THE LEADING BUSINESS MAGAZINE FOR CONTRACTORS

MARCH 2024 | CONSTRUCTIONBUSINESSOWNER.COM

CONSTRUCTION BUSINESS OWNER



Libby Pritchard
Director of Occupational Health, Safety & Sustainability
NSSGA

SUSTAINABILITY VIP 2024

2024'S INFLUENTIAL VOICES IN SUSTAINABILITY

SPOTLIGHTING PERSPECTIVES ON SUSTAINABLE PRACTICES IN THE CONSTRUCTION SECTOR

IN THE OFFICE
Strategic cost estimation for contractors in 2024

IN THE FIELD
How construction sites can utilize clean energy



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FROM THE EDITOR

MEGAN BEAM

If you've ever started a new job in a new-to-you industry, you know the time it can take to adjust. For me, learning the processes of a new job — the minute details, the humans involved in the labor that produces all the moving pieces that become a brand — is the first layer of expertise I want to feel confident in before I try anything else. But that second layer is so much more complex. For me, that layer starts with everything the brand touches.



Andrew Arnold, Megan Beam and Fletcher Allen in front of the Bellagio fountains.

As the still new-ish editor of Construction Business Owner (CBO), my first real foray into seeing the brand in the wild was this past January at World of Concrete. Even though I started working on this magazine in the late summer of 2023, most of my interactions with CBO's readership and collaborative partners had been via email and the occasional virtual call. But to finally be in the hustle and bustle of the industry in real life, on the floor of the Las Vegas Convention Center, was when I finally had my "OK, I am officially here" moment. It's true what they say: Sometimes the journey is the destination. But sometimes the destination is the destination too, right?

I had so many great conversations in connection with contributors, and I am looking forward to bringing you all the exciting content from places in the CBO community that may have gone untapped. There are so many wonderful ideas and perspectives moving in this industry, and it's my genuine delight to be part of the team that spotlights those ideas and perspectives for you. And speaking of delight, don't miss the photo of part of the CBO team in front of the Bellagio fountains during our trip — shoutout to the CBO sales team for letting me watch the fountains every time we passed them.

I would be remiss not to point you toward our special section, CBO's 2024 Sustainability VIP profiles. If you only peruse one part of this issue, let it be the stories of the leaders in these pages. It is no secret that the conversation of sustainability is vast and diverse. These peer-submitted nominees use their positions to create and uphold practices that lessen construction's impact on the environment in both the short and long term, which we know is no small feat.

Finally, if you are ever inspired with an idea or expansion on something you've read in an issue of CBO, or if there's something you would like to see discussed in these pages that has not yet been featured, we would love to hear from you. Please feel free to reach out to me or Carmen via our contact information found on this page anytime.

As always, thanks for reading,



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VOLUME 21 ISSUE 3


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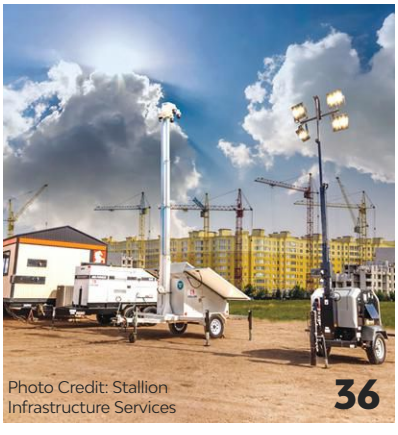


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Exploring a microgrid success story





2024 Sustainability VIP Alyssa Jaksich
Read all SVIP profiles starting on p. 26.

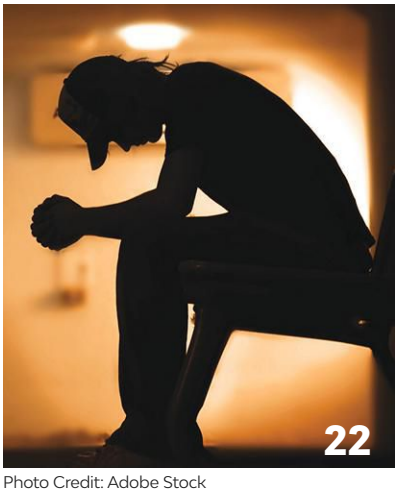


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Construction Change Order Fundamentals

CONSTRUCTION BUSINESS OWNER webinar

Sponsored by Deltek ComputerEase

FREE > March 7, 2024 > 1 p.m. CST

Change orders are an inevitable part of doing business as a contractor and can often mean more revenue. However, when mismanaged, change orders can be time-consuming and disruptive to the relationship between the contractor and their customer. Contractors that have mastered the art of managing change orders are capable of increasing their revenue while minimizing the disruption per customer.

In this webinar, you will learn:

- **What a change order is and common pitfalls**
- **The different types of change orders and where they are applicable**
- **Best practices for change orders to ensure a profitable and smooth experience with customers**



SPEAKER



John Meibers
Vice President & General Manager
Deltek ComputerEase

>> Register at constructionbusinessowner.com/webinars

DeWalt Unveils Electrified Line of Heavy-Duty Tools to Optimize Concrete Jobsites

DeWalt, a Stanley Black & Decker brand and provider of total jobsite solutions, announced the launch of DeWalt Powershift, an equipment system to optimize the workflow of concrete jobsites through electrification. Designed to meet the critical needs of concrete professionals — power, runtime and ergonomics — the electrified line will allow users to transition away from gas-powered equipment. The system, made up of six concrete tools, streamlines the full concrete application through use of the same DeWalt powershift 554 watt-hour battery and high-speed charger across all tools. The DeWalt Powershift line launched at World of Concrete on Jan. 23 with the following products: battery and charger, plate compactor, rammer, backpack vibrator, powerpack vibrator, power screed, core drill and stand, and adaptor. The line delivers fully integrated connectivity with the DeWalt Site Manager app, providing users with data on asset management, tool location, utilization and safety. In addition, Converge's artificial intelligence-based platform ConcreteDNA, powered by data from DeWalt's wireless concrete sensors, interprets real-time data allowing users to observe compressive strength gain of concrete and to predict when it will reach critical strength. Visit dewalt.com/world-of-concrete-2024.

Hh2 Appoints New CRO & CTO

Hh2 Cloud Services, a provider of software for the construction industry, announced the appointment of Aaron Brandwein as chief revenue officer (CRO) and Geoff Gohs as chief technology officer (CTO). Hh2 is backed by Capstreet, a Houston-based, lower middle market private equity firm. Brandwein brings more than 25 years of experience leading large, high-performing private equity-backed portfolio companies and other privately held companies. Previously, he served as CRO at Net Health and Optima Healthcare Solutions, and as executive vice president (EVP) of sales and marketing at software-as-a-service (SaaS) provider Homecare Homebase. Gohs joins hh2 from Gaggle, where he served as CTO having previously held the same position at Linq and XiLi Mobile. He also served as VP of Engineering at both Apiture and Live Oak Bank. Visit hh2.com.

3A Composites USA Increases Its Nationwide Focus on Megaprojects



John Tarr



Nate German

3A Composites USA — manufacturer of Alucobond — is demonstrating its dedication to further cultivating relationships with leading architectural firms by shifting John Tarr into the position of national specification manager. An industry veteran and three-time sales award-winner for the architectural division of 3A Composites USA, Tarr will transition to the new role and concentrate his efforts on partnering with architectural firms that specialize in the design of large public venues such as stadiums, airports and other cultural centers. In conjunction with this organizational update, and as a result of the growth of Alucobond Plus — as well as the EasyFix and FaceFastened systems — throughout the South-Central U.S., the company has updated its sales territories. 3A Composites USA recently added Nate German as sales manager for South Texas, Louisiana and Mississippi. German will focus his attention on meeting the unique needs of architects and fabricators throughout the region. Visit 3acompositesusa.com.

ToolWatch Rebrands to Align Technologies

After more than three decades in the construction technology space, construction software provider ToolWatch announced that it has rebranded to Align Technologies to better reflect the company's current capabilities and position it for future growth. Following a 2021 strategic investment by The Riverside Company, a global growth-oriented private equity firm, ToolWatch expanded into mobile safety and compliance with the addition of Safety Reports in 2022 and workforce management with the acquisition of busybusy in December 2023. By bringing these capabilities together, contractors can consolidate the management of assets, labor and safety tasks with a single technology partner and on a single platform. Align Technologies will serve as the parent company of both Safety Reports and busybusy. While the ToolWatch brand will be replaced by Align, Safety Reports and busybusy will remain in the market as part of the Align family of brands. Visit aligntech.co.

McCarthy Promotes Billy Naylor to SVP, National Safety



Billy Naylor

McCarthy Holdings Inc. (McCarthy), one of the nation's largest commercial construction companies, announced the promotion of Billy Naylor to senior vice president (SVP), national safety. In this role, he will oversee the implementation of McCarthy's national safety program, including all company policies and procedures regarding safety. He will replace retiring SVP, national safety, Kevin Maitland. Naylor joined McCarthy in 2006 and has nearly 30 years of construction experience. Prior to his promotion, he was VP, safety, for the southern region of McCarthy Building Companies Inc., providing leadership for the company's professional and skilled trade employees in Dallas, Houston and Atlanta. One of Naylor's significant impacts to McCarthy's safety approach has been helping shift away from a policy-driven safety program to the firm's current safety-based approach built on creating accountability and personal ownership, cultivating a true safety culture. While under Naylor's

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leadership, McCarthy's Southwest and Southern regions improved safety performance consistently year over year. Visit mccarthy.com.

Sage Acquires Bridgetown Software

Sage, a software provider for small and midsized businesses (SMBs) in the construction industry, announced the acquisition of Bridgetown Software, owner of BidMatrix — a cloud-native bid analysis tool for the construction industry. This is Sage's second acquisition in the construction sector within a year. The acquisition of BidMatrix aligns with Sage's strategy to transform Sage Estimating into a cloud-native solution. It combines the powerful features and efficiency of Sage Estimating with the collaborative and scalable capabilities of the BidMatrix cloud native platform. This combination will improve productivity for small and medium-sized construction businesses by simplifying processes, removing uncertainties, and helping them secure more projects at the right price with greater confidence. This deal brings Sage Estimating and BidMatrix together, bridging the gap currently felt by estimators today. Sage and BidMatrix will continue to work with third-party preconstruction/estimating tools, offering customers the freedom to opt for the optimum blend of Sage and third-party solutions that best suit their needs. Visit sage.com.

Paul Martzke Named Recipient of 2024 Wisconsin Titan 100



Paul Martzke

Paul Martzke, president of Immel Construction, was a recipient of the 2024 Wisconsin Titan 100. The Titan 100 program recognizes Wisconsin's Top 100 CEOs and C-level executives. Martzke is an architect who leads a construction firm. He worked as a general contractor for over 15 years with Immel Construction. Martzke started his role in leadership by directing projects for clients like the University of Wisconsin and Door County's Cana Island Lighthouse. Shortly after, he took on the role as Immel's director of business development. Martzke transitioned into his current role as president of Immel Construction in 2020 and was instrumental in Immel's evolution to a 100% employee-owned company, creating an atmosphere of ownership and teamwork. In 2023, Paul led Immel to their highest sales year, generating $135 million in revenue. Serving as the 2023 president of the Associated General Contractors of Wisconsin and as a previous president for American Institute of Architects Wisconsin, he is believed to be the only professional in the state of Wisconsin to have achieved both accolades. Visit. immelconstruction.com.

Pacific West Environmental & Infrastructure Unveils New Brand Identity

Pacific West Environmental & Infrastructure, formerly known as Pacific West LLC, is launching a new brand and new messaging to reflect its enhanced capabilities and expanded service area. Pacific West has merged with Eagle Remediation & Demolition (Fort Worth and San Antonio) and Overley's and Hawkke (Phoenix). The combined Pacific West Environmental & Infrastructure substantially expands the capabilities and geographic coverage to serve customers. This merger brings together three specialty industrial and environmental services contractors with hub locations strategically located throughout the Western U.S. The leadership and project teams will all remain in place in the combined company. Pacific West Environmental & Infrastructure offers a wide range of contracting services to clients in the transportation, construction, industrial, utility, consulting engineering and government sectors. It provides industrial and civil infrastructure construction, environmental remediation, environmental drilling, trenchless piping installation, 24/7 emergency response assistance industrial services, and ongoing maintenance services from facilities strategically located throughout the Western U.S. Visit pwenviro.com.

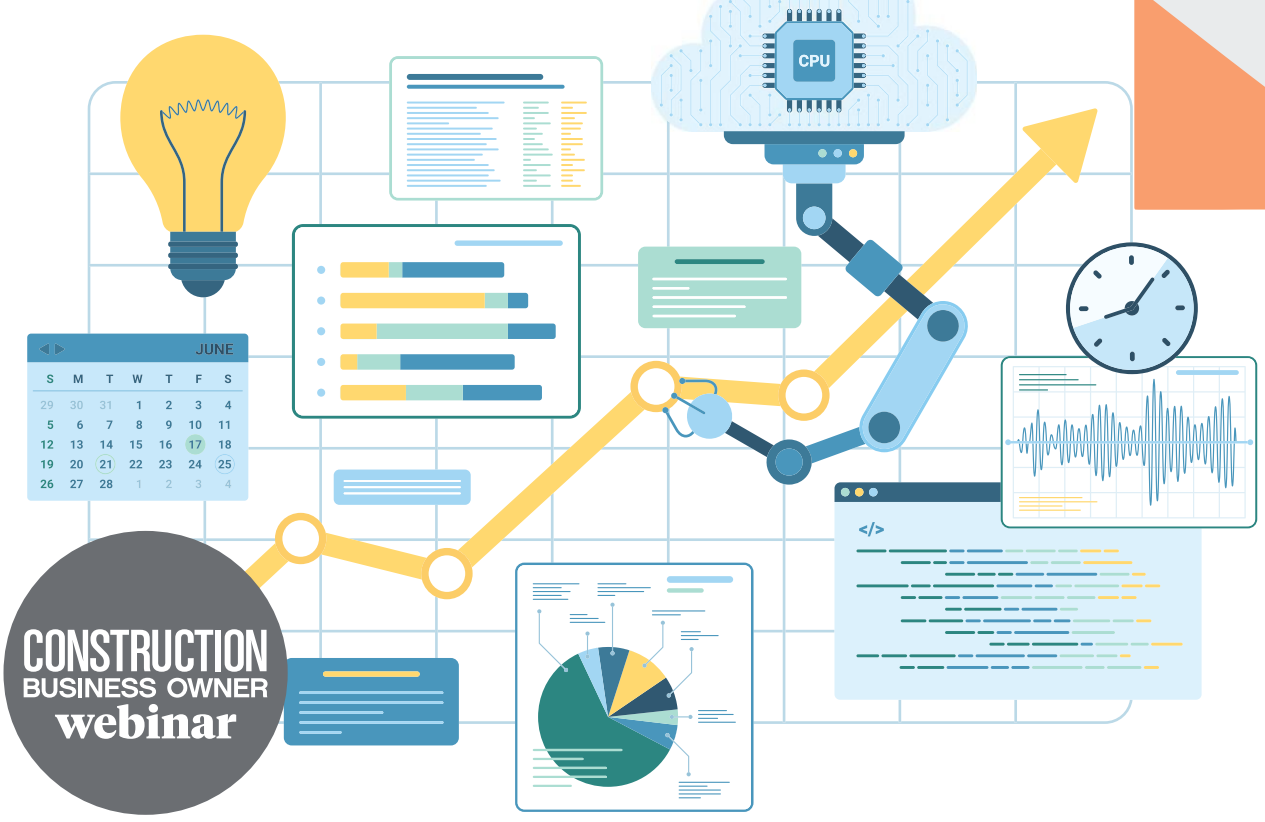
Stephanie Schmidt-Lehmann Joins ABC as EVP of Industry Relations & Member Value



Stephanie Schmidt-Lehmann

Associated Builders and Contractors (ABC) announced Stephanie Schmidt-Lehmann, 2022 chair of the ABC board of directors and former president of Poole Anderson Construction, State College, Pennsylvania, has been named EVP of industry relations and member value. In this role, Schmidt-Lehmann will bring leadership, vision and strategic thinking to ensure the association delivers on its value proposition for its 68 chapters, 22,000 member companies and the overall construction industry. Schmidt-Lehmann will develop programs and services that help ABC members win and deliver work safely, ethically and profitably while creating and deploying an effective business development strategy. She will lead ABC's communications, events, strategic partners, member services and marketing teams as well as its inclusion, diversity and merit initiatives. At Poole Anderson, she was responsible for formulating the strategic direction and oversight of day-to-day company performance, servicing sectors such as higher education, health care, hospitality and multifamily residential. Schmidt-Lehmann was named one of Construction Business Owner's Outstanding Women in Construction in 2021. Visit abc.org.

