermore, ML algorithms can evaluate past data and make predictions of future events. If more companies had availed themselves of the predictive functions of AI and ML, they could have more effectively adjusted to the notorious lumber shortage of 2020. It may have meant the difference between success and failure for some.

AI and ML unlock numerous advantages, from inventory management to clear, effective governance of a company's assets. Separately, each technology offers advantages over traditional supply chain management. Together, they provide the potential to change the way companies manage their supply chains. AI and ML can improve demand forecasting, optimize inventories, plan efficient routes, automate tasks like order picking and packing, and evaluate products for any defects before they reach the end user.

## The Bottom Line

As the attention on supply chains has increased over the past four years, the urgency of modernizing its management has become more pressing. That's why finding partners who understand the capabilities of the modern supply chain tools is essential. Whether your company is looking to make full use of the IoT, enhance your real-time location systems, or unlock the potential of AI and ML to save you time and money, the right partner can offer guidance and help you navigate this complicated but essential part of the U.S. economic engine.

Embracing new supply chain management tools is no longer optional if you want to succeed in the challenging construction industry. Adapting quickly to changing market conditions is vital, and using all the tools available will keep you ahead of your competitors. ▲

*William "Bill" Wappler is the CEO of Surgere, an industry pioneer leveraging IoT technology to revolutionize the supply chain. Wappler has more than 20 years of experience directing and executing technology strategy growth for global and Fortune 500 companies. Visit surgere.com.*





Photo Credit: Sona - stock.adobe.com

# Navigating Traumatic Brain Injury Protection & Effective Helmets

How to select appropriate head protection for construction workers

BY MICHAEL BOTTLANG

Construction has the highest number of fatal and nonfatal work-related traumatic brain injuries (TBIs). Nonfatal TBIs are life-altering events, whereby 43% of patients treated for TBI did not attend ordinary work for five years after injury.[1] Helmets are the single most effective tool for prevention of head injury. Over the past decade, an unprecedented variety of helmets has been introduced, differing in style, price point, compliance with standards and manufacturers' claims of improved protection. To develop a guideline for selection of head protection, the Occupational Safety and Health Administration (OSHA) tasked the Center for Construction Research and Training (CPWR) to form a panel of experts from academia, labor, government and industry. In April of 2024, CPWR released the resulting guidance document, which can be downloaded at bit.ly/4dm8pYs. This guidance document clarified that helmet performance is not based on a particular helmet style (e.g., hard hat versus climbing-style safety helmet). Rather, helmet performance is indicated by the Type I/Type II certification based on American National Standards Institute (ANSI) standard Z89.1. Type I certified helmets are only tested for impacts to the helmet crown, while Type II helmets provide additional protection from front, side and rear impacts. This article summarizes guidance regarding the proper selection of Type I/II helmets, helmet retention and most recent innovations for brain protection.

## Type I vs. Type II Certified Helmets

The Type I/II classification of U.S. ANSI standard Z89.1 assesses the protection from skull fracture caused by straight impacts to the head. The strap suspension of traditional helmets is a directional design (Figure 1). It is designed to absorb crown impacts, but it was found "practically useless" against side, front and rear impacts in a 1987 helmet test study.[2] The authors of that study concluded that a redesign is necessary, since the majority of impacts are lateral while only 15% of impact occur to the helmet crown. The ANSI standard Z89.1 properly recognized this shortcoming and added a Type II designation, whereby Type II certified helmets are also tested for their ability to absorb front, side and rear impacts. A recent publication document that most helmets from leading brands still only delivered Type I "crown only" protection. This shortcoming was noted for hard hat style helmets as well as for "climbing-style" safety helmet. Many safety helmets employ a foam liner in addition or in place of a strap suspension. But this liner might be too thin or might not extend far enough to the sides to pass Type II testing, as shown in a recent publication titled "Climbing style safety helmets do not improve impact protection over type II hard hats".[3] Selecting an ANSI Type II helmet, regardless of style, is therefore important to provide the best protection from skull fractures.

## Helmet Retention

A helmet can only provide protection if it stays on the head during a fall. Chin straps can readily prevent a helmet from falling off the head. The U.S. standard ANSI Z89.1 does not require chin straps but requires retention testing of chins straps if they are supplied with the helmet. In contrast, the European standard EN 12492, titled "Helmets for Mountaineers," requires chin straps. This standard is often used for "climbing style" safety helmets, since it requires chins straps as well as lateral impact testing. For best head protection, helmets with chin straps should be selected. While an EN 12492 certification will ensure the presence of a chin strap, this standard is no substitute for meeting ANSI Z89.1 Type II performance.