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CONSTRUCTION BUSINESS OWNER webinar

Accelerating Your Month-End Close with *Financial Automation*

FREE • March 28, 2024 • 1 p.m. CST

Closing the books can be a time-intensive task for construction finance teams. It might take days of detailed work, cause backlogs on other projects, and unearth errors that have to be corrected. In this presentation, BILL will share tips for closing the books faster, including how you can automate some of the tedious tasks that slow you down. Plus, you'll get a helpful checklist to make sure you're ready for a thorough, thoughtful and accelerated month-end process.

In this webinar, you will learn:

- What roadblocks you may face as you close the books
- Steps to follow for a faster closing process
- How a checklist can save you time and headaches

SPEAKER



Haley Eckels
Sr. Marketing Manager, BILL

Haley Eckels is a Senior Content Marketing Manager at BILL. Her background includes thought leadership work on webinars, white papers, ebooks, and other materials to help small and mid-size businesses understand financial automation, spend management, and the latest best practices in financial management. She focuses on the needs of the construction industry, understanding the unique challenges you face and how you interact with financial technology to make your business more efficient.

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Coaching Through Connection: Establishing Healthy Confrontation

Steps & strategies to hold your workers accountable



GEORGE HEDLEY, CPBC, is a professional construction business coach, consultant and popular speaker. He helps contractors to build better businesses; grow, profit, develop management teams; improve field production and get their companies to work. He is the bestselling author of "Get Your Construction Business To Always Make A Profit!" (available on amazon.com). Email Hedley at gh@hardhatbizcoach.com to sign up for his free e-newsletter, start a personalized BIZCOACH program, attend his educational webinars, watch his YouTube channel, download online courses or utilize his contractor templates. Visit hardhatbizcoach.com for more information.

Just Ask George.

Send your questions for Hedley to Managing Editor Carmen Capoccia at ccapoccia@cahabamedia.com.

Many managers, supervisors and employees always have excuses for not completing tasks on time. A lot of leaders struggle with holding people accountable. They are often afraid if they're too tough by demanding accountability, their people will resist and potentially quit their positions. They ask me what consequences they should impose on employees to force them to be accountable. But you can't force people to do something. They decide if, when and how diligently they will work on an activity or responsibility. When you tell your direct reports you are going to hold them accountable to finish this activity on time or on budget, they think: "What if I don't perform? I'm not sure I can get it done on time with all my other priorities. What are the consequences if I'm late? Is this a threat? Or what?"

Accountability requires strength. It may require you to confront employees about their lack of performance, and then deal with their reactions to your observations, comments or accusations. Most everyone wants to be accountable, do a good job and be successful. Therefore, holding someone accountable is a result of you caring about their success,. As a company owner or leader, it's important for you to hold people accountable to hit their goals, complete projects on time and achieve results.

Unfortunately, too many people associate accountability in a negative, restrictive or constraining way. They don't want to be held accountable as it may lead to unfriendly conversations, pointing out flaws, or uncovering weaknesses which have prevented them from achieving desired results.

Holding people accountable is an act of caring versus reprimanding or admonishing poor performance. When you care about people and their success, your approach to holding them accountable changes in a way that helps them. The weaknesses which are uncovered can be addressed and improved. This allows for an opportunity to learn and try new strategies and ideas to achieve success. Holding people accountable is about identifying and strengthening challenges to allow them to perform and hit their goals.

The No. 1 reason people aren't accountable to perform tasks is a lack of understanding the goals, expectations or required deadlines. When they don't know exactly what's expected, people are being paid to guess what to work on and how to do it. When they clearly know the specific measurable objectives, targets and processes, they'll feel confident and work diligently to achieve the expected results.

ACCTP: Accountability Plan

A - Accountability Starts With You!

Your people watch you. You are the model of behavior you exhibit, and therefore influence others to follow your lead. If you don't do what you say you'll do or don't follow company standards and systems, they won't think they have to do them.

- First, you must be accountable, hold yourself accountable, hold people accountable, and never tolerate poor performance or lack of accountability.
- You are accountable for holding

employees accountable to achieve results. You provide positive input, coaching and mentorship. And, when they don't perform, you realize and accept the fact that you haven't performed either.

C — Clear Expectations

- Determine and define clear expectations and measurable results each person is responsible for accomplishing.
- Define and document clear measurables, targets, goals, and results. Establish the specific deadlines, timelines and milestones. A timeline explains the step-by-step milestones or phases to complete the project and a deadline defines when everything is due and must be completed. Develop an action plan to accomplish the expected results. Define the level of authority for financial decisions. Set check-in and follow-up meeting dates.
- Agree on priorities and the expected level of effort. Remember that each accountability has only one owner. Assign who owns the accountability and is responsible to perform whatever's required to complete the work and achieve the expected result.

To make sure you have clearly communicated expectations, ask: Do you clearly understand the objective, target and commitment? How did you interpret what we just agreed to? To be sure we are on the same page, please explain your commitment and expected results.

Never assume they know what you want. Make sure you both are clear on the objectives and outcomes.

C - Commitment Goes Two-Ways

- Get buy-in and a two-way written commitment to perform, achieve the goals and produce results. Agree on ownership — who owns the accountability and is expected to perform and solve all requirements and problems associated with the activity. Team members are accountable to make decisions and complete the work on their own. The manager's job is not to do the work or solve workers' problems but rather to offer advice or suggestions. Ask them to provide solutions for how they can solve their challenges. Explain why their goals are important to the overall success of the company. Plus explain any incentives or consequences when they succeed or fail. Ask direct reports how they want to be managed.
- Develop and agree on an action performance plan with detailed steps and plans to monitor and measure progress. Always set and confirm the dates for regular check-in meetings.

T - Track, Follow Up, Monitor, Measure Results and Provide Feedback

- Make sure you have clearly defined accountabilities and agree on the specific results expected.
- Set specific times to meet, monitor, review progress and evaluate results.
- Keep an open line of communication of the progress, timelines and results to track the action items. Don't micromanage your direct reports. Provide positive feedback and regularly review progress and results as soon as available. Discuss progress and actual versus expected results in a clear and honest manner based on facts. Let them know where they stand and provide regular open, positive and honest feedback on performance and progress.
- Check in weekly, at every milestone or phase to evaluate progress. Ask inquiring questions like: How's your project going? Are you moving forward and progressing well? Where are you at this point? Do you need any help to achieve your goal? What's your opinion of your results and performance?
- When poor progress occurs, focus on the behavior and how they can improve. Follow up immediately, and confront when not in conformance with commitments. Provide support, training and constructive input when needed. Provide regular praise and recognize positive performance. Discuss how their results impact the overall project or company.
- Remember, the manager's job is to make sure team members have the resources, knowledge and assistance they need to achieve their goals and objectives.

P — Performance (Enforce and Hold People Accountable For Results)

- Proactively address and correct poor performance as soon as possible in a respectful, one-on-one basis. Never confront in front of others.
- Determine the basic cause of an employee's poor performance, and remember it's not always the lack of effort or responsibility. The issue might be: lack of skill, training or knowledge; lack of confidence or ability to communicate misunderstandings; workload and unclear priorities; or the manager's temperament, distrust, respect, treatment or attitude.
- Stay in touch. When they don't perform, ask: Do you understand what the assignment was? What was your understanding of what you agreed to do? What can I expect from you the next time you commit to perform or meet deadlines?
- Link performance to the consequences or incentives which will be in effect. Remind them of their commitment to perform. Think like a coach and mentor to develop an action improvement plan if required. Agree on a check-in follow-up plan for future commitments.

The choice is yours. You be accountable and hold your people accountable, or you can continue to expect and receive poor results. ▲

Do Not Pass Go; Do Not Collect $200 for Your Change Order

Migrating from a traditional classroom to interactive collaboration



GREGG M. SCHOPPMAN is a partner at 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.

Many organizations are realizing that their labor crisis — availability of capable and qualified associates — will not be solved by passivity in the marketplace. Construction leaders are consistently reminded that education and training are needed to adequately develop their teams. Firms that do not make this a priority lose their high performers, only exacerbating a fragile situation. Training and development takes many forms. Two of the most common are external, independent programs (i.e., project management programs, negotiation programs, etc.), and the other are internal, bespoke programs that provide customized solutions by creating content around a firm's infrastructure, culture and unique internal situations. Both are excellent talent development solutions, and depending on the needs of the organization, both provide nuggets that any associate can apply to their situation. However, there are other options and applications that progressive leaders are utilizing to drive deeper and impactful learning and "stickiness."

Best-of-class organizations are finding a balance of "classroom"-style training and education coupled with collaborative game-style settings that allow interaction, conversation and "aha" moments that are achieved through doing.

Scenarios & Role Playing

Education and learning are different when it comes to adults compared to traditional adolescent teaching. For instance, we often think of learning multiplication tables and the repetition that comes with mastering arithmetic. Furthermore, some students learn visually while others learn auditorily. Adults tend to learn more through sharing and experiential learning, also known as kinesthetic learning. In fact, for some, the message or theme only sinks in by doing. There is an opportunity for firms to better leverage their training investment through experiential modules and scenarios that simulate a real-world setting. Consider the following role-playing exercises that leadership can create and use to drive themes:

- *Customer management* — A customer who has particular nuances or pet peeves has asked the contractor to build a project. Armed with the list of preferences both ordinary and peculiar, a small team must develop a "go-to-market" project delivery plan to drive superior customer satisfaction.
- *Errors and omissions* — Assuming a contractor has access to a small set of drawings that might have significant errors and complications, teams are assigned to do a rudimentary takeoff, preconstruction strategy or closeout strategy. Put another way, the teams

are charged with conducting an Easter egg hunt, challenging them to identify problems and execute proactive solutions.

- *Conflict resolution* — Leadership plays the role of "agitator" while small teams of managers and supervisors are tasked with being the "resolver." Situations like unforeseen change orders, conflicting scopes, staffing/manpower and missed deadlines are all "playacted."
- *Getting dirty* — While more applicable to a trade contractor (or those with the available space) co-mingled teams of managers and tradespeople actually build something similar to a mockup. In addition to seeing how things get built, associates can be graded on quality and installation best practices. This is common in many trade schools or technical programs.
- *Technology leverage* — For service contractors, there is an opportunity to utilize short videos that are generated on a service call. For example, an HVAC contractor or roofing contractor can take a simple 30-to-60-second video of an actual system or existing condition. Those videos would then be shown to a group of technicians, simply asking them to triage what they see or make observations about what they see in the video. A minute-long video of an existing roof might show that bird paths on the roof have created pooling of stormwater, cracked mastic or simply unsealed penetrations. The lead technician can then outline what was actually done and the real-time solution.

Arguments against these training concepts or any of these ideas relative to talent development, range from cost — for both the trainers and the trainees — to spatial limitations, particularly for the mockup creation. While these concerns are realistic, it is important to consider the impact of not training, which manifests itself in things like employee attrition, mistakes or rework in the field, and lost market share.


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Internal Subject Matter Expertise

There are certainly subjects that necessitate external knowledge or thought leadership. However, some of the smartest people are within the four walls of your business. Sure, they may not be trained teachers, but there are opportunities for internal subject matters experts to showcase and utilize. For instance, consider a vertical building general contractor that usually has activities ranging from site work to electrical systems. What if the firm were to assign "majors" to the various managers, asking them to "get smart" on those specific aspects of the business? This might include developing a cheat sheet, or top 10 considerations when you are doing the phases of an electrical system or site work package. It might also include learning about the types of mechanical systems and pros/cons to installing a chilled water system versus a split-package HVAC system. This is not to replace the trade contractor partners in the market but to provide deeper walking-around knowledge.

A firm might also do similar thought leadership with finance, risk, legal or scheduling. In addition to asking internal experts to become the point person for questions and opinions, these associates might conduct small lunch-and-learns for colleagues. The primary difference between the traditional classroom training described previously and this is the fact that the teacher is a peer. This allows a safe place to practice presentations while allowing the ultimate in customization for the firm.

Almost everyone would agree that training and education are important, but urgent items often become the five-alarm blaze that takes priority. One solution that may aid in prioritizing training and education is the creation of a master calendar. Just as firms establish an annual meeting cadence that ranges from staff meetings, operations meetings and the holiday parties, training sessions are earmarked on that same calendar. This provides everyone an opportunity to plan ahead and work around these important events. Ultimately, training and education is migrating from not only important but urgent strategic initiatives to win the war for superior talent. ▲

Strategic Cost Estimation for Contractors in 2024

Overcoming challenges for profitable projects



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As we navigate the complexities of the construction industry in 2024, the ability to provide accurate cost estimations remains the cornerstone of a contractor's success. The art of cost estimation is fraught with complexities and often undermined by factors that were either overlooked or impossible to predict. Nonetheless, the importance of developing a precise cost estimate cannot be overstated. It is the foundation upon which a profitable project is built, serving as a road map for resource allocation, risk assessment and financial planning. Contractors face the dual challenge of maintaining competitive pricing while ensuring profitability. As we navigate through 2024, contractors should consider the critical components of labor, material and indirect costs, exploring the challenges they present and the strategies to formulate estimates that pave the way for successful and profitable projects.

Labor Costs

Labor costs often represent one of the most significant expenses in construction projects. Estimating them accurately is challenging due to skilled labor shortages, wage fluctuations and varying productivity levels. These issues can lead to either overestimating, which makes bids less competitive, or underestimating, which eats into profits. The scarcity of skilled workers is pushing wages up, and contractors must find ways to prepare for these changes to remain competitive and profitable. The following list shows challenges contractors face and need to consider when estimating labor costs.

1. *Skilled labor shortage* — This is not new to contractors anymore. The lack of skilled labor has been an ongoing issue and will always be the biggest challenge. The construction industry faces a severe shortage of skilled labor due to an aging workforce and fewer young people entering the trades. This shortage can increase wages as contractors compete to attract and retain qualified workers, driving up labor costs. Due to the skilled labor shortage, less experienced laborers could be put on a job, resulting in more labor hours. The contractors should review skilled laborers' abilities and how they would impact each project.
2. *Increased demand for construction* — With a growing population and the need for infrastructure development, there is an increased demand for construction services. This demand can create a competitive labor market in which wages are driven higher, especially for specialized skills in short supply.
3. *Productivity challenges* — Despite technological advances, construction productivity has not increased as quickly as other industries. The physical nature of the work, the complexity of projects and the variability of site conditions can limit productivity gains, meaning that more labor hours may be required to complete a project, inflating costs.
4. *Regulatory changes* — Governments may introduce new regulations regarding wages, benefits and working conditions, which can impact labor costs. Changes to minimum wage laws, health and safety requirements, or apprenticeship programs can increase the cost of labor.
5. *Inflationary pressures* — General inflation

affects the cost of living, which puts upward pressure on wages as workers seek to maintain their purchasing power. Many hope that inflation will be stopped or slow down in 2024, but the reality is that contractors must factor these pressures into their cost estimations to ensure that wage estimates remain realistic over the project's duration.

Wages are expected to experience upward pressure in 2024, and the skilled labor shortage will not be soon resolved. Contractors should review and evaluate their current labor resources quantitatively and qualitatively and incorporate them into cost estimates.

Material Costs

In the past few years, changes in material costs have made it difficult for many contractors to achieve the profit they anticipated when they won the bid. The pricing of construction materials is subject to a complex interplay of global supply chains, economic trends and environmental factors, making it a critical and volatile aspect of project planning. Material costs are subject to myriad external influences, from global economic conditions to local supply chain disruptions. The past few years have taught contractors that materials can become unexpectedly costly or scarce, throwing off even the most meticulous estimates.

Contractors should expect material costs in 2024 to continue fluctuating, with a general trend toward higher prices due to increased demand for construction and potential supply chain uncertainties. These fluctuations can significantly impact the cost estimates for new projects, making it challenging for contractors to submit competitive and accurate bids. As contractors prepare to enter new bids for work, it's crucial to develop strategies to cope with unstable material prices.

1. *Market research and analysis* — Stay abreast of industry trends and market analyses to anticipate shifts in material costs. Subscribe to construction market intelligence reports and communicate with suppliers to get insights into potential price changes.
2. *Flexible pricing models* — Use flexible pricing models in bids that allow for adjustments in material costs. Include escalation clauses in contracts that specify how price adjustments will be handled if material costs increase beyond a certain point.
3. *Supplier relationships* — Build strong relationships with multiple suppliers to increase negotiating power and ensure access to the best prices. Long-term contracts with suppliers can lock in prices or provide more predictable pricing structures.
4. *Bulk purchasing and stockpiling* — When feasible, purchase materials in bulk or ahead of time to lock in lower prices, especially for materials that are known to be volatile. However, be cautious of the risks associated with overstocking, such as storage costs and potential material waste.
5. *Hedging strategies* — For large projects with long timelines, explore hedging strategies to mitigate the risk of price increases for critical materials.
6. *Regular review and update* — Review and update estimates throughout the project life cycle to reflect any changes in material costs.

Unstable material costs are a significant challenge, but with careful planning, contractors can prepare their project estimations to accommodate these uncertainties. As the market continues to change, staying flexible and informed will be vital to navigating the complexities of material pricing in construction projects.

Indirect Costs

Indirect costs, such as project management, administrative support, equipment rental and utilities, are often harder to pin down but just as crucial to a project's financial health. These costs can slip through the cracks, leading to budget overruns. It is essential to monitor indirect costs and accurately estimate factors that impact the project cost.

- Conduct a thorough review of past projects to identify recurring indirect expenses.
- Apply a systematic approach to allocate indirect costs proportionally across projects.
- Keep abreast of changes in the cost of equipment and services that could impact overhead.
- Ensure that project managers are trained in financial management and cost control techniques.

Due to inflation and increased interest rates, the cost of doing business has grown. Contractors should consider the economy in general to see how it will impact their business. For example, insurance companies started pulling out of high-risk states, such as California and Florida. Contractors in these states will likely experience increased insurance costs due to fewer available insurers. The cost of doing business will grow. Contractors should be aware of the anticipated cost changes in overhead and plan accordingly.

Accurate cost estimation remains complex, with labor, material and indirect costs presenting their own challenges. However, by leveraging historical insights, embracing technological advancements and fostering strategic relationships, contractors can create sophisticated estimates that reflect the realities of the market. In doing so, they safeguard their anticipated profits and enhance their reputation for reliability and financial acumen. The future of construction may be uncertain, but with strategic cost estimation, contractors can navigate this uncertainty and steer their projects toward success and profitability. ▲

Transforming US Health Care

A look at the rise of hospital infrastructure & modernization updates



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The U.S. boasts a robust health care infrastructure, consisting of over 6,000 hospitals and thousands of small clinics, offering more than a million hospital beds to patients. This infrastructure encompasses a variety of important elements, such as advanced research labs, cutting-edge technology and a wide range of medical equipment. America's hospital infrastructure is designed and expected to function under a daunting array of circumstances, including providing services 24 hours per day, seven days a week, and meeting continually evolving federal quality and safety standards.

For over 50 years, the federal government has been providing funds for the continuous modernization of the country's health care infrastructure. This is because of the critical nature of citizens' needs. The funding support ensures sustainability, and health care facilities are a vital component of the country's economic development. In fact, hospitals and health systems are economic anchors that support one 1 of every 9 jobs in the U.S. and provide more than $1 trillion annually to the nation's gross domestic product (GDP) in goods and services.

The 2021 American Rescue Plan Act allocated $1 trillion to construct, renovate and modernize health care facilities. That same year, the Build Back Better Act provided another $10 billion for projects related to health care facilities. Funding is still available for health care projects, and there is a deadline looming in 2024, which will see hundreds of projects launched.

In Texas, leaders are investing heavily in mental health care, and one of the first initiatives will be the construction of a new North Texas State Hospital in Wichita Falls. The project is estimated to cost $452 million, with $300 million allocated for construction and $152 million for the demolition of an old structure. Currently in the planning phase, construction is scheduled to begin in the summer of 2024.

The effort is part of a larger statewide initiative that includes plans to construct additional new hospitals in Amarillo and Lubbock and replace a hospital in Terrell.

The University of Utah will be responsible for overseeing the construction of a medical campus aimed at addressing the health care needs of residents in Salt Lake Valley. This project will be the biggest capital project ever undertaken in or near West Valley City, costing $855 million. The medical campus will consist of a multispecialty outpatient health center, an emergency building and a hospital facility. A state bond has provided financial support for the project. However, to combat rising construction costs, the university officials plan to break the project into phases. The first phase will focus on building the multispecialty health center, which will offer primary care services and specialized services. This phase will begin in 2024, and the entire medical campus is scheduled to be completed in 2027.

Michigan State University and Henry Ford Health are working together to construct a $393 million medical research center as a part of a $3 billion


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development in Detroit's New Center. The eight-story research lab, covering an area of 325,000 square feet, will be close to the Henry Ford Hospital and will serve as a hub for basic and translational health research. It will house a diverse partnership of health professionals and will include wet bench laboratories, core labs, a vivarium, and meeting areas for research in cancer and health disparities. The research center will also dedicate an entire floor to a top-of-the-line neurofibromatosis research institute. Construction is expected to start in May 2024, with a projected completion date in 2027, according to officials from Michigan State University and Henry Ford Health.

In October of 2023, officials at the Texas Health and Human Services Commission (HHSC) announced that an investment of $120 million would be used to renovate an aging treatment center into a state-of-the-art inpatient psychiatric facility in Harlingen, Texas. The upgraded treatment center will serve patients in need of treatments related to intellectual or behavioral disabilities. The existing center will be renovated to include a new 50-bed treatment annex to provide inpatient services. The project will also call for upgraded security and state-of-the-art therapeutic spaces. This project's planning and design phase began in October 2023 and continue through early summer 2024. Construction is slated for late summer 2024, with completion scheduled for 2027.

Two new psychiatric hospitals are set to be constructed in Kansas and Alabama to extend mental health services and reduce wait times for patients. The first facility will be built in the south-central region of Kansas in Sedgwick County, with $55 million in funding committed to the project. The 50-bed hospital will be designed to accommodate up to 100 beds and will either modify an existing structure or construct an entirely new facility. The project is currently in the design phase, with the hope of acquiring the required property by the end of January.

The second facility will be located in Lee County, Alabama, and will have 40 short-term mental health patient beds and nine long-term care adolescent beds. The hospital will also relocate the psychiatric care department and 6-12 grade school for long-term adolescent patients to a freestanding building. Lee County officials recently approved the use of $4 million in federal funds for planning and construction. In 2021, approximately 500 patients were turned away due to a lack of space. The total cost of the project is estimated at around $29 million, with construction scheduled to begin in the spring of 2024.

Medical facility projects are complex undertakings that require a wide range of industry expertise, including architecture, engineering, construction and health care management. In addition, these projects involve a significant investment in state-of-the-art equipment, cutting-edge technology, and advanced security systems to ensure the highest levels of patient care and safety. If you are interested in learning more about upcoming construction for medical facility projects in the United States, I recommend reaching out to your state health and human service agencies to gather more information and resources. They can provide you with the latest updates on new developments, regulations and funding opportunities in this field. ▲

Solving the Pricing Puzzle

How to stay competitive while maintaining profitability

BY PETER LOUCKS

Through working closely with fence contractors, general contractors and dealers over the years, I've seen one issue come up repeatedly for construction business owners: getting the balance between pricing and profitability right. You must remain competitive in the market while still offering prices accessible enough for your customer base. You need to pass rising costs onto your clientele to stay profitable, but you can't afford to alienate those same folks. How does anyone successfully achieve this delicate balance?

Fortunately, there are ways. If you've felt the squeeze of increasing expenses, extended lead times and slow permitting, while fielding calls from customers who are disgruntled about your pricing changes, you're not alone. Here are six proven ways to stay competitive while maintaining profitability — and keeping your customers happy.

1. Account for Eventual Price Increases Early & Often

One of the worst ways a contractor or dealer can operate in the construction industry is with blinders on. Sometimes, this looks like ill-founded optimism. You're hoping the market will right itself, so you just keep going with the day-to-day, believing everything will sort itself out. Other times, this is simply in the form of ignorance. Maybe your specialty is fencing and shutters, but you've never run your own business before. You don't know what it takes to achieve profitability. Neither option ever pans out well.

Instead of these scenarios, go into your projects with your eyes wide open. Recognize that you, as a business owner, are going to face your own price increases. The question is when, not if. Plan ahead for these bumps in expenses and set the expectation that you will also have to raise your own prices in order to maintain your margins. Accepting that this is the nature of the business goes a long way in keeping you aware and prepared.

Along the same lines, realize that a homeowner or business owner typically considers the price you include in a contract to be a fixed price. Sure, you can try to get around this by including a qualifying statement about the possibility of material price increases. But your customer will still likely believe the price you've quoted is the price they will pay. As such, it's critical you think ahead and account for potential price increases in the quotes and contracts you send out. That way, your customer isn't going to be surprised — and upset — by hikes later.

2. Lock in Material Costs at the Time of Contracting

Delays are another reality in the construction world that can make achieving profitability difficult. When you have long lead times and permitting processes, you can easily end up in a situation where your material cost has increased from the time of your contract to the time of installation.

In addition to factoring the potential increases into your original quote and contract, you should take further steps to mitigate this risk. The best way? Lock in your material cost at the time of contracting by purchasing and storing the material. Or, if you're not able to do that, at least make a deposit to hold your pricing. Good cash flow management like this can help you lock in higher profits and avoid the problems that come when material costs spike dramatically because of delays and long permitting processes.

3. Keep an Eye on General Market Conditions

In a perfect world, you'd be able to access a magic formula that would help you forecast the future of the industry with precision. In the real world, there is no such thing. Even so, this doesn't mean you should avoid forecasting altogether; it just means you need to approach it a different way.

First, pay attention to what's going on in the economy at large. What's happening with the cost of living in your area? In the nation? What's going on in the housing market? How has the price of oil (e.g., the price of gas at the pump) changed recently, or is it expected to change? Any of these factors can be indicators of potential cost increases across the board.

Second, tap into trusted industry resources. For example, if steel is one of

the materials you use the most in your projects, there are analysts and economic authorities that regularly project where steel costs may be heading in the near future. You can't get guarantees this way, but it can offer a window into informed insights so you have a rough idea of what to expect.

4. Protect the Customer Relationship

One of the most critical parts of the pricing puzzle is ensuring you keep your relationships with your customers intact. Raise prices too significantly, and you're bound to lose customers. Raise prices too often and your client base is going to get irritated, if not downright angry. Raise prices haphazardly, and your customers won't trust you.

As mentioned previously, the best way to protect your relationships with your customers is by factoring in projected rising costs prior to signing a contract. This way, you reduce the odds you'll have to raise prices after you've already agreed to terms.

Another way to help customers is by giving them a window of time to lock in orders before you increase prices. If you know increases are coming down the line and will affect your own expenditures within three months, for instance, then you can give your customers a heads up and offer them a chance to place an order at the existing price in the next month. This is a gesture of goodwill and can genuinely help your customers better manage their own finances.

5. Ask Your Vendors Outright

Some contractors don't think about this, but it's perfectly acceptable and encouraged to ask your vendors if they expect impending price hikes. Sometimes, they may not know. But oftentimes, they'll have an idea of what's coming down the road. If you just ask, you'll have a much better shot of properly planning your own purchasing and pricing, rather than being unpleasantly surprised.



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6. Buy in Bulk

Last, but not least, have you considered placing bulk orders? While cash flow doesn't always allow for this, the cost of certain hardware items utilized for fence and/or shutter installations, as an example, can be reduced significantly by buying in case quantities rather than on a job-by-job basis. This approach requires good inventory and cash flow management but will add profit to every job. Given that small to midsize contractors do more than 100 jobs per year, this can add up to significant dollars.

Final Thoughts

No one in the construction industry has a crystal ball about material costs and other factors that impact how you have to set your pricing. But you don't need to know the future in order to set fair prices that protect your customer relationships and keep you both profitable and competitive.

If you remember that price increases will happen, factor them in before contracts are signed, watch the market, put your customers first, ask for information and consider buying in bulk, you'll be well on your way to mastering the balance between pricing, profitability and pleasing your customers. ▲

Peter Loucks is a visionary leader of AMD Supply with a proven track record of success in the aluminum manufacturing industry. With 18 years as president of AMD Supply, he has led the company from startup to industry leader, shaping its direction and vision for growth. Visit amdaluminum.com.



Navigating Heat-Related Safety

Using Florida's safety legislation to prioritize worker protection

BY ANGELO FILIPPI

In my capacity as a labor and employment defense attorney specializing in Florida's bustling construction sector, I am acutely aware of the persistent challenges associated with ensuring workplace safety, particularly during the scorching summer months that pose significant risks to workers. My primary objective is to assist clients in understanding and complying with the stringent regulations set forth by the Occupational Safety and Health Administration (OSHA), guiding them to implement comprehensive safety protocols and strategies.

Understanding OSHA Guidelines for Florida Employers

Compliance with the OSHA Heat Illness Prevention guidelines is not only crucial but also a legal requirement for all employers in Florida. These guidelines encompass a range of safety measures, including the provision of water, shaded rest areas and mandatory breaks for workers. Equally vital is the implementation of comprehensive training programs aimed at educating employees about the early signs of heat-related illnesses, fostering a culture of awareness and preparedness within the workforce. Additionally, the introduction of acclimatization systems to help employees gradually adapt to working in high-temperature environments is considered an essential precautionary measure.

Insights Into Miami-Dade County's Legislative Measures

An ongoing development in Miami-Dade County highlights the urgency for stricter adherence to safety standards within the construction industry. The proposed bill, if enacted, would necessitate construction and agriculture companies with a staff of five or more employees to enforce stringent measures to prevent heat-related illnesses. Notably, these measures include the provision of accessible water sources and shaded rest areas for workers when the temperature exceeds 90 degrees. The bill also emphasizes the need for comprehensive employee training on recognizing the symptoms of heat illness and the appropriate steps to take in emergency situations. However, concerns regarding the potential financial penalties for noncompliance have sparked significant debate and prompted a comprehensive review of operational practices within the industry.

Navigating Safety Challenges

Despite the complexity of the new regulatory landscape, there is an urgent need for employers to prioritize the implementation of proactive safety measures. This involves meticulous hazard assessments to identify potential risks and developing tailored mitigation strategies to ensure the well-being of the workforce. Furthermore, a thorough review of existing policies and procedures to ensure alignment with OSHA guidelines is essential in mitigating the risk of legal entanglements and penalties.

Empowering the Workforce for Enhanced Safety

A cornerstone of fostering a culture of safety within the workplace is the empowerment of employees through comprehensive education and training. Providing robust training sessions focused on identifying the warning signs associated with heat-related illnesses is crucial in enhancing the workforce's preparedness and their ability to respond swiftly and effectively in the event of emergencies. Moreover, cultivating an environment that encourages open communication and the proactive reporting of safety concerns is instrumental in creating a robust safety culture within the organization.

Utilizing Legal Counsel to Enact Proactive Measures

In my role as a labor and employment defense attorney, my primary objective is to provide clients with comprehensive guidance to navigate the evolving regulatory landscape effectively. By fostering a deep understanding of OSHA's expectations and requirements, I aim to assist employers in developing and implementing proactive safety measures tailored to their specific operational needs. Through this approach, businesses can effectively safeguard their workforce, mitigate the risk of costly penalties and legal disputes, and foster a safe and productive work environment.

Together, my clients and I develop a plan of action to protect the businesses' bottom line, which includes:

- *Ensuring compliance with* OSHA — Develop procedures for adherence to the OSHA Heat Illness Prevention guidelines, including providing access to water, shaded rest areas and mandatory breaks for employees, as well as implementing comprehensive training programs for recognizing heat-related illnesses.
- *Risk assessment and mitigation* — Conduct thorough hazard assessments to identify potential risks associated with excessive heat exposure and develop tailored mitigation strategies to safeguard the workforce.
- *Policy review and alignment* — Conduct a comprehensive review of existing policies and procedures to ensure alignment with OSHA regulations.