## Brain Protection

Brain protection has been a blind spot in helmet design. A September 2023 article in Occupational Health & Safety, titled "Addressing an Overlooked Danger," stated that current helmet standard must be updated to account for rotational motion, which is the key cause of concussions on construction jobsites. There are two different types of head injuries, namely skull fracture and brain injury. Fracture of the hard but brittle skull is caused by a straight impact,[4] similar to the straight impact one would induce to crack a brittle eggshell. A rigid helmet shell combined with an impact-absorbing liner or suspension greatly reduces the skull fracture risk by decreasing the force of a straight impact to the skull.

Conversely, brain injury is mainly caused by head rotation in response to an impact.[5] Head impacts typically cause a short but forceful head spin that twists the brain and shears the soft brain tissue. Similar to severing nerves of the spinal cord, shearing of brain tissue causes irreversible damage that may lead to lifelong suffering with staggering financial implications. Brain injuries can range from a mild concussion to severe TBIs, whereby the cost associated with a single work-related traumatic brain injury can exceed $1 million.[6] This staggering human and financial cost of brain injury is often caused by rather simple and frequent events. Over 60% of work-related brain injuries are caused by simple slips, trips and same-level falls.[7] Most interestingly, over 90% of such brain injuries occur in absence of a skull fracture,[4] which further confirms that the soft brain is injured by a distinctly different mechanism than the hard skull. However, this critical vulnerability of brain to rotational forces is neither considered in standardized helmet tests nor accounted for in traditional helmet designs.

Sports helmets have recently adopted technologies to shield the brain from rotational force. One technology, called MIPS, is a plastic sheet that seeks to reduce transmission of rotational force by slipping during impact (Figure 2). These MIPS slip liners can be retrofitted into existing

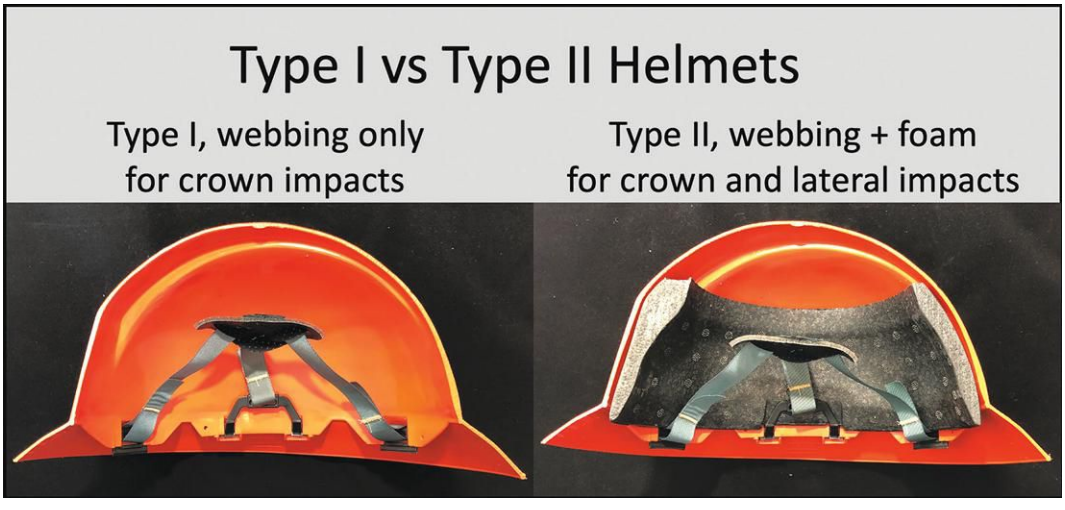



Figure 1. The strap suspension of a Type I helmet is optimized for crown impacts, but not lateral impacts. Adding a foam liner can provide Type II protection from lateral impacts.