- *Employee training* — Provide comprehensive training for employees to recognize early signs of heat-related illnesses, and empower them to respond effectively in emergencies.
- *Establish communication and reporting procedures* — Foster a culture of open communication and proactive reporting of safety concerns within the organization, encouraging employees to voice their apprehensions and ensuring prompt resolution of issues.

By incorporating these steps into their operational practices, employers can significantly mitigate the risks associated with workplace safety, ensuring the well-being of their workforce and maintaining a safe and productive work environment.

Be Prepared for Litigation

Utilizing a comprehensive legal firm that integrates its labor and employment defense practice with a dedicated team equipped to handle workers' compensation claims and potential legal issues — such as negligent supervision and premises liability — can offer significant advantages for businesses. By having access to a cohesive legal team with expertise in multiple areas, employers can benefit from a streamlined and holistic approach to managing potential legal challenges that may arise in the context of workplace safety. This integrated approach not only ensures comprehensive protection for the organization but also facilitates a more efficient and coordinated response to any legal issues that may arise, thereby minimizing the risk of potential liabilities and safeguarding the company's overall interests. Additionally, this approach fosters a more proactive stance toward mitigating potential legal risks, enabling businesses to create a robust and sustainable framework for maintaining a safe and secure work environment.

In Florida's dynamic construction industry, ensuring the safety and well-being of the workforce is nonnegotiable. By prioritizing the implementation of robust safety protocols and fostering a culture of vigilance, employers can effectively mitigate risks, ensure compliance with regulatory standards, and cultivate a secure environment. ▲

Angelo Filippi, a seasoned attorney in OSHA and labor law, is a pivotal partner at Kelley Kronenberg, a multi-practice firm with 16 offices and 200-plus attorneys. His role contributes to the firm's cross-disciplinary approach, offering innovative legal solutions across more than 25 practice areas. Visit kelleykronenberg.com.



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Uncovering the Construction Industry's Opioid Crisis

Understanding the factors underlying substance misuse & how employers can address it

BY CAL BEYER

The Centers for Disease Control and Prevention (CDC) reports the number of overdose deaths in the U.S. has more than doubled in the past five years. Over 105,000 Americans died from all overdoses in calendar year 2022, and approximately 70% of all overdose deaths in the U.S. are attributed to opioids. Almost 70% of all opioid deaths are due to synthetics, especially fentanyl.

For more than two decades, the U.S. has felt the impact of this epidemic. Overdose deaths inflict a toll on families, workplaces, communities and the national economy. The opioid crisis impacts every socioeconomic class and demographic in the country. Every year, a portion of working-aged adults and youth is lost to overdoses. Nationally, the age group most affected by overdoses is those aged between 25-34 years. Males account for 71% and females comprise 29% of all overdose deaths.

A recent CDC report confirmed the construction and extraction industries have been hit hard by the opioid crisis. The report, released on Aug. 22, 2023, is titled "Drug Overdose Mortality by Usual Occupation and Industry: 46 U.S. States and New York City, 2020." The construction and extraction industries had the highest rate of overdose deaths in 2020 the first year of the pandemic.

This is the first time there has been national data highlighting the impact d on industry groups and occupations. The rate per 100,000 workers was reported as 162.6 per 100,000 workers. Isolating the construction industry from the extraction industry, the rate falls to a lower level of 130.9 per 100,000 workers. This number is almost three times higher than the rate of suicide for the construction industry reported as 45.3 per 100,000 workers.

Musculoskeletal Injuries Contribute to Opioid Use

A major contributing factor for opioids in construction stems from the high frequency of musculoskeletal injuries affecting construction workers. The Center for Construction Research and Training (CPWR) highlights approximately 34% of construction workers have at least one musculoskeletal disorder — which can lead to opioid prescriptions.

Despite opioid prescriptions declining for 13 consecutive years, prescription medications for on- and off-the-job injuries continue to be source of new persistent opioid use in construction. "In Waging a Counterattack Against Opioids in the Workplace & at Home," the increased frequency of opioid prescriptions among construction workers is highlighted. Moreover, prescription doses tend to be 20% stronger and for 20% longer durations.

Action Steps for Construction Leaders

There is a need for urgent and focused action to address the impact of substances leading to overdoses.

1. Initiate a discussion among the company's leadership team to intentionally break down stigma associated with substance misuse and substance use disorders. Discuss the operational and financial toll substance misuse has on the company and its workforce. The National Safety Council's employer substance use cost calculator is an effective tool at quickly looking at the effects substance misuse has to the company and on the workforce.
2. National nonprofit SAFE Project (Stop the Addiction Fatality Epidemic) uses the No Shame Pledge form as a means of breaking stigma associated with substance misuse. Company leaders are increasingly signing and posting the No Shame Pledge at company locations and on social media to encourage employees to seek support for themselves and family members.
3. Identify resources and services available to employees and family members seeking support for substance misuse addiction treatment and recovery. This includes understanding the resources and services available from a company- or union-sponsored employee health benefits programs, including the employee assistance program (EAP).

An increasing number of companies are sharing information about recovery programs, including 12-step programs, like Alcoholics Anonymous (aa.org) and Narcotics Anonymous (na.org). SMART



Photo Credit: Adobe Stock

Recovery is another option, which stands for Self-Management and Recovery Training (smartrecovery.org).

The US Substance Abuse Mental Health Service Administration (SAMHSA) operates a National Helpline. Calling 800-662-HELP (4357) is a free, confidential, 24/7, 365-day-a-year treatment referral and information service (in English and Spanish) for individuals and families facing mental and/or substance use disorders.

4. Review Worker's Compensation injury reports to identify operations and work practices with high potential for musculoskeletal injuries. Double-down on injury prevention to reduce the frequency and severity of soft tissue sprain and strain injuries.
5. Provide basic education on opioids in toolbox talks or in conjunction with daily safety huddles on risks of opioids. Teach employees about the availability of alternative non-opioid pain management medications. Reinforce the importance of everyone becoming an advocate for themselves and their family members scheduled for any medical, surgical or dental procedures to minimize unnecessary exposure to opioids.

The Center for Construction Research and Training (CPWR) has compiled various resources that can help with developing supervisory and employee education. One such resource is the "Workplace Guidelines to Prevent Opioid and Substance Abuse for the Construction Trades," which provides a deep understanding of how opioids and substance misuse impact construction.

6. Consider distributing at-home drug deactivation and disposal products to employees in conjunction with an education program on opioid risks. Drug deactivation products help properly dispose of leftover opioid pills after prescriptions for on- and off-the-job injuries and surgeries. Research shows 90% of patients receiving pain medication do not properly dispose of the leftover pills. This increases the household risk of overdose deaths due to the diversion of the leftover pills.
7. Consider the benefits of stocking naloxone (Narcan) in your workplace and projects/jobsites. The US Food and Drug Administration (DFA) approved two naloxone products in 2023 for over-the-counter use: Narcan on March 29 and RiVive on Aug. 3. It is important to understand the Good Samaritan and naloxone access laws that exist in the state in which you are considering stocking naloxone. The Legislative Policy Analysis and Public Policy Association (LAPPA) and SAFE Project have compiled updates for both these topics. ▲

Cal Beyer, CWP, is a long-time national advocate for workplace mental health, substance misuse, suicide prevention, and opioid risk reduction and overdose prevention. This grew out of his work on human capital risk management and worker well-being. Since 2016, he has served as a member of the Editorial Advisory Board for Construction Business Owner. He is a strategic partner with SAFE Project (Stop the Addiction Fatality Epidemic). He serves on the Executive Committee of the National Action Alliance for Suicide Prevention, and advisory boards for the Suicide Prevention Resource Center, Goldfinch Health, MindWise Innovations and Youturn Health. Reach Beyer at cal.beyer@gmail.com or 651-307-7883.



Picture This: The Rise of Visual Intelligence

Construction cameras & AI solutions yield unprecedented insights

BY CHANDLER MCCORMACK

For decades, leaders across all industries have used photos to see, understand and act upon insights appropriately. However, today's artificial intelligence (AI)-enhanced construction cameras provide a level of insight and awareness that was previously unattainable.

Yet the information within an image isn't always so evident. While technology has rapidly evolved, many data points within a photo remain untouched and unexplored.

While many industries have focused on facial recognition through image analytics, and artificial intelligence systems can now generate images with just a few prompts, actually unlocking the mountain of information in a photo is still a challenge.

- How do you understand what's happening in one snapshot of time?
- How do you reveal the history of that time?
- How do you begin to see the circumstances behind the photo?

In the construction industry, photo documentation is a natural and deeply embedded part of the job. General contractors, owners and developers all have a need for visibility so they can take the right actions at the right time. But what was once just a form of recordkeeping is now a crucial part of managing, monitoring and marketing jobsite success.

Clear Visuals Are a Timeless Solution

Before high-speed internet, plugging into the jobsite was exceptionally limited. Webcam views could only offer a 320-by-240 video stream, but this view was, and still remains, essential. When construction begins, sharing information doesn't stop with just the team on-site. General contractors must coordinate with architects and engineers. Developers need to set schedule expectations for investors. Owners need to ensure their investment is secure.

In the late 1990s, the challenge for visibility was about sharing live visuals clearly and quickly. Dial-up connections reigned supreme, a dreaded option that clogged phone lines and took substantial time to transmit. Images would load pixel by pixel, line by line, excruciatingly slowly. Construction camera providers had to build out servers and call lines so that instead of turning off phone lines for a few hours, construction teams could find a camera service provider that could buffer the data through a 1-800 line.

When the first construction cameras came online in the early 2000s, it was an attempt to deliver real-time information to jobsite stakeholders, fast. It was a way in which to finally "keep the record straight." It was also the beginning of automating documentation. Images included metadata, a key piece of information that sourced the date and time of a photo's creation, automatically.

Construction professionals could review jobsite changes and filter those changes by date and time. Now, photos could be tied together to create time-lapses of progress. In 30 seconds, clients could see the history of their jobsite in detail.

But metadata was easy to change or remove entirely. Simply saving an image from one camera to another computer desktop could wipe out the photo's digital history. The data tied to images still lacked significant context: What was the weather like throughout the day? What else could be pulled out of an image and used to make decisions? What did images contain that wasn't easy to see on the surface?

By 2012, construction cameras grew from a silent sentry on the jobsite to a key piece of a functional project management system. Cameras:

- Made it easy to access one or more projects from anywhere and on any device.
- Delivered unbiased, unfiltered documentation to mitigate risk and rework.
- Shared real-time project status to all team members.

As computer and cellular systems advanced, so did the camera. Technology began to help unravel the data points within every image.

Weather data and precipitation levels were time-stamped and marked appropriately. Optical zoom became a powerful means of exploring detail on a live camera feed. Simply being able to click into a project and understand what was happening over the last day, week, month or entire life cycle of the work, was game-changing. Changes within a camera were driven by megapixel optimization, video stabilization, advanced zoom and robotic control from all devices.

What was important by the late 2010s was maintaining sharp, ultra-clear insight into the jobsite's progress. Camera providers began to find ways to fix literal visibility issues, such as dirt on the lens, or a view that had become tilted. It was important to deliver construction cameras that clients could "set and forget," focusing only on seeing the real-time details of a job come to life on their screens.

Then the pandemic hit.

AI Adds Breakthrough Management Control

Visibility shifted from being about understanding day-to-day construction progress to understanding what was happening across the country. At OxBlue, we started our journey into using artificial intelligence to manage our own internal support service. It was important to give our clients peace of mind that camera management was under control by their trusted provider.

A construction camera typically captures 25,000 images over the year that it is positioned on-site. Those image collections, partnered with artificial intelligence, turned the construction camera from a device for decision-making into a tool offering invaluable context for reflecting and improving in the future.

The camera, in addition to the AI solution, created an invisible force, a level of engagement akin to having the whole team on-site at all times. Real-time vision removed the need for waiting for quarterly reports to assess the impact of the pandemic on the construction industry; the images, bolstered by AI, showed where there were slowdowns and where activity was spiking.

Artificial intelligence began to unravel the context within jobsite images and videos. Activity data came first, then safety information regarding hard hats and high-visibility vests. A more complete picture started to emerge. Now, clients could see the correlation between labor hours and weather hazards. AI could "review" images and pinpoint the objects within them. Instead of sifting through months and years worth of data to understand how often equipment was being used, or which teams were more operationally efficient — AI could serve information on a platter, in an easy-to-read format.

This type of photo review by AI is still relatively new. While Google Images came to life in 2001 due to Jennifer Lopez's infamous green dress, the search giant can't use those images to tell you how many people were in attendance to see her, or how long they stayed for her red-carpet walk. Other, recent innovations, like DALL-E, are focused on serving up information based on a user's query, rather than compiling that photo information on your behalf.

Construction cameras with artificial intelligence can now provide a level of insight that is impossible to achieve single-handedly. It becomes easier to answer big questions:

- What factors are driving delays on the job?
- Where are resources being underutilized?
- Are my suppliers fulfilling their promises?
- When and where did our equipment arrive?
- Did last weekend's storm impact progress?
- Are things going according to plan?

The Evolution of Camera Images Is the Evolution of Efficiency

AI has revealed data that allows general contractors, owners and developers to monitor the day-to-day with ease, but it provides context and insight.

Now, images aren't a matter of seeing a snapshot of time, but part of weaving together the circumstances behind the photo. Photos could be used to check in on progress, but they are now a source for driving change. Visibility is valuable on its own, but understanding alongside that visibility is what will determine the future.

By consistently measuring site actions and activity over time, industry professionals have access to deep insight that will inform future planning. Cameras can now be a measure of "stress testing" for the unexpected.

What does it mean now that you can see that while Team A can deliver a final product in record time, they also have more safety violations than Team B, which consistently delivers a week past deadline? How different is life on the jobsite knowing that equipment rentals only have a utilization of 30% over a span of a few days, instead of the assumption that they were needed 100% of the time? Understanding what key conditions look like, or what consistently gets in the way, means knowing how fast your team can turn things around, or what needs to be avoided in the future. These data points can all be essential diagnostic tools for what changes need to be made.

We've Only Scratched the Surface

AI is still in its infancy. But even so, what's happening today is promising. Construction teams can now know if there is low activity on-site; they can monitor if safety concerns have passed a certain threshold and require attention. AI can even look for motion and send an alert to a security team to dispatch authorities.

The full potential of AI is yet to be released, and cameras with this technology can already:

- Quickly verify jobsite activity, equipment delivery and material use.
- Report findings that highlight when something on-site needs your attention.
- Support compliance of evolving safety, health and regulatory standards.

While there is more to come, we know one thing for certain: this consistent collection of data will help us all understand how to create consistent results, and do so more efficiently than ever before. ▲

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5 Influential Voices in Sustainability

Sustainable methods of building and the strategies that shape them continue to stimulate change across the built environment. As the practice of sustainability becomes more prominent, it gains a stronger foothold throughout the construction industry and drives the transformation of both local and global business operations in many areas, including:

- Industry and infrastructure
- Clean energy, water and sanitation
- Recycling and responsible consumption and production
- Protection of climate, wildlife and waterways
- Sustainable cities and communities
- Green building and LEED efforts
- Humanitarian efforts (poverty, hunger, equality, health, wellness, education, employment)

In this section, Construction Business Owner (CBO) Magazine spotlights this year's Sustainability VIP finalists, whose efforts and ingenuity are building a better future. Selected from a group of peer-submitted nominations, CBO's Sustainability VIPs are industry professionals who have developed or supported initiatives within their companies to advance these areas of sustainability and others.





SAMUEL ASHLEY JR.

President | Cunningham-Limp

Most construction companies wouldn't accept a project with a 10-year-plus timeline. But when Japanese Solderless Terminals (JST) approached Michigan-based Cunningham-Limp with a grand vision of a campus that preserved the surrounding forest, the company couldn't say no, said President Samuel Ashley Jr. The campus is now the most sustainable construction site in Michigan, according to Ashley.

"A client sold the land to JST, and passed the project information on to us because they were confident that our company would be able to build exactly what they wanted," Ashley said. "It was 2015 when we actually sat down for our first meeting."

The site is a "newer forest" in that it was planted and grown in the last 40 years, but JST took into consideration everything from the original indigenous community (the Potawatomi Tribe) to the watershed to animal and insect behavior.

"JST's goal was to maintain and advance the natural ecosystem. That means for us, carefully carving out the main driveways, preserving as many trees as possible while selectively removing trees and reclaiming as much timber as possible," Ashley explained.

The six-building campus is seven years into development, with one building complete, a second about 50% complete, a third and fourth with foundations laid and the final two still in the design phase. Construction has been underway for about three years, and Ashley estimates there is 2 1/2 to three years left in the project. The buildings are primarily built from wood so that they blend into the forest surrounding them.

The COVID-19 pandemic caused some headaches for the project, notably in sourcing timber and other commodities. While materials costs soared, Ashley also had to contend with the Japan-based JST leadership no longer being able to visit the site when the world shut down.

"They used to come every two months," Ashley said. "There were many days we were doing video walkthroughs with them to show the site's progress and answer questions."

Ashley said he gives JST a lot of credit for sticking with the project through the crisis.

The site has required a lot of education in the surrounding community, with many calling it "that weird project off [Interstate] 696."

"They would ask me, 'What is this?' And I said, 'I can't really explain it, but I can show you,'" Ashley said. He now leads tours of the site every Friday for anyone who has questions, this includes group of university students majoring in construction, environmental science and more. Ashley said the local school system has added some trade classes, and he hope to be able to extend the tours to high school students in those classes.

That goes along with changes Ashley would like to see in the construction industry and sustainable practices within it, Ashley wants to see more education of younger generations.

"We have a substantial emerging skills gap right now," Ashley said. "Let's focus on those high school and college students. I think we lost the opportunity to attract a lot of talented people to our industry [and] there are people about to retire with 40-plus years of knowledge and experience. There's a big difference in 40 years and three years. If you want to see change, then those with a lot of experience need to step up and share with the next generation. … [Education] is probably one of the easiest and one of the best ways for people to get involved."



ALYSSA JAKSICH

Chief of Staff & Head of ESG | Bernhard

If college-age Alyssa Jaksich, Bernhard's chief of staff and head of ESG, heard her motto for life today, she would have laughed.

"One of my college volleyball coaches always used the phrase, 'Don't just talk about it, be about it.' He would usually say it in a goofy voice, and we'd use it jokingly to lovingly mock him," she said. "But I think it's stuck with me for more reasons than just being catchy and fun to say. It reminds me that actions speak louder than words. Showing is arguably more impactful than telling."

That advice, Jaksich said, has been especially relevant for her journey with environmental, social and governance (ESG) issues in the construction industry. After college, Jaksich landed with Bernhard's measurement and verification team, quantifying energy savings generated for customers through the company's projects. She also worked on energy-as-a-service initiatives.

Over time, Jaksich was offered an opportunity to move into an executive fellow role under Bernhard CEO Ed Tinsley. This led to her being tasked to form and launch Bernhard's ESG team, which officially launched in 2021 with a focus on measuring and reducing the company's carbon footprint and growing the diversity, equity and inclusion (DE&I) program.

"When I was first approached about creating our ESG program, I was actually a bit hesitant," she said. "I'm never one to make an uninformed decision, so naturally I dove into the details and researched as much as I could on what ESG really was and what it could mean for Bernhard. I realized that I didn't just want Bernhard to launch an ESG program, but I wanted to be the one doing it, the one responsible for challenging our company culture to move forward."

Since the launch of the ESG program, Jaksich has taken the motto 'be about it' to heart. The company has deployed compensation measures to offset Scope 1, Scope 2 and select Scope 3 greenhouse gases, with an ultimate goal of becoming a net-zero carbon company. In addition, the company launched Bernhard Leans In, a cultural initiative aimed at making employees feel more empowered to achieve their personal and professional goals while building new connections and creating a more united company. While Lean In was initially an initiative targeted at women in the workplace, Bernhard has extended the program to all employees.

"Our program centers around a network of small groups called "Lean In Circles" that can be created and led by any Bernhard employee," Jaksich explained. "Lean In Circles are welcoming, supportive spaces focused on inspiring discussion, education and connection, and are backed by step-by-step guides to help Circle members get the most out of every meeting. Circles are formed around a common thread, from the unique issues faced by minorities in leadership roles to challenges the LGBTQ+ community may face in and outside of work."

While Bernhard's leadership has been supportive of Jaksich's initiatives, she said that there are some slow adopters.

"I think a lot of employees have so much on their plate already, so these new ESG programs are viewed as optional or less important than their core job functions," Jaksich said. Overcoming these hurdles involves education and demonstrating how the programs align with the work they are doing.

Widespread adoption of ESG in the construction industry is another hurdle, she said, emphasizing that consumer demand for better practices is likely to lead the charge.

"While government and large corporations may have the most influence to ultimately drive large-scale change, I would still emphasize stakeholder demand. Whether as an employee or a customer, there's power in your opinion. I think it's important to voice what's important to you," she said.



TOMMY LINSTROTH

Founder & CEO | Green Badger

Tommy Linstroth started his career in real estate development with a company that committed to sustainable building practices. This company handled everything from historic building renovations to affordable housing to the first Leadership in Energy and Environmental Design (LEED)-certified McDonald's in 2005.

During this time, the Savannah, Georgia-based entrepreneur realized that a lot of construction projects require manual processes and "spreadsheet after spreadsheet after spreadsheet."

"I wanted to make my own life easier and was not finding a solution," Linstroth said. "I decided to launch Green Badger to automate that process and make those headaches go away."

Founded in 2014, Green Badger is a software-as-a-service (SaaS) company that helps automate LEED and environmental, social and governance (ESG) efforts in the construction industry. The company has also added other third-party certifications in recent years, including FitWell, Living Building Challenge and WELL. The company helped 1,600 projects meet their LEED goals, from small offices to remodeling airport.

Those 1,600 projects have turned into another initiative for Linstroth and Green Badger — planting more than 16,000 trees. In partnership with One Tree Planted, Green Badger plants 10 trees for every project they bring on. The latest planting is focusing on revitalizing areas of California ravaged by wildfires.

"We're working to do our own part to reduce and offset any emissions," Linstroth said. "We felt that making tree planting part of every project we bring on board is an outward sign that shows our partners that it's important to us, and we're going to continue to do it."

Linstroth hopes that automating LEED efforts in construction helps create buildings and structures that last well into the future.

"Buildings are around for a long time, decades if not hundreds of years. The residual impact they have if not building them correctly is just huge. It's a pressing global need to have more sustainable buildings," Linstroth explained. "It's a contractual obligation [in most cases] … So we're there at the implementation level to help [contractors] meet their project goals. … "Every year you maximize the life of a building reduces its overall impact."

But buildings don't last forever, particularly in coastal areas like Savannah. Making sure older buildings are deconstructed safely and sustainably is another passion for Linstroth. He is on the board of directors for Re:Purpose Savannah, a nonprofit that deconstructs old buildings and reuses as much material as possible in new construction.

"It's not the typical process where you come in with a front-end loader and knock the building down and throw the whole thing away," Linstroth explained. "We come in and pull out the 100-year-old framing lumber and put it in our shop yard to resell it."

These reused materials have less embodied carbon than newer materials, and this process keeps construction materials out of landfills.

"It's a fantastic example of hands-on sustainability," Linstroth said.

For business owners looking to implement LEED and ESG strategies into their business, Linstroth said simply, "take your time."

"It's not going to happen overnight. Think about it like you would any other business strategy," Linstroth explained. "Come up with an implementation plan and take it in steps or phases, and it'll give you a much higher likelihood of success."



LIBBY PRITCHARD

Director of Occupational Health, Safety & Sustainability | National Sand, Stone & Gravel Association

Libby Pritchard, Director of Occupational Health, Safety & Sustainability at the National Sand, Stone & Gravel Association (NSSGA), has a bachelor's degree in environmental science and two master's degrees: one in water policy and management, and one in geography. It was while writing her theses for those degrees that she was introduced to aggregates.

"I ended up becoming completely fascinated by it. It was this commodity that I didn't event know existed," Pritchard said. "I didn't fully understand it or recognize the impact that it had on my daily life."

The Oregon native grew up with a love of nature. But, she said, she also likes to look for win-win scenarios. Aggregate and reclamation "just clicked" when she realized how much aggregates are used to build and add amenities to communities.

"My first love of sustainability is reclamation and specifically enhancement. It's more than your basic slope and pit. When you're finished extracting, you turn it into something else, kind of like upcycling," Pritchard said.

Prior to her role with NSSGA, Pritchard put those degrees to use with a quarry, helping with reclamation planning. The quarry was on farmland, and the surrounding neighborhood enjoyed the views of the undeveloped land. In the rezoning talks, Pritchard said, the company came in with a reclamation plan in place, but more importantly, Pritchard and her colleagues went out to the community and got their input.

"We talked to our neighbors … at times that worked for them. We would go to their homes and visit with them. We invited them to come to our facility," she said. "I think the biggest thing we did was bring in a landscape architect to draw up examples of what the view would look like. … We showed them different options, asked, 'Do you want these kinds of trees, these kinds of bushes?' Things like that go a long way in that planning and processing."

In her current role with NSSGA, Pritchard has added another hat and another passion: occupational health and safety. She works with the association's member companies on questions they have on health and safety plans, with a focus on new OSHA regulations for mining operations. She also leads the workforce development team trying to address the workforce challenges in the aggregates industry. Pritchard said that health and safety initiatives go hand-in-hand with sustainability efforts.

"If you have healthier people, you're going to have better businesses, and those better businesses are going to be able to last for many years. It's not going to be a 'turn and burn' mentality," she said. "Safe, healthy employees are going to be able to be better mothers and fathers and more active in their communities. I think that, if you start with the person as the base [of your initiatives] it really spreads from there."

One initiative in the health and safety space Pritchard has championed in the post-pandemic years is the mental health of the workers in the mining industry. Mine workers were deemed essential during the height of the COVID-19 pandemic, and for those with children at home or spouses in health care, the mental load could become burdensome, Pritchard said.

"We started seeing a lot of accidents that were head scratchers. Why did they happen? You never know if it's distraction or fatigue or mental overload," she said. "You can't put a dollar on a life … Every single life is precious and meaningful across the board."

Pritchard said the industry still has a long way to go when it comes to the stigma of mental health, but she is seeing progress and will continue to champion efforts that treat the whole body of industry workers.



TODD USHER

Founder & Owner | Addison Homes

Todd Usher, founder and owner of Greenville, South Carolina-based Addison Homes, didn't start in construction. In fact, he started out in chemical manufacturing. That experience, though, set him on the path to building sustainable homes.

"The company was very driven by sustainability. Even in the '90s, they had a zero-landfill policy," Usher said. "The owner was a huge fan of trees. Every one of the manufacturing facilities was essentially a small arboretum. … It was very unusual for a large, multinational, privately held corporation to have such a focus on sustainability and environmental stewardship."

Usher fell in love with construction while managing rental properties fixing things for his tenants. He realized that building homes was something he wanted to do. When he was laid off from a different chemical company, he decided it was time to start that dream. That meant researching best practices in the industry, but Usher knew he wanted to focus on sustainability.

"I landed in the training course for a regional green building program out of Atlanta called Earth Craft House. That became [Addison Homes'] standard for construction. In 2002, we build our first Earth Craft House," he said.

Today, Addison Homes builds projects that are Zero Energy Ready with a focus on air quality, durability and sustainability.

"We don't focus on multimillion-dollar projects," Usher said. "We focus on projects that are more mainstream, reachable and affordable by more people today. … My business has always been how we can make sustainability more affordable."

There are challenges to building affordable, yet sustainable homes. The United States Department of Energy's "Zero Energy Ready" home standards require that all heating and cooling systems are within the insulated envelope of the home, meaning ductwork can't be run in a vented attic or crawlspace. It can be a challenge to fit everything into a home in a way that's aesthetically pleasing and beautiful to potential buyers.

"We just tried this new approach that involved a different design to our roof trusses to create an insulated envelope in the attic," Usher said. "We got to implementation, and it just didn't work. It was more expensive than we budgeted for. I was like, 'Wow, there must be a better way to do this.'"

Also among challenges facing the green home building space is labor. Addison Homes are built "two steps above code," Usher said, but finding skilled laborers and contractors that are willing, and know how, to go above the minimum requirements has been a "daily struggle."

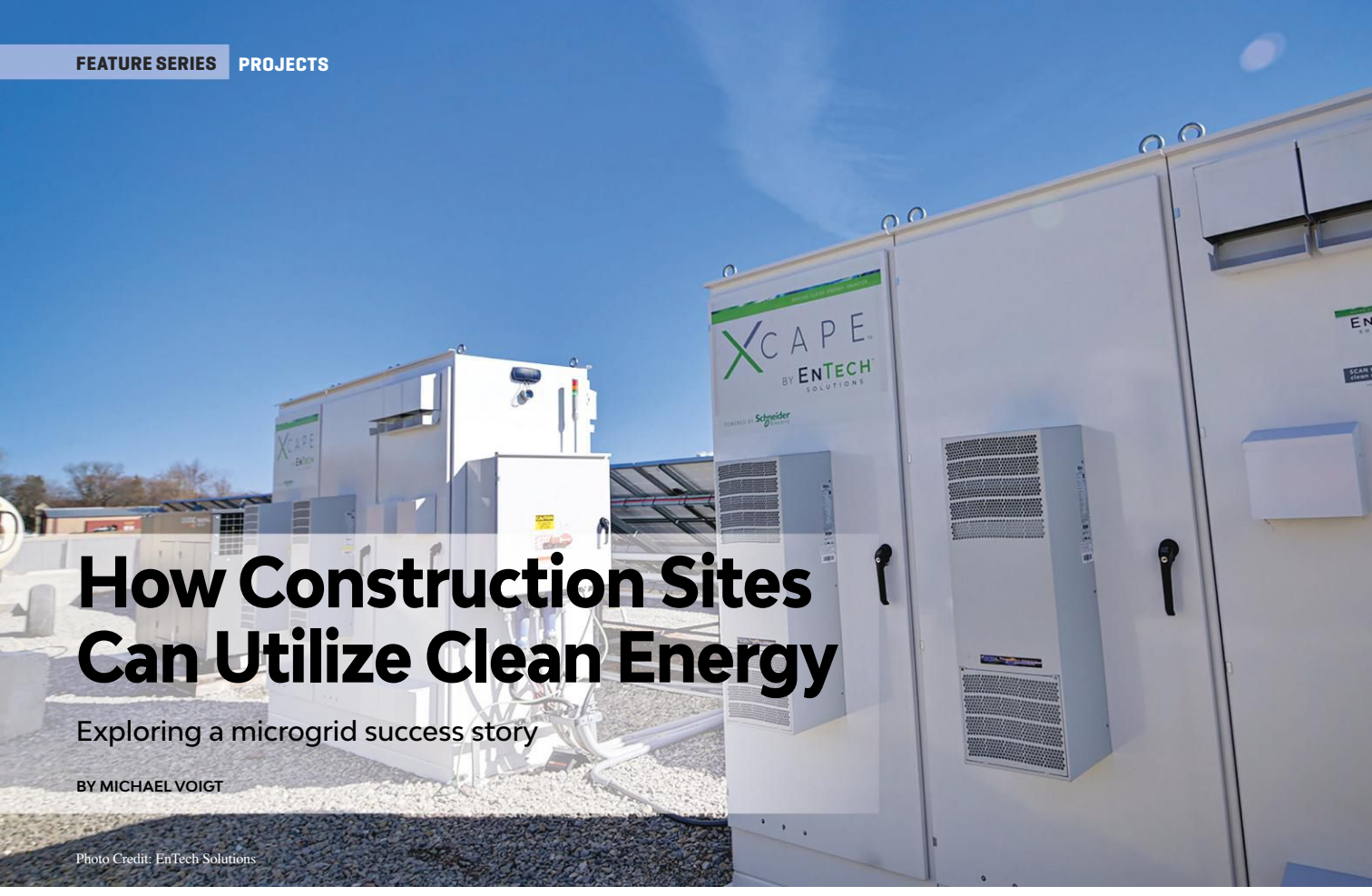
Usher received a Ph.D. in construction science from Clemson University in 2022, and outside of his work with Addison Homes, is a part-time professor in the Master of Real Estate Development program at Clemson University. He teaches construction materials and methods and contractor operations, with a focus on sustainability.

"It's fun. It keeps me in touch with the up-and-coming developers and constructors of the future," he said. "And eventually I'm able to convince them that there is a business case for practicing sustainable construction."