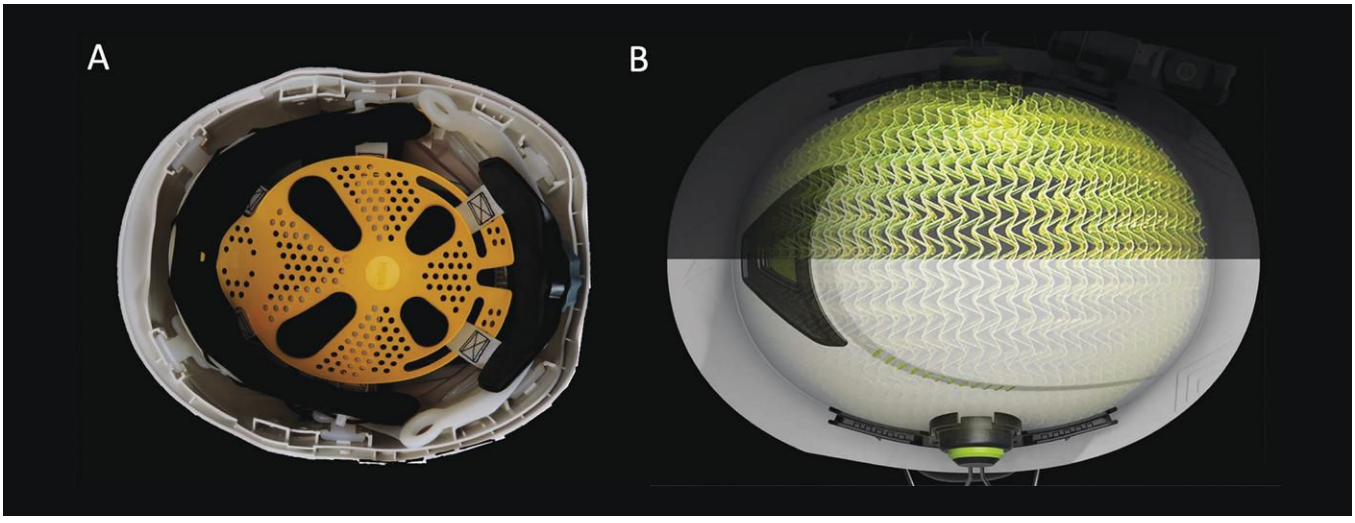



Figure 2: Rotation mitigation technologies. A) MIPS slip liner; B) WaveCel dome.

helmet designs and are available in a range of bike and snow helmets. In contrast to this two-dimensional slip sheet, WaveCel technology employs a dome formed of a cellular structure that was specifically designed to fold, crush and glide during impact (Figure 2). Compared to standard helmets, it has shown to reduce transmission of rotational forces by up to 57% and was able to reduce the predicted risk of sustaining a concussion to 1.2% in the same impact scenario.[8] These rotation-damping technologies have most recently been introduced in safety helmets to better protection from rotational forces than modern safety helmets with an EPS foam core.[3] Since over 250,000 brain injuries are admitted to hospitals in the U.S. each year,[9] selecting helmets that have rotation-damping technology should be a primary consideration when selecting a new helmet.

## Conclusion

When choosing a helmet based on available evidence of performance, the following three aspects should be considered:

1. Choose a helmet that is ANSI Type II rated to provide protection from lateral impacts which occur far more frequent than crown impacts.
2. Choose a helmet with chin straps to ensure the helmet remains on the head during impact.
3. Choose a helmet with a rotation-mitigating technology to reduce the risk of brain injury.

In addition to these impact performance criteria, factors pertaining to user satisfaction are equally important for helmet adoption, such as comfort, weight, heat and style. Regarding style, helmets should be selected based on performance, independent of a particular helmet style. ▲

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*Michael Bottlang is the founder and director of the Legacy Biomechanics Laboratory in Portland, Oregon. His research has been funded by the National Institute of Health and he has published over 80 peer-reviewed papers. Dr. Bottlang is also a founder of WaveCel LLC, a helmet company dedicated to reduce the incidence and severity of brain injury. Contact him at mbottlan@lhs.org. Visit wavecel.com.*