Usher also serves on the board of the Energy and Environmental Building Alliance, and in his spare time enjoys flying.

When it comes to building sustainable homes that are expected to last well into the future, Usher has one piece of advice: Don't settle for below your standards.

"It is worth it to remind yourself that, 'No, I've got a standard, this is the standard for our business, and we're not going to settle for anything less," he said.



How Construction Sites Can Utilize Clean Energy

Exploring a microgrid success story

BY MICHAEL VOIGT

Photo Credit: EnTech Solutions

The 2022 Global Status Report for Building and Construction reports that the buildings and construction industry represents an estimated 37% of global operational energy and process-related carbon dioxide (CO2) emissions.

As a construction business owner, it's important to recognize the growing need in the industry to reduce carbon emissions and minimize environmental impact. One of the most effective ways to achieve this goal is through integrating clean energy solutions at construction sites. Renewable energy plays an integral role in cost reduction, environmental protection and creating a sustainable future.

In Wisconsin, renewable energy was used to support the construction of a 210,000-square-foot cheese production factory, powering job trailers, site lighting, engine block heaters and power tools. How did this organization, a forward-thinking North American dairy leader, benefit from integrating clean energy into the construction process? What are the advantages of utilizing off-grid energy to power a construction jobsite?

Energy Solutions That Meet Industry Energy Goals

The first step in implementing clean energy on a construction project is to understand the energy requirements through an energy assessment. Complex project jobsites like this require significant electrical power to support work being completed by contractors and subcontractors. A determining factor in the renewable energy use on this build was the organization's significant environmental, social and governance (ESG) goals, including working toward a U.S. dairy industrywide goal to achieve net-zero emissions by 2050 or sooner.

Distributed Energy Resources

Understanding how much energy a jobsite requires to power the work that will take place over the lifetime of the construction project is critical to determining the best distributed energy resources (DERs) to use. Some common examples of DERs include solar, wind, battery storage and generators. If the goal is to be as close to net-zero as possible, as was the case with this organization, finding a DER solution that enables the achievement of that goal is paramount. Depending on the DERs used, the jobsite can be entirely off-grid or connected to the utility grid, used in tandem with utility power. For this project, the energy solutions were completely off-grid, which helped the customer meet their project deadlines due to the quick implementation of the resources.

Using a Microgrid to Power a Construction Site

Microgrids can combine the use of traditional power generation (e.g. fossil-fuel generators) and fully renewable power generation



(e.g. solar). On this construction site, two microgrids were installed by a Wisconsin-based clean energy solutions provider that harvested 40 kilowatts (kW) of solar power paired with 176 kilowatt-hours (kWh) of battery storage. The system was backed up by a 35kW propane-fueled generator. The entire system operated off-grid and powered two jobsite trailers, temporary lighting for the wastewater treatment plant, and charging of power tools and engine block heaters to keep the construction vehicles operational throughout the frigid Wisconsin winter.

A microgrid, like the one used on this project, is similar to a small power plant because it produces renewable energy on-site. Traditional electricity sources for jobsites, such as connecting to the utility or solely using generators, lack the benefits that microgrid technology can provide.

Microgrids can:

- Create an uninterruptible power supply.
- Save money on overall energy costs.
- Minimize greenhouse gas emissions into the environment.
- Provide reliable and rapid access to power.
- Offer real-time energy performance monitoring.

On this construction jobsite, utilizing microgrid technology prevented nearly 77,500 pounds of CO2 from being released into the atmosphere. That is equal to the amount of carbon captured by about 43 acres of forests.

Ahead of Schedule

While this client wanted the construction of its new facility to be as sustainable as possible to work toward its net-zero goals, there were other benefits to utilizing clean energy on this site as well. The jobsite could have been connected to the traditional power grid with the use of a temporary power connection; however, a connection of that size was not readily available and would have delayed the project by at least six months. Instead, the microgrid units were rapidly deployed and installed in under two weeks, keeping the project on schedule. Another benefit of using renewable energy with battery storage to power this microgrid was that it was reliable and eliminated power outage concerns.

Real-Time Monitoring

The jobsite's microgrid was equipped with real-time monitoring software, enabling the construction manager to view the amount of available solar power and battery capacity via a remote monitoring system. This also allowed the clean energy solutions provider to remotely calibrate the system for optimal energy use when and where needed throughout the duration of the project.

Some of the key benefits of real-time microgrid power monitoring at a jobsite include:

- *Remote monitoring and control* — Remote monitoring of your jobsite energy enables the ability to make adjustments and monitor usage from anywhere at any time.
- *Real-time monitoring capabilities* — With easy-to-use software, a microgrid can be precisely monitored for how much energy is being produced, how much is feeding the load and how much is being stored in the microgrid's battery system.
- *Predictability* — The microgrid provides analytics and data that will help track performance over time and plan for future energy needs.

Now Is the Time

The integration of clean energy solutions at construction sites can bring multiple advantages to the industry. This clean energy construction site project exemplifies how incorporating sustainable solutions can help construction companies thrive through significant cost savings, energy reliability and reduced environmental impact, boosting their reputation and securing more projects.

The construction industry stands at an exciting crossroads where innovation and sustainability intersect. This project highlights not only the practicality of renewable energy microgrids in construction but also its economic and environmental benefits. As the industry continues to evolve, clean energy solutions like microgrids are no longer a futuristic concept but a present-day reality. By embracing this trend, construction businesses can significantly reduce their carbon footprint and save money, while also appealing to clients that prioritize sustainability. The continued growth of construction companies that make renewable energy an integral part of their energy equation paves the way for a greener and more sustainable future for all. ▲

As a project development manager at EnTech Solutions, Michael Voigt works with customers to support various types of clean energy projects. This includes solutions that involve metering, efficiency improvements, energy generation and energy storage, determining which mix of solutions will provide the most value to customers. Voigt has a strong passion for renewable energy, electric vehicles, microgrids and science. Visit energybyentech.com.





Photo Credit: Develon

Cutting Heavy Equipment Fuel Use

Learn more about fuel management systems, auto idle & various power modes

BY JACOB SHERMAN

The cost of diesel fuel remains a primary concern for contractors in the construction industry. Fuel costs can constitute a significant portion of operational expenses, particularly on large projects or when equipment operates in less populated areas, requiring longer-distance fuel transportation.

The evolution of nonroad diesel engines has helped with fuel consumption, and manufacturers are also designing dozers, excavators, wheel loaders and articulated dump trucks (ADTs) with cutting-edge heavy construction equipment technologies. These include real-time fuel management systems, automatic engine start-and-stop features, and selectable power modes. These innovations can go beyond fuel saving and reduced emissions — they can also increase equipment longevity and improve efficiency.

Advancements in Technology

Newer technologies on construction equipment can help optimize fuel consumption and improve overall efficiency. Here are several technologies of importance.

Fuel Management Systems

Fuel management systems offer real-time monitoring capabilities, allowing you to track fuel consumption for each machine. You can use the live data to make informed decisions about equipment usage, maintenance schedules and operational practices. These monitoring systems generate detailed reports that break down fuel efficiency metrics, including information on fuel consumption patterns, high-consumption periods and locations of specific machines. They can also be configured to send alerts or notifications based on predefined thresholds. For example, if a machine's fuel consumption exceeds normal parameters, the system can automatically notify you and your dealer, prompting an investigation into such potential issues as fuel leaks or inefficient operation.

One major benefit is that fleet management systems often integrate with maintenance scheduling tools. This integration allows you to align fuel efficiency with preventive maintenance, ensuring the equipment operates at peak efficiency. Regular equipment maintenance helps prevent issues that can lead to increased fuel consumption.

In addition, fuel management solutions can help with operator training and accountability. By providing actionable insights into equipment fuel consumption and efficiency, they can help you encourage more responsible and fuel-conscious behavior, and contribute to cost savings.

Automatic Engine Start-&-Stop Systems

Also called idle management systems,

automatic engine start-and-stop systems are designed to optimize fuel consumption in heavy equipment by automatically managing engine idling. Engine idling is a significant contributor to fuel waste in the construction industry. These systems shut off the engine during periods when equipment is not actively working, such as during breaks, waiting times or temporary halts in operation. When the equipment is ready to resume work, the system starts the engine, so there is minimal disruption to workflow. The systems can be equipped with an option to override the automatic function in situations where continuous engine operation is needed.

In addition to saving fuel, auto idle can contribute to the overall health and longevity of heavy equipment. Reducing unnecessary idling minimizes the stress on the engine, contributing to extended service life and reducing maintenance costs.

Power Modes

Heavy machinery can be equipped with power modes, which are designed to balance power output and fuel efficiency to adapt to different working conditions. The eco, or economy, mode is geared toward optimizing fuel efficiency without compromising overall productivity. In this mode, the engine operates at lower revolutions per minute (rpm) to reduce fuel consumption during less demanding tasks or when maximum power is not needed. This is especially beneficial during periods of idling or with lighter workloads.

Proper training on how to use different modes helps maximize efficiency, extend equipment life and minimize fuel consumption. Your local equipment dealership can help make sure your construction equipment is outfitted with the right fuel-saving technologies.

Evolution of Engine Technologies

Today's diesel engines in construction equipment are very different from what was on the market even 10 years ago. The advancement from mechanical to electronically controlled engines has made diesel engines significantly more efficient. These systems continuously monitor and adjust various engine parameters in real time, optimizing performance based on the specific operating conditions while minimizing fuel emissions.

Loran McNally, with The A. Johnson Company in Vermont, gives a prime example. The company purchased a newer wheel loader equipped with a more sophisticated diesel engine and fuel systems, and it has reduced fuel consumption "easily by 50%," according to McNally.

The ongoing development of alternative technologies like hydrogen power and electric vehicles (EV) is becoming a popular trend. EVs operate solely on electric power, eliminating traditional fuel sources altogether, along with the reliance on aftertreatment systems in equipment. Electric equipment not only provides zero-emission operation at the point of use, but also contributes to lower overall energy consumption when the electricity is sourced from renewable or low-emission power generation.

The construction industry is increasingly exploring alternative power sources like hybrid technology, which combines traditional engines with electric power. Hybrid systems allow heavy equipment to operate more efficiently by leveraging electric power during periods of lower demand. For example, electric power may be used for lower-speed operations or during idle times, reducing the reliance on the combustion engine and resulting in significant fuel savings.

Autonomous technology is another notable trend that may lead to reduced fuel consumption because owners will have more control of the machine operation. And this technology can enhance safety by reducing the need for operators on high-risk jobsites. The remote monitoring and control can offer real-time insights into equipment performance and enable quick responses to any issues that may come up.

Autonomous technology is in the works for some equipment manufacturers, and companies are already testing ADTs, wheel loaders, dozers and excavators that can function without an operator in the cab. These machines will have the power to navigate through complex environments and perform a variety of tasks on their own, reducing the risk to employees on jobsites.

From advanced engine technologies and automatic engine start/stop systems to customizable power modes and sophisticated fuel management systems, you now have a diverse toolkit to optimize your equipment performance and reduce fuel consumption. ▲

TELEMATICS TECHNOLOGIES

Telematics systems are revolutionizing the construction industry by providing real-time insights for contractors, including the location, performance and usage patterns of heavy machinery. Telematics systems utilize GPS, sensors and data analytics. By leveraging this data, contractors can make informed decisions to streamline routes, reduce idle time and ultimately curtail fuel consumption.

Jacob Sherman is the dealer and product marketing manager at Develon. Sherman has over 20 years of experience in various aspects of the equipment industry, including sales, marketing and management. He has a bachelor's degree in aerospace administration/business and an MBA with a secondary focus in economics and finance. Visit na.develon-ce.com.




Photo Credit: Stallion Infrastructure Services

The Rise of AI-Enabled Mobile Monitoring Trailers in the Construction Industry

How advanced machine learning & analytics counter security risks & enhance operational productivity

BY CAMERON SIMON

Theft at construction sites is a growing crisis, with the National Equipment Register reporting losses amounting to billions of dollars annually. In an era where the prices of crucial materials like lumber and copper are at record highs, this issue poses a severe financial burden on business owners. The repercussions of such thefts extend beyond the direct loss of materials; they significantly disrupt the flow of operations, which can be detrimental to the overall budget.

To combat this challenge, a variety of security measures are being implemented. Among these, the use of CCTV systems and the deployment of 24-hour security guards are common. However, traditional CCTV systems, which have been more focused on internal site surveillance, often lack effective deterrent capabilities. This situation is transforming with the advent of mobile security trailers equipped with advanced artificial intelligence (AI). These trailers enhance the scope of site security and add significant operational efficiencies.

Compounding the challenge is a nationwide shortage of law enforcement officers, potentially leading to longer response times during emergencies. This reality places an even greater emphasis on the need for construction sites to strengthen their security strategies.

Elevating Site Safety With Advanced Technology

Mobile security trailers, previously a more common sight in retail parking lots, are increasingly being adopted in the construction sector. These trailers are equipped with high-definition cameras mounted on extendable masts and are typically solar-powered. Their design enables rapid deployment and easy repositioning in response to evolving security needs.

The introduction of sophisticated data analytics has revolutionized the functionality of these smart systems. This mirrors the trend in retail surveillance, where the focus has expanded to include monitoring external areas such as parking lots and access points, along with traditional in-store surveillance.

Advanced AI technology in these systems facilitates continuous, real-time monitoring of construction projects, staff, assets and the surrounding environment. These AI systems can identify specific threats — including the presence of weapons — and detect elements such as vehicles, people and motorcycles, as well as potential fire and smoke hazards.

Business Continuity

In the construction industry, the risk of theft, attacks or property damage is a significant concern. However, perhaps

more critical is the potential loss of operational uptime or business continuity. For example, a recent incident at a remote facility involved an attempted theft of electronic equipment worth over half a million dollars. The presence of AI-enabled security trailers prevented this theft.

Advanced analytics detected the intruder before he could enter the property. The virtual guard monitoring team, upon receiving the alert, coordinated with the on-site team to prevent theft, showcasing the efficacy of these systems in preventing crime and averting potential losses.

In the construction industry, the true value of such security measures extends beyond merely preventing theft. It's about managing project timelines effectively.

Preventive Measures: Strengthening Site Security Through Visual Deterrents

The deployment strategy of mobile security trailers differs markedly from traditional CCTV systems. These trailers are designed to be conspicuous, actively signaling their presence and monitoring capabilities. This approach aims to deter potential criminals, making them think twice before engaging in illicit activities.

Notable deterrent features of these trailers include motion-activated strobe lights and talk-down speakers that can issue warnings or announce that police or security have been alerted. Simultaneously, these trailers can relay alerts to a central monitoring center. Here, trained professionals can assess the situation in real time and decide on the appropriate course of action, which may vary depending on the specific needs of each facility.

Beyond their security role, these AI-equipped trailers offer operational benefits. They can, for instance, help manage congestion due to simultaneous deliveries or analyze activity patterns to optimize workflows. Some construction sites might also need additional monitoring for environmental hazards, spills or equipment malfunctions. These trailers serve not only for security purposes but also as an extra set of eyes and ears on the site.

These mobile units are also advantageous in terms of maintenance and support. Companies can rapidly replace trailers if maintenance issues arise, ensuring continuous operation. They conduct daily system checks, ensuring all components, including cameras and software infrastructure, are functioning optimally.

Connectivity is another critical aspect of these trailers. It's essential that they maintain constant communication, not just via a single cellular service but through multiple carriers and satellite connections for redundancy. This multifaceted connectivity approach allows for remote monitoring from any location, offering users access to their sites through secured portals.

The demand for robust security solutions in the construction industry is consistent, regardless of the economic climate. In prosperous times, companies invest in these systems to manage multiple projects efficiently, reducing the burden on staff. In contrast, during economic downturns, the increased risk of theft and equipment loss makes such security measures even more critical. Thus, addressing security concerns is an ongoing necessity for the construction industry, independent of market conditions. This persistent need underscores the importance of innovative and effective security solutions like mobile security trailers, equipped with advanced AI and analytics, to safeguard construction sites against the ever-present threat of theft and vandalism.

Moreover, the evolution of these security systems reflects a broader trend in technological advancement and its application in various industries. The construction industry, traditionally seen as slow in adopting new technologies, is now at the forefront of utilizing AI-driven solutions for ensuring safety and efficiency. The use of mobile security trailers is just one example of how the industry is adapting to modern challenges through technological innovation.

These mobile security solutions also represent a shift in the philosophy of site security. Instead of reactive measures that come into play after an incident has occurred, the focus is now on proactive surveillance that can deter potential threats and provide immediate response in case of any suspicious activity. This shift is critical in an industry where time is money, and any disruption can have cascading effects on project timelines and costs.

In addition to theft prevention and operational efficiency, these systems play a crucial role in ensuring the safety and well-being of the workforce. Construction sites are inherently hazardous, and the ability to monitor activities constantly helps in enforcing safety protocols and responding quickly to any accidents or emergencies.

The integration of AI-driven mobile security trailers in the construction industry represents a significant advancement in tackling the persistent issue of site theft and vandalism. These systems not only provide effective security measures but also contribute to operational efficiency and workforce safety. As the industry continues to evolve, the adoption of such innovative solutions is likely to become more widespread, setting new standards in construction site management and security. ▲

Cameron Simon is the senior vice president of industrials, technology and services for Stallion Infrastructure Services, a provider of mobile security, video surveillance and communications services. Visit stallionis.com or 281-247-2666.




Photo Credit: Adobe Stock

What Do You Know About the Lumber Supply Chain?

How a TMS can alleviate material management & ensure project success

BY MICHAEL YOUNG

Trees are harvested in the forest or on tree farms by manually cutting the trees with chainsaws or using heavy machinery. Once harvested, the trees are transported to sawmills for processing. The trees are either loaded onto flatbed trucks or rail cars for transport to the sawmill. Trucks are used for shorter distances, but logging companies use rail cars when the trees must be transported long distances.

At the sawmill, the logs are processed into lumber. This involves debarking, sawing and sometimes further processing to create specific wood products. Modern sawmills often use automated machinery for efficiency. The processed lumber may undergo treatment to enhance its durability and resistance to pests or decay. Additionally, the lumber is usually dried to reduce moisture content, making it suitable for various construction applications.

Once the lumber is processed and ready for distribution, it is transported to building product distribution centers, typically by trucks, although rail and shipping may also be used for longer distances or international shipments.

The wood products are stored at the distribution center until they are ready to be shipped to retailers, construction sites or other end users. Distribution centers are crucial in managing inventory and ensuring that products are available when needed.

From the distribution center, the building products are delivered to retailers or construction sites based on orders. This final stage involves using trucks for local deliveries or other modes of transportation for longer distances. Deliveries need to align with project timelines, ensuring that the required materials are available during construction.

Technology for the Forestry Industry

Building contractors, retailers or construction companies place orders with building product distributors based on project requirements. Building product distributors manage their inventory to ensure they have the required stock of lumber to fill their orders. Often, building product distributors use inventory management systems to track stock levels, anticipate demand and reorder supplies.

Once an order is received, warehouse personnel pick the right lumber products from inventory. The lumber is packed securely for transportation, considering factors like size, weight and fragility. Loading procedures consider the type of lumber, weight distribution and special handling requirements.

Trucks are a standard mode of transportation for lumber, providing flexibility and accessibility to construction sites. However, if the distribution center is far away, the lumber may be placed on rail cars.

Shipping forestry products takes a transportation management system (TMS) designed explicitly for this industry. Since

lumber is often shipped via multiple modes, the TMS must be able to handle multimodal shipments via truck, rail, barge, etc.

A multimodal TMS will:

- Eliminate manual processes, such as securing carriers, executing orders, scheduling transportation, creating documentation and analyzing results. The TMS will contract with a suitable carrier to deliver to the correct location for the right price. The TMS will provide a coordinated schedule for picking up the lumber, loading it onto trucks or rail cars, and routing it to the correct location so the order arrives on time.
- Incorporate disparate data sources, provide automated functionality to replace many manual or distributed processes, and provide the end-to-end visibility and control needed to optimize logistics operations.
- Track shipments using Internet of Things (IoT), GPS or telematics devices, providing visibility to shippers so you always know where your products are. If an issue arises, such as a truck breakdown, rail car maintenance, a traffic jam or another problem, these devices give immediate insights into the status of the assets so that shippers know what is happening within their supply chain network in real time.
- Perform both shipment execution and visibility across rail, truck, intermodal, barge and ocean shipments, providing unmatched degrees of agility and flexibility. From real-time alerts to interactive data visualizations, a TMS with artificial intelligence (AI) and machine learning (ML) technologies gives organizations the tools to ask more profound questions, predict better outcomes and deliver more impactful results.
- Provide proper documentation, such as bills of lading and shipping manifests. The documentation helps track the origin, destination and contents of the lumber being transported. Treated lumber may be classified as hazardous, requiring the correct documentation and labeling to comply with HAZMAT regulations.
- Manage cross-border shipments. This may include adherence to standards set by organizations such as the International Maritime Organization (IMO) for sea transport.
- Manage alerts. Suppose a shipment is problematic or encounters a problem. In that case, the TMS will alert managers about the issue, providing options to ensure the shipment will continue moving, improving customer service and satisfaction.
- Has an ever-expanding tendering functionality that offers substantial savings compared to older competitive systems that remove the load from each carrier after their time to review has expired. This can save 12% or $110 per load.

A dock scheduling system will allow carriers to check in quickly, get to the loading or unloading spot, complete the process, send proof of delivery, and move to outbound steps like tarping and inspections. Carriers can make appointments with dock scheduling systems to minimize detention times, saving costs.

Safety, Regulations & Compliance

Adherence to transportation regulations, including weight limits, permits and safety standards, is essential to ensure legal compliance and safety during transit. Trucks transporting lumber must adhere to weight limits established by transportation authorities. This includes both axle weight limits and overall vehicle weight limits. Oversized or overweight loads, which may apply to specific lumber shipments, require special permits.

Some distribution center yards use kiosk-type devices that integrate with a TMS to keep truck drivers in the truck, where they will be safer. With a kiosk, the guard at the delivery yard knows certain information before the truck arrives, allowing them to wave the driver into the yard without the driver having to stop and get out of the truck. Even better, the warehouse personnel preparing shipments sees when a truck is approaching the facility before check-in — providing advanced confirmation of the required product staging. Using kiosk functionality within a TMS speeds up the check-in process and reduces on-site time by 30 minutes or more, significantly reducing the total shipping cost.

Sustainable practices are increasingly important in the construction industry. Some companies may prioritize using eco-friendly transportation methods or sourcing lumber from sustainable forests.

Rail cars must follow the standards of the American Association of Railroads (AAR), The Federal Railroad Administration (FRA) and Transport Canada (TC) regulatory compliance requirements. Shippers can't move their products if a rail car is out for repair. To stay compliant and avoid penalties, rail cars must be maintained appropriately by certified rail shops that can show proper service records. A TMS can house all maintenance records, repair and operational costs, and fleet data, maximizing productivity and ensuring compliance.

Efficient logistics in the lumber supply chain contribute to the overall success of construction projects by ensuring a steady and reliable flow of materials to construction sites while minimizing delays and costs. ▲

Michael Young is the director of sales and marketing at IntelliTrans. The IntelliTrans TMS is the only software as a service (SaaS)-based TMS that provides shipment execution and visibility across rail, truck, intermodal, barge and ocean shipments. That means companies stay in the know the entire time shipments are en route. Visit intellitrans.com.



Planning for the Future: The Northeast Transmission Line

The Northeast Transmission Line project's impact on Houston's water supply & subsidence mitigation

BY JAIPAL MUSKU, MACKRENA RAMOS & GREG HENRY



Image 2: Northeast Transmission Line tap to existing 84-inch waterline

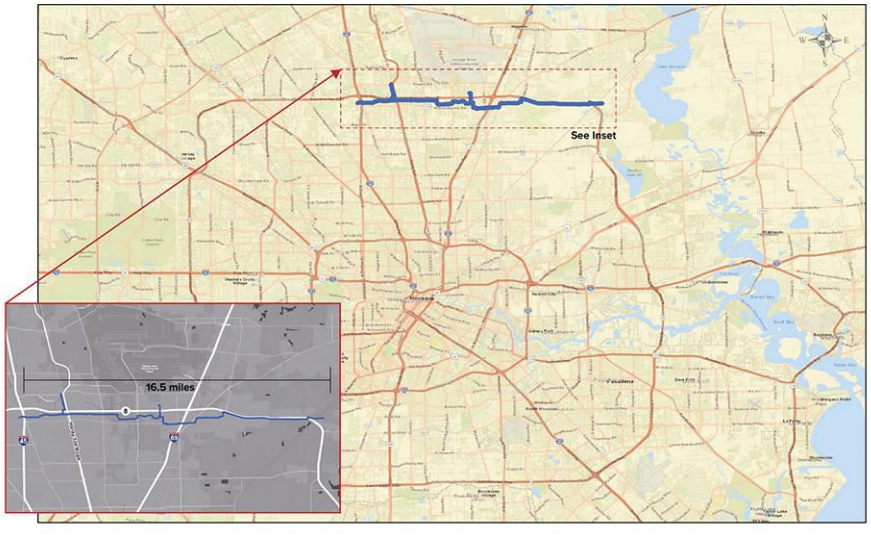
In just two years, 60% of the drinking water supply in the Houston, Texas, area — more than 500 million gallons per day (mgd) — will come from surface water. By 2034, the percentage is required to rise to 80%. The reason for this is to avert subsidence, which can be caused by excessive pumping of groundwater. Subsidence, which refers to the gradual sinking or settling of the ground, can lead to increased flooding risks, impact water supplies and cause damage to infrastructure like roads, bridges, pipelines and buildings.

In 1975, the Texas state legislature created the Harris-Galveston Subsidence District (HGSD) to regulate groundwater withdrawal in Harris and Galveston counties to prevent subsidence. Since its inception, the HGSD has set targets for surface water usage in the region. Therefore, by 2025, at least 60% of the drinking supply must come from surface water with an eventual goal of 80%. As a result, the counties in the region have been actively diversifying their water sources to include surface water from reservoirs, rivers and lakes.

The Northeast Transmission Line (NETL), a series of 13 construction packages under one program, is leading the way in this initiative. According to Panduranga Kuruva, PE, MBA, the managing engineer of the City of Houston's Capital Projects, "Construction is almost complete, and the 16.5-mile pipeline will be in service by the end of this year. It will increase surface water usage and reduce ground subsidence in the Houston area. NETL is a collaborative effort involving the City of Houston and four Regional Water Authorities: North Harris County, Central Harris County, West Harris County and North Fort Bend. The NETL is a large-scale water infrastructure project designed to deliver 320 mgd of treated surface water to the northwest portion of the region. Its completion is expected to ensure a reliable drinking water supply for this fast-growing region well into the year 2050."

The NETL project, which began in the planning stages in 2010, is a massive undertaking involving the construction of 16.5 miles of waterlines. The NETL will be an extension of the Northeast Water

Image 1: Map of the 16.5 mile Northeast Transmission Line



Purification Plant, a major Houston water treatment facility that draws water from nearby Lake Houston. The NETL is constructed from 120-inch/108-inch diameter steel pipe through 13 individual construction contracts. The interconnector lines that will feed the regional water authority sites are ranging from 54 inches to 66 inches.

The design and construction of the NETL project has been a huge operation requiring the expertise of engineers, contractors, vendors and specialists. This soon-to-be-operational waterline stretches through a myriad of topographies: heavily wooded rural areas, densely populated neighborhoods, established commercial development and even under heavily trafficked interstate highways, which transport thousands of people a day.

During the multiphase planning process, there were many intricate details and issues for the decision-makers and engineers to consider: routing, easements, haul routes, material availability, cost models, schedules and technical standards. It also involved:



Image 3: NETL project managers standing in front of the 135-inch earth pressure balancing tunnel boring machine used for tunneling at US-59

- modeling scenarios for single and dual pipelines
- supply chain capabilities of up to 156-inch pipe and shipping challenges
- developing a cost model
- contract scheduling



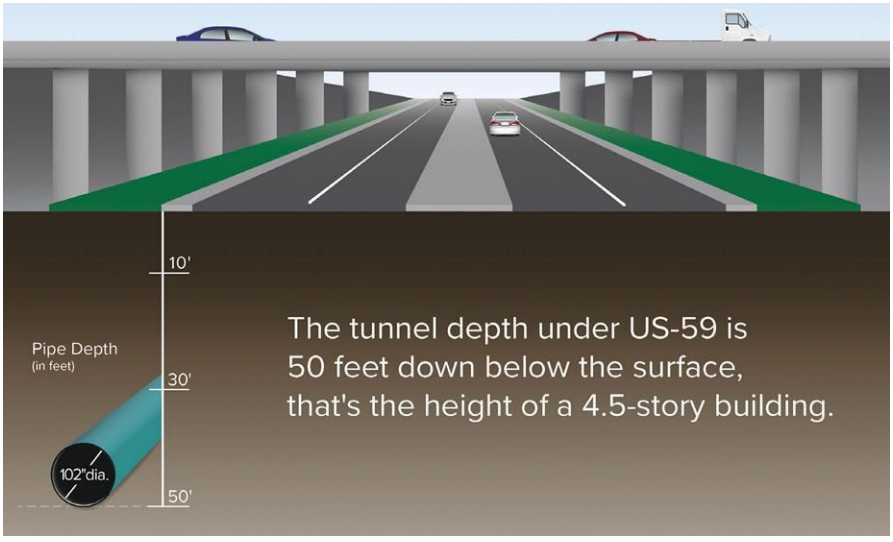


Image 4: The tunnel depth under US-59

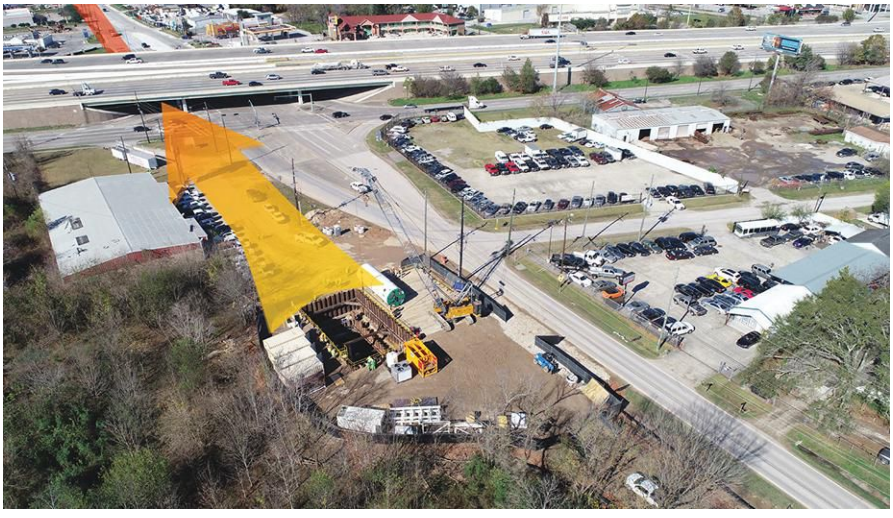


Image 5: NETL crossing under US-59, arrow showing tunnel shaft and the direction of underground route



Image 6: NETL crossing near school and neighborhood

- easement determination
- risk matrix
- energy cost present-worth analysis
- evaluating accessibility and haul routes

There have been unique challenges to installing this waterline. After the route selection, for example, the NETL project required more than 120 easements, in addition to the already existing easements. For the pipe installation, there were 3.25 miles of excavation for tunneling, aside from the crossings through 40 major roadways and waterways.

To ensure precision and efficiency in the workflow, the NETL project has been divided into three phases and 13 separate project segments. Ram Chakradhar, PE, the city's supervising engineer says, "There are crossings we would consider 'complicated.' These complex locations included crossings under U.S. Route 59 (US-59), Interstate 45, Beltway 8 and the Hardy Toll Road. For example, we had to pass the 108-inch water line through a tunnel more than 1,000 feet long under US-59. This measure was designed to minimize the impact of construction on businesses, freeway and feeder road traffic, residents and schools. More than 192,000 cars travel on US-59 every day and another 18,000 travelers daily on the feeder road."

Another significant 1,000-foot-long tunnel crossing was near a school and neighborhood. The underground tunneling was necessary to minimize impacts to residents and the campus.

Kuruva adds, "You can imagine, with the pipeline traveling through areas where a lot of people live and work, there was active engagement with stakeholders, including environmental experts, landowners, regulatory authorities and community representatives. The city and the water authorities fostered transparency for the public to understand the need and development of the project."