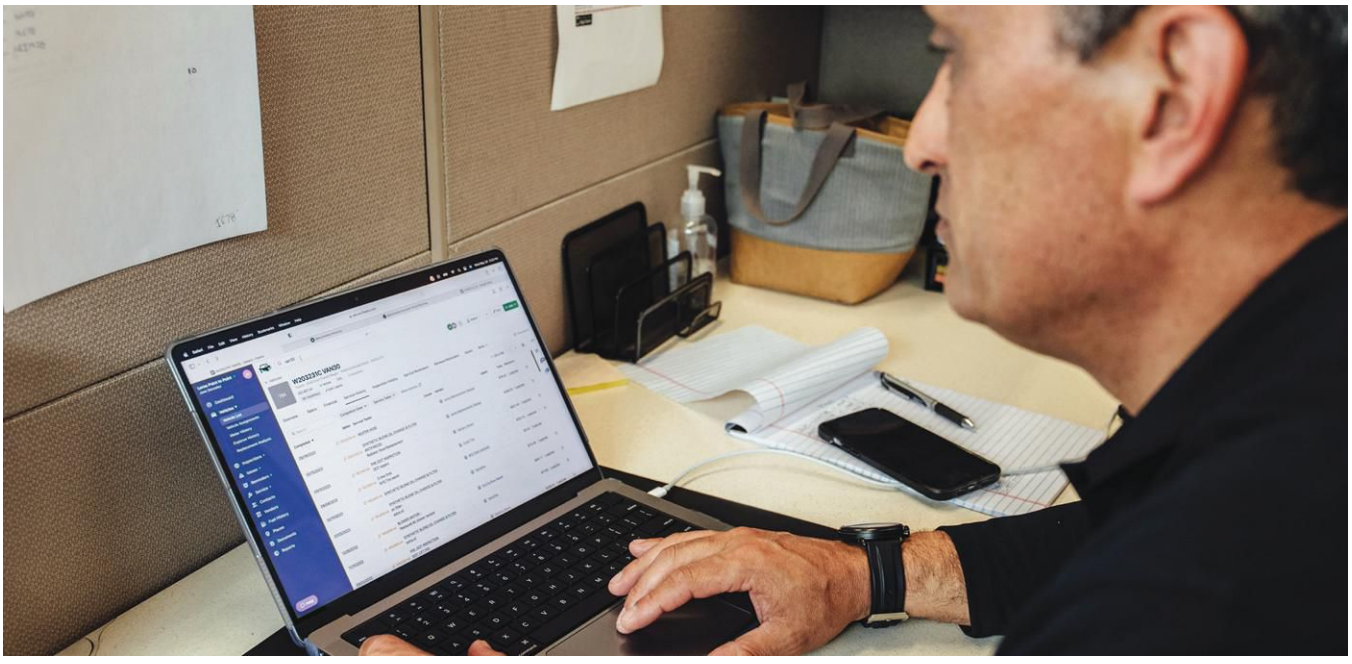


Photo Credit: Fleetio

# Addressing Unexpected Challenges in Sustainability

Strategic planning can help construction fleets make feasible green decisions

BY RACHAEL PLANT

Sustainability within the construction industry can encompass everything from project design, build and waste removal, to what materials and fleet assets are used. A significant amount of focus around sustainability is on electrification of both vehicles and equipment, but to build a solid sustainability strategy, it's imperative to also consider other aspects — such as the efficacy of green materials — and gain a clear understanding of risks.

Guylaine Desmarais, Richard Trempe and Mario Gonçalves, the authors of a research study out of Oak Ridge National Library, outlined one such risk: "A green roof was incorporated into the design of [a building]. … Within two years, water infiltration was reported. The investigation revealed that the aluminum base of the plumbing vents was perforated, at the junction with an extension sleeve. To accommodate the extra height due to the planting medium, it had been necessary to extend the plumbing vents. The problem is that the sleeves were made of stainless steel, which is a noble metal in comparison to aluminum. The combination of these two metals with a very moist environment (the planting medium) led to galvanic corrosion."

With a growing number of available green materials, assets and technologies, and as more data on these become available, sustainability planning can be tailored more closely to the business's needs to ensure a smooth transition.

## Pros & Cons of Going Green

Weighing the pros and cons is a helpful step in most any endeavor, but it can have the added benefit of helping construction businesses prioritize short- and long-term goals. This is especially beneficial in creating five-, 10- and 15-year plans, which can be adjusted over time as specific goals are met or challenges arise.

Some pros to consider include:

- *Regulatory compliance* — Aligning with local, regional and/or national sustainability initiatives can help businesses comply with new and incoming regulations.
- *Potential cost savings* — On the fleet side, electric assets may offer reduced fuel and maintenance expenses.

- *Enhanced reputation* — Businesses focused on sustainability may gain higher public standing, which can translate to new business opportunities. "Sustainable construction is an approach widely sought by governments, environmentalists and other stakeholder groups who recognise its benefits," according to Science Direct.



Photo Credit: Fleetio

Look at the pros in terms of what the business is trying to accomplish. What do you hope to gain by moving toward sustainability, and what is the best path forward that factors in both goals and cost?

Some cons to consider include:

- *Higher upfront costs* — Investing in green materials and tech typically requires a significant upfront investment, which may pose financial challenges. On the fleet side, fluctuations in crude oil prices can offset fuel savings associated with electric vehicles (EVs), which should be taken into account when evaluating the overall cost-effectiveness of fleet electrification.
- *Increased risk of asset damage* — EVs may be more susceptible to damage from rough terrain and jobsite conditions, potentially leading to higher repair costs, while green materials like concrete can increase drum corrosion.
- *Product understanding and efficacy* — Lack of understanding has so far played a significant role in building enclosure failures caused by issues like mold and reduced structural integrity due to water damage. Product changes often mean process changes, so knowing how certain green materials and assets operate — including the differences in form and function from their standard counterparts — is critical to success.

Look at the cons in terms of challenges that need to be addressed proactively. Will you need to reallocate a portion of the budget to offset higher purchase costs, and if so, from where in the budget can these funds be pulled with the lowest impact?

## Building on a Strong Foundation

With sustainability goals and challenges firmly in place, it's important to conduct thorough research into the green material or asset you're looking to procure. How does it stack up to current materials or assets in productivity and efficacy, and what potential impacts might it have on equipment? Consider factors such as abrasiveness, viscosity and corrosiveness to ensure current equipment can handle the new conditions. You may end up having to switch to models that are designed to withstand the unique challenges posed by sustainable materials.

Working closely with suppliers and equipment manufacturers is a great way to address any compatibility issues or concerns related to sustainable materials, as they can provide guidance on equipment selection, maintenance best practices and product recommendations tailored to the specific needs of construction fleets adopting sustainability practices. Be sure to also provide any necessary training and education for construction crews on the proper handling and use of any new materials, including how they may affect equipment performance and what measures operators can take to minimize damage. Encourage open communication and feedback to identify issues early and implement effective solutions.

## Measuring the Value

The transition toward sustainability doesn't stop at planning or even implementation, but also encompasses measuring the cost versus value of those investments. Businesses can leverage historical data to analyze and quantify the impact of sustainability initiatives on key metrics, such as product and material usage rates, fuel and/or energy consumption, productivity and downtime. By comparing the return on investment (ROI) of green purchases, businesses can make data-driven decisions that align with their long-term goals and objectives.

Investing in a robust fleet management software can help businesses easily assess electric asset ROI and performance, and total cost of ownership. These findings can be quickly compared to conventional assets so issues can be addressed in a timely manner, whether it's mitigating increased asset wear and tear risk or aligning vehicle charging times to off-peak hours.

Addressing unexpected challenges in sustainability requires embracing innovation through strategic planning. By weighing the pros and cons and measuring the value of green investments, construction businesses can make informed decisions around sustainability goals to achieve long-term success. ▲

*Rachael Plant is a content marketing specialist for Fleetio, a fleet management software company that helps organizations track, analyze and improve their fleet operations. Visit fleetio.com.*



# New Products to Watch

Selected by the editors of Construction Business Owner, these new-to-the-market products are just a few of our favorites recently released to the construction community. Stay tuned in every issue to find out what you need to know about the latest gear, solutions & industry-leading innovations.



## ◂ LOFTNESS
24SG Stump Ax
**Released: 3/19/24**
**Availability: U.S. market**

**What's new?** Loftness has expanded its line of stump grinder attachments with the 24SG Stump Ax. Featuring a 24-inch cutting wheel, the new model is designed for use with low-flow skid steers and excavators. The 24SG has a rigid mount, allowing operators to work quickly by simply repositioning the power unit, rather than articulating the attachment itself. It also has an angled hitch and forward-reaching boom to provide superior visibility and control.

**Specs:** Leonardi's Phantom Wheel enhances visibility. This cutting wheel has cutouts, which create a see-through effect during operation. It is equipped with Tomahawk teeth, which offer fast grinding times. Powered by a 110cc high-torque radial piston motor, the new Stump Ax is compatible with 17 to 35.9 gallons per minute flow ranges and requires 30 to 80 hydraulic horsepower. It can be ordered with a universal skid steer mount or a custom excavator mount.



## ◂ KEEN UTILITY
Arvada Shift
**Released: 2/1/24**
**Availability: U.S. & Canadian markets**

**What's new?** The Arvada Shift is designed for jobs requiring constant movement and long hours on your feet. With an elastic-equipped slip-on fit for easy transitions into work mode, this work sneaker is a blend of athletic-level cushioning and style.