Kevin Tran, PE, the city's team lead for

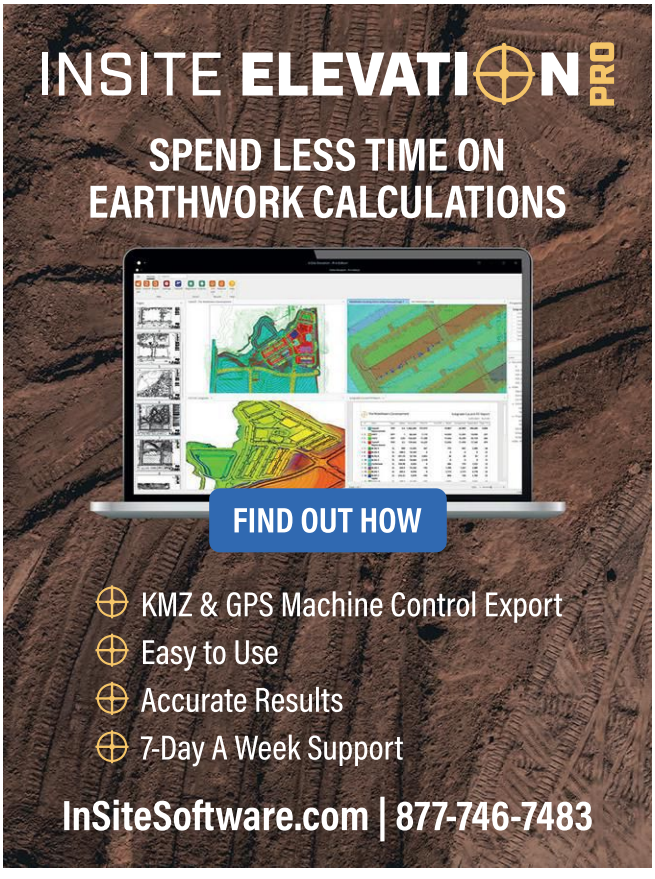


Image 7: NETL installation along Beltway 8 Feeder Road

capital projects, says the planning has been thorough and methodical throughout the process. "During the design phase, the city found out that a portion of the proposed 108-inch waterline segment was designed in the same alignment of a proposed major pipeline. The city and design team worked immediately with the third-party pipeline company to resolve the situation. With effective communication and coordination, we were able to secure a straight path alignment for the NETL, and the third-party pipeline was re-routed to a different location without delaying anyone's schedule."

To install the pipe, approximately 465,000 cubic yards of dirt were removed. That same amount could fill 145 Olympic-sized swimming pools. When the pipeline is completed, it will take 136 million gallons of water to test the system. That is the same amount of water it takes to supply half a million households for a day.

This project is instrumental in reducing the demand for groundwater and improving drinking water supply resiliency in the Houston area and mitigating the effects of subsidence on the region's infrastructure and environment. The project is expected to be commissioned and operational this year. As in this case, the state, the City of Houston and the water authorities understand the importance of working together to



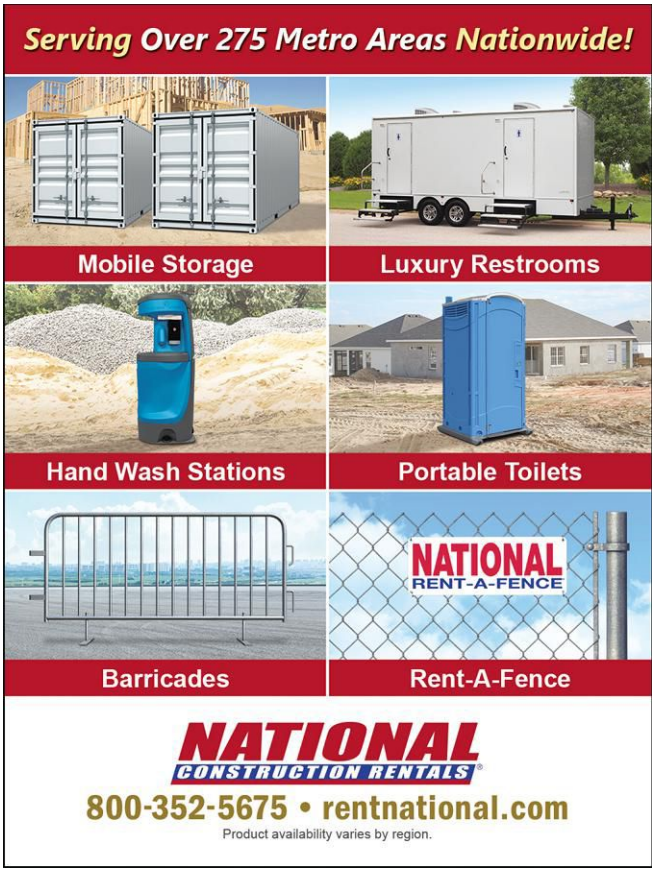




Image 8: NETL installation

address the critical subsidence issue to ensure a safe water supply for the future.

Diversifying water sources also reduces vulnerability to droughts and climate variations, ensuring a more reliable and responsive supply of drinking water.

Surface water treatment technologies can also enhance water quality, reduce energy consumption and promote a sustainable infrastructure. For the City of Houston, that is resulting in a safer and more efficient long-term water supply. ▲

Photo Credits: Lockwood, Andrews & Newnam Inc. (LAN)

Jaipal R. Musku, PE, is senior project manager at LAN. He has more than 16 years of experience in program management, planning, design and engineering construction phase services for large-diameter waterline projects. He worked as the NETL program design and construction project manager.



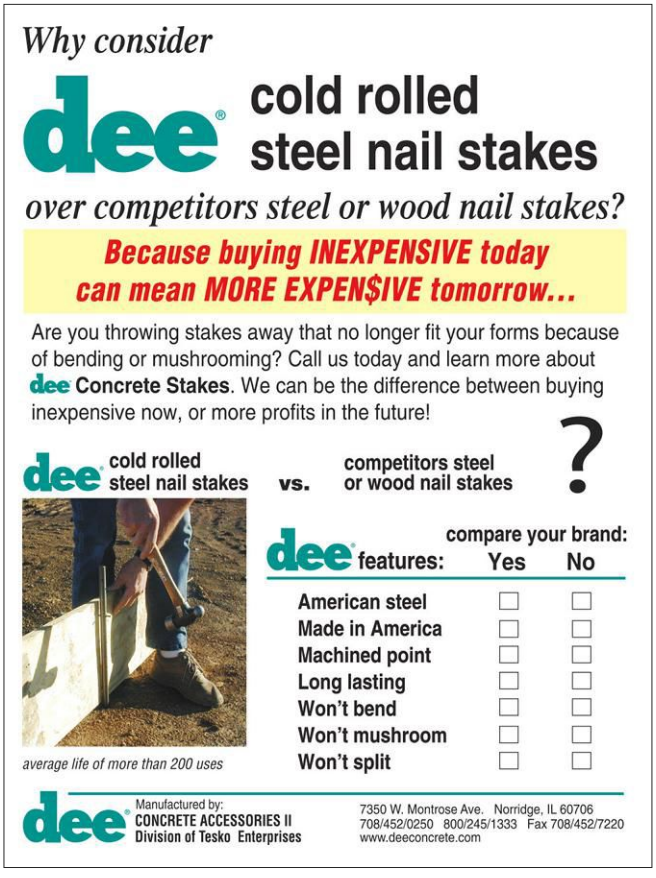
Mackrena L. Ramos, PE, is vice president at LAN. She has more than 24 years of experience in program management, planning, design and engineering construction phase services for large infrastructure projects. She is the program manager of the NETL program and responsible for managing the entire program.



Gregory J. Henry, PE, is team leader at LAN. He has more than 23 years of experience in program management, planning, design, condition assessment and construction management services for large infrastructure projects. He is the assistant program manager of the NETL program and responsible for managing the entire program. Visit lan-inc.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.



▲ CHEVRON

Rykon

Released: 2/1/24

Availability: U.S. & Canadian markets

What's new? Rykon is a high-performance grease that increases uptime and helps enhance durability for the next generation of equipment. Rykon will round out Chevron's grease offering with a grease formulated for heavy-duty and extreme pressure applications. This grease also provides an alternative option to lithium-based thickeners, which have become widely expensive due to rising global demand.

Specs: Rykon is designed to help increase equipment longevity, extend lubrication intervals and reduce the total cost of equipment ownership. The overbased calcium sulfonate complex grease delivers oxidation and thermal stability with water performance to protect equipment from failures and downtime. Rykon also meets the demands of high pressure and shock loads, providing wear protection under heavy loads and in high ambient temperatures.



◀ INFINITY X1

Infinity X1 Denali Flashlight 5000L

Released: 1/4/24

Availability: U.S. market

What's new? The new Infinity X1 Denali Flashlight 5000L is designed to do more than illuminate the dark and is packed with practical features. To help reduce battery waste while ensuring the light is always operational in an emergency, the Infinity X1 Denali Flashlight 5000L comes with two power cores. One core is a rechargeable battery, and one is for dry cell batteries. The flashlight can be used to power other devices like a phone.

Specs: The light has a beam distance of up to 180 meters and a run time of up to five hours. A patent-pending safety heat lock turns the flashlight off when the lens is covered, preserving battery life, and ensuring the flashlight does not power on and overheat in a tent or backpack. The Infinity X1 Denali Flashlight 5000L is crafted from lightweight aircraft-grade aluminum. It weighs 2.2 pounds and measures 12.6-by-2.2 inches.

VOLVO CONSTRUCTION EQUIPMENT ▶

ECR40 compact excavator

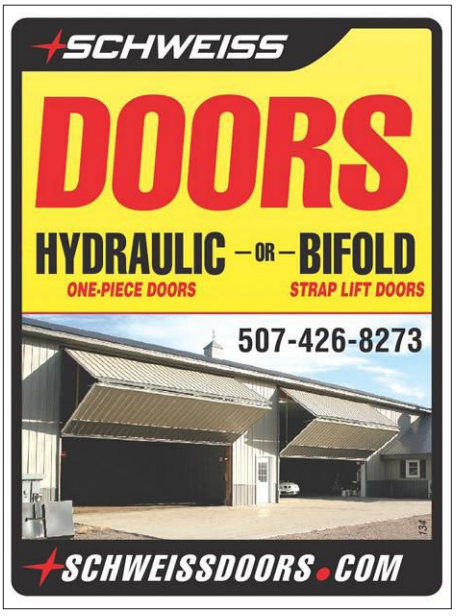
Released: 1/16/24

Availability: North American market

What's new? The 4-ton ECR40 contains features that provide increased operator comfort, 10% more fuel efficiency, better stability and easier maintenance. This machine has a short swing radius to allow for work in more confined spaces. Gives operators a spacious, ergonomic and quiet cab. It provides outstanding visibility thanks to slim corner pillars and wide, flat glass areas. For added comfort, the armrest and controls float with the seat, and the door opening and travel pedals are larger than in previous models.

Specs: The intuitive jog wheel and easy-to-navigate human machine interface (HMI) functionalities provide controllability and adaptability for any job requirements. Work modes now include an ECO mode and an auto engine shutdown in addition to the existing auto engine idle. With auto engine shutdown, hours not worked are not recorded, keeping the machine operating efficiently for longer while reducing maintenance costs. This also contributes to a 10% boost in fuel efficiency. Includes an elongated undercarriage for optimum stability in almost any environment, thanks to the better weight balance provided by longer contact between the tracks and the ground. The adjusted center of gravity reduces the "rocking chair effect" other compact excavators may create.







▲ STIHL

TSA 300 Stihl Cutquik

Released: 1/23/24
Availability: U.S. market
What's new? The TSA 300 Stihl Cutquik is the newest professional battery-powered cut-off machine powered by the Stihl AP battery system. Crafted with power, precision and ease-of-use in mind, this machine is a lightweight, low-maintenance tool, allowing for greater productivity and less user fatigue than the gasoline-powered Stihl TS 420. Designed to be used by professionals in construction and landscaping, this lightweight, compact tool is designed to cut through a 4-inch concrete slab.
Specs: The TSA 300 is equipped with a commercial-grade high-torque brushless motor, reducing maintenance, while the magnetic filter helps protects the motor from the influence of fine metal dust particles. The durable magnesium cutting wheel guard also improves maneuverability. With an IPX4 rating, this machine has the ability to be used in wet conditions. Additionally, the quick-connect water hose adapter is designed to prevent water from spraying on the user when the pressurized water hose is disconnected. The variable-speed trigger enables the user to select the desired speed of the wheel, depending on the material, thickness, density and composition, keeping the user in complete control of every cut.

YOKOHAMA OFF-HIGHWAY TIRES ▶

Galaxy MFS 101 Severe Duty Solid tire

Released: 1/22/24
Availability: U.S. market
What's new? The Galaxy MFS 101 Severe Duty Solid tire combines solid construction with a more comfortable ride, heat-dissipating design, more rubber above the 60J wear limit, and a high-performance steel bead design to transfer torque with reduced slip. Two circumferential grooves also improve steering and cornering, and the shoulders of the MFS 101 are also siped all the way to the edges for added grip on smooth surfaces.
Specs: The MFS 101 features a high-strength steel bead package across the entire rim area to virtually eliminate wheel slip. Contains three distinct layers: a durable base for stability and firm grip on the rim, an inner cushion that enhances rider comfort, and a wear-resistant tread compound for long service and great traction on hard surfaces. The newly introduced tread compound of the Galaxy MFS 101 SDS reflects a careful balance between wear resistance, cut and chip resistance, and heat resistance. The resulting compound is long-lasting on hard surfaces — making it ideal for warehouses and ports — and durable on shop floors and loading docks, where debris and metal ramps can destroy pneumatic or foam-filled tires.





◀ KOMATSU

GD955-7 motor grader

Released: 1/26/24
Availability: North American market
What's new? The GD955-7 offers operators the control and precision needed to build and maintain haul roads for truck fleets of 100 tons and up. This new machine features ample horsepower and powerful blade downforce pressure for efficient grading performance. With faster working travel speeds compared to the previous model, Komatsu engineered the GD955-7 to increase grading efficiency while helping reduce maintenance requirements and total cost of ownership. It can execute tight U-turns on a standard 100-ton class haul road without the need to fully cut the wheel or course correct.
Specs: The long wheelbase and large, 27-degree articulation angle allow a tight turning radius and provide maneuverability for narrow haul road applications in confined spaces and around obstacles. The long-life circle bearing allows for smooth and precise rotation of the moldboard while eliminating the need for circle play adjustments or replacing wear plates.

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❑ 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)*
❑ 10 Owner, Partner, President, CEO, CFO, COO, Vice President, Director
❑ 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
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Annual Value of Construction Put in Place

December 2021/2022/2023 Annual Rate Comparison

This chart compares the two previous years' total value of construction put in place to an annual forecast based on December 2023 figures. (Millions of dollars. Totals may not add up perfectly due to rounding.)

	2021	2022	2023
Total Private Construction	**1,292,857**	**1,427,128**	**1,619,686**
Residential	810,288	857,150	911,713
Nonresidential	482,570	569,978	707,972
Total Public Construction	**347,007**	**382,658**	**476,326**
Residential	8,847	9,150	10,447
Nonresidential	338,159	373,508	465,879
TOTAL Construction	**1,639,864**	**1,809,785**	**2,096,012**

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

$2,096,012

DECEMBER 2023 TOTAL ANNUAL VALUE OF CONSTRUCTION PUT IN PLACE

"Billings at firms declined for eight months of the year, and the last four months saw this overall weakness accelerate," said Kermit Baker, Ph.D., AIA chief economist. "Fortunately, project backlogs at firms eased only slightly through the year despite the overall reported softness in billings."

AIA Architectural Billings Index (ABI)

National			*Regional – Billings				*Sectors – Billings			
Month	Billings	Inquiries	Northeast	Midwest	South	West	Multifamily Residential	Commercial/ Industrial	Institutional	Mixed
Jul-23	50.0	54.5	49.3	51.6	48.9	49.6	45.4	52.7	51.2	46.3
Aug-23	48.1	54.8	50.6	48.1	49.9	45.8	44.1	51.5	49.4	46.9
Sep-23	44.8	53.7	46.4	49.3	46.2	44.3	43.5	45.0	50.1	46.2
Oct-23	44.3	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

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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