**Specs:** Highlights include a lightweight, compression-resisting KEEN.ReGEN midsole that returns 50% more energy than standard EVA foam and an ultra-breathable mesh upper to keep feet cool. At the same time, the Arvada Shift does not sacrifice safety offering asymmetrical carbon-fiber safety toes and an EH-rated oil-and-slip-resistant rubber outsole provides dependable footing. The Arvada Shift will be available for both men and women in several colorways as well as an ESD option.

## DEVELON ▸
MY DEVELON app
**Released: 4/1/24**
**Availability: North American market**

**What's new?** This digital platform is an expansion of the company's existing Fleet Management telematics offering. The new platform makes navigating the system easier for customers and dealers when managing Develon construction equipment. Users can download service tools and get personalized quotes for parts for Develon equipment.

**Specs:** Dealers and customers can subscribe to receive notifications when a machine requires service. Available for download from popular app service providers. Current users of the Fleet Management system should replace the current app by downloading the new MY DEVELON app. They can log in with their same credentials..






## ◂ PHILIPPI-HAGENBUCH
Sideboards
**Released: 4/3/24**
**Availability: U.S. market**

**What's new?** Designed to haul more material with each load while minimizing material loss. Philippi-Hagenbuch Sideboards install easily and precisely fit to vertically extend the sides of off-highway haul truck bodies. The company works with each operation to custom engineer Sideboards to achieve the optimal height based on the truck's rated weight, the material being hauled and the loading equipment. Sideboards increase the haul truck's capacity while reducing or even preventing spillage, keeping haul roads clean — reducing downtime to clear the road — and protecting haul truck tires.

**Specs:** Sideboards are available in 1-inch increments from 6 inches to 40 inches. In some cases, they may be available in an even larger size, depending on the haul truck, the environment and the material being hauled. The company also considers the operation's loading equipment to ensure the final height will not exceed the loader's capabilities. Sideboards are built of Grade 80 steel for trucks ranging from 20 to 150 tons and 450 Brinell on trucks 150-plus tons for excellent durability. They're also engineered with internal structural gussets to help provide a long service life.




## ▲ SHURTAPE TECHNOLOGIES LLC

### FrogTape Double-Sided Poly-Hanging Containment Tape

**Released: 2/26/24**

**Availability: U.S. & Canadian markets**

**What's new?** FrogTape Double-Sided Poly-Hanging Containment Tape has premium painter's tape adhesive on one side and an aggressive adhesive on the other that offers 50% time savings compares to standard poly-hanging methods. This professional grade tape is designed to securely hold poly-sheeting and create a strong, airtight barrier preventing dust, debris, mold, asbestos and other airborne fibers from escaping the work area. It also removes quickly and easily, with 21-day clean removal.

**Specs:**

- Hand-tearable
- Overall grade/function: Professional
- Backing: Fine structured crepe paper
- Adhesive: Synthetic rubber
- Standard widths: 1.41 inches [36 millimeters] / 1.89 inches [48 millimeters]
- Standard length: 25 yards [22.8 meters]
- Standard core size: 3 inches
- Tensile strength: 21 pounds/inch width
- Thickness: 11.6 mils
- Elongation: 9%
- Service temperature range: 32 degrees to 120 degrees



## ▲ LEICA GEOSYSTEMS

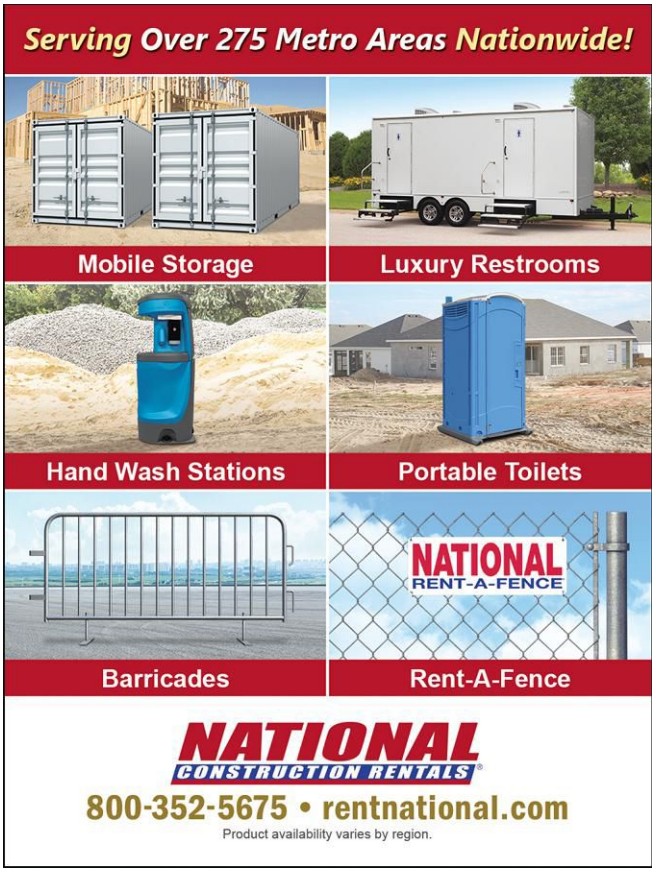
### Leica iCON gps 120

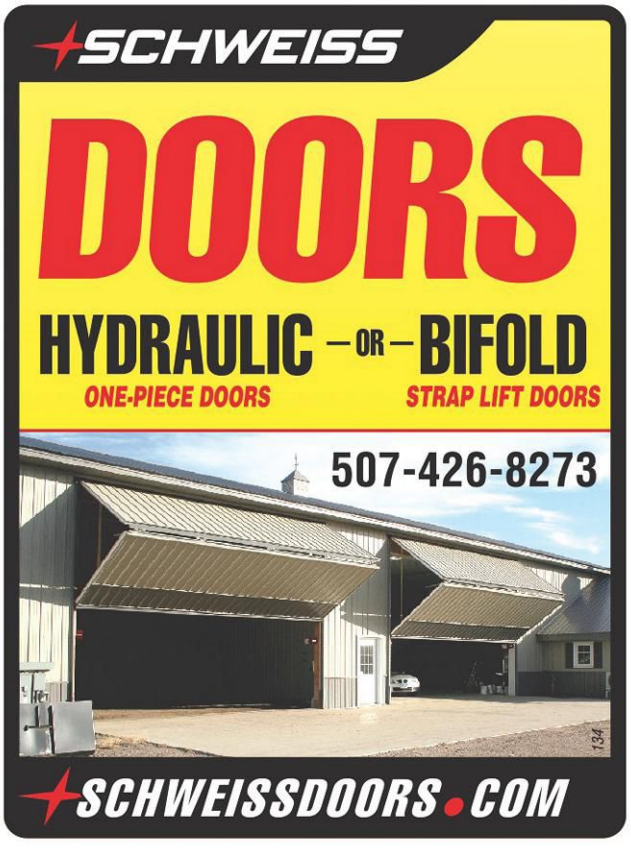
**Released: 4/24/24**

**Availability: Global markets**

**What's new?** The new Leica iCON 120 Machine Smart Antenna is integrated into the existing Leica MC1 solution platform. Thanks to its flexibility, scalability and modularity, it extends the machine control solution offering to more applications and machine types. This allows streamlined operations and consistent workflows between heavy construction equipment that vary in application requirements. Using the Leica MC1 machine control solution enables more precise and quicker task completion, significantly enhanced fleet efficiency, reduced waste and more environmentally friendly operations.

**Specs:** Construction customers can start with a single GNSS solution using a satellite-based augmentation system (SBAS) or HxGN SmartNet PPP service. Once they need to advance their systems to higher specifications, they can easily upgrade to an RTK solution with low or high accuracy by adding the communication unit Leica CR50. With a second iCON gps 120 Machine Smart Antenna, customers get a full high-accuracy dual GNSS solution with heading. The iCON gps 120 customizable solutions will suit their requirements, regardless of machine control accuracy or specifications. Moreover, the antennas can be easily switched between Leica MC1 prepared machines, thanks to the easy mounting and dismounting, such as the quick disconnect system.



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- ❑ 03 Highway and Street Construction
- ❑ 04 Water, Sewer and Utility Construction
- ❑ 05 Heavy Construction
- ❑ 06 Concrete Work
- ❑ 07 Excavation Work
- ❑ 08 Wrecking and Demolition Work
- ❑ 13 Architecture, Engineering and Construction Management Services
- ❑ 11 Consulting Contractor
- ❑ 99 Other (please specify)

**2. Your primary job title is:** *(Check only one)*
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- ❑ 11 General Manager, Manager, Foreman, Superintendent, Purchasing Agent, Controller, Accountant
- ❑ 12 Engineer, Architect
- ❑ 06 Consultant
- ❑ 99 Other (please specify)

**3. Approximate annual contract sales volume:**
*(Check only one)*
- ❑ 01 Less than $500,000
- ❑ 02 $500,001 – $1,000,000
- ❑ 03 $1,000,001 – $2,500,000
- ❑ 04 $2,500,001 – $5,000,000
- ❑ 05 $5,000,001 – $10,000,000
- ❑ 06 $10,000,001 – $20,000,000
- ❑ 07 $20,000,001 – $50,000,000
- ❑ 08 More than $50,000,000

**4. Which of the following products/services are you planning to buy during the next 12 months?**
*(Check all that apply)*
- ❑ 01 Earthmoving Equipment
- ❑ 02 Trucks, Trailers and Accessories
- ❑ 03 Compact Equipment
- ❑ 04 Lifting and Hoisting Equipment
- ❑ 05 Safety Equipment and Apparel
- ❑ 06 Attachments
- ❑ 07 Concrete and Paving Equipment
- ❑ 08 Survey and Site Prep
- ❑ 09 Compressors, Generators and Pumps
- ❑ 10 Financing and Accounting Services
- ❑ 11 Software and Technology
- ❑ 12 Insurance and Bonding
- ❑ 13 Training and Education
- ❑ 14 Telecommunications
- ❑ 16 Greases, Lubricants and Filters
- ❑ 17 Jobsite Lighting
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## Annual Value of Construction Put in Place

**March** 2022/2023/2024 Annual Rate Comparison

*This chart compares the two previous years' total value of construction put in place to an annual forecast based on March 2024 figures. (Millions of dollars. Totals may not add up perfectly due to rounding.)*

| | 2022 | 2023 | 2024 |
|---|---|---|---|
| **Total Private Construction** | **1,379,653** | **1,435,052** | **1,600,780** |
| Residential | 882,045 | 827,696 | 884,285 |
| Nonresidential | 497,609 | 607,355 | 716,495 |
| **Total Public Construction** | **350,816** | **399,640** | **483,146** |
| Residential | 9,236 | 9,851 | 11,641 |
| Nonresidential | 341,580 | 389,789 | 471,505 |
| **TOTAL Construction** | **1,730,469** | **1,834,692** | **2,083,926** |

**Seasonally Adjusted Annual Rates. Source: U.S. Census Bureau*

**$2,083,926**

MARCH 2024 TOTAL ANNUAL VALUE OF CONSTRUCTION PUT IN PLACE

"Elevated construction costs coupled with prolonged high interest rates continue to discourage new project activity," said Kermit Baker, Ph.D., AIA chief economist.

## AIA Architectural Billings Index (ABI)

| National | | | *Regional - Billings | | | | *Sectors - Billings | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Month | Billings | Inquiries | Northeast | Midwest | South | West | Multifamily Residential | Commercial/ Industrial | Institutional | Mixed |
| Oct-23 | 44.13 | 48.8 | 42.1 | 48.9 | 48.5 | 40.0 | 40.1 | 43.7 | 49.1 | 44.0 |
| Nov-23 | 45.3 | 56.9 | 44.4 | 49.0 | 46.7 | 39.5 | 42.1 | 45.7 | 46.6 | 42.7 |
| Dec-23 | 45.4 | 53.1 | 45.9 | 50.3 | 43.4 | 45.3 | 45.8 | 46.4 | 46.5 | 42.3 |
| Jan-24 | 46.2 | 53.8 | 43.6 | 50.9 | 45.2 | 46.9 | 44.6 | 47.0 | 48.5 | 42.9 |
| Feb-24 | 49.5 | 56.0 | 44.0 | 50.8 | 47.7 | 47.2 | 44.9 | 46.1 | 50.7 | 47.1 |
| Mar-24 | 43.6 | 54.9 | 46.0 | 45.2 | 45.3 | 47.6 | 44.2 | 42.9 | 49.9 | 48.3 |

For more information on the index or to subscribe to the complete historical data going back to 1995 for your internal analysis, **please contact economics@aia.org.** The ABI presents monthly construction billings data, using a base score of 50. A score of more than 50 indicates a growth from the previous month, and a score of less than 50 indicates a contraction from the previous month. A score of 50 indicates no change. Source: The American Institute of Architects (AIA), Architecture Billings Index (ABI).

*Regional and Sectoral indexes are three-month moving averages, due to small sample size. All data is seasonally adjusted.
**Every January, the AIA research department updates the seasonal factors used to calculate the ABI, resulting in a revision of recent ABI values.

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