

IN THE OFFICE: 6 STRATEGIES TO REDUCE OVERHEAD

IN THE FIELD: MAXIMIZE MIXED-FLEET OPERATIONS

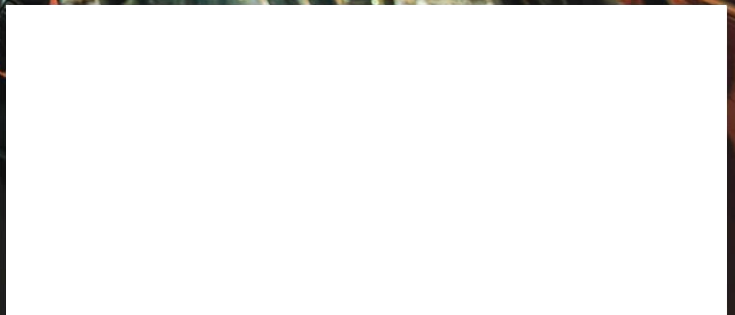
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The construction industry spent the better part of this year pacing in suspense about when — or even whether — the long-discussed infrastructure bill might pass. At press time, we finally saw the bill clear the House in a 228-206 vote, providing construction-industry hopefuls with a \$1.2 trillion package and the possibility of a project-packed 2022. The bill will be paid for with \$210 billion in unspent COVID-19 relief aid and \$53 billion in unemployment insurance aid, and will focus on the following areas of work:

- Roads and bridges — \$110 billion
- Public transit — \$39 billion
- Passenger and freight rail — \$66 billion
- Electric vehicles — \$7.5 billion
- Internet access — \$65 billion
- Electric grid — \$65 billion
- Airports — \$25 billion
- Water and wastewater — \$55 billion on water and wastewater; \$15 billion to replace lead pipes; \$10 billion to address water contamination from polyfluoroalkyl substances

So, what happens next? According to two major industry associations — Associated Builders and Contractors (ABC) and Associated General Contractors of America (AGC) — both sets of members will be eager and ready to begin the work at-hand. The bill, which is purported to provide millions of jobs, must still be signed into law — at which time, many of the nation's contractors will pick up their toolbelts and take on the challenge of rebuilding the country's crumbling infrastructure.

What's yet to come is the work itself, and outlining the specifics on the many impending contracts, bidding processes, contractor qualifications, project timelines, etc. But for you, reader, the work is where you shine brightest. As you make plans to venture into some of these infrastructure opportunities in 2022, I hope you'll count on us as a resource to guide your success. While the work itself may come easy, running a safe and profitable business can be complicated, and maintaining top-notch operations will be crucial to outperforming the competition.

Please feel free to contact us with your questions, concerns, comments or any professional problems you're looking to solve. We're always here, accompanied by our crew of industry experts, to help you meet and exceed your business goals.

Take good care,

Correction: In the Stats section of Construction Business Owner's November 2021 issue, the total value of construction put in place was incorrect for the month of August. The correct value is \$1,584,085.

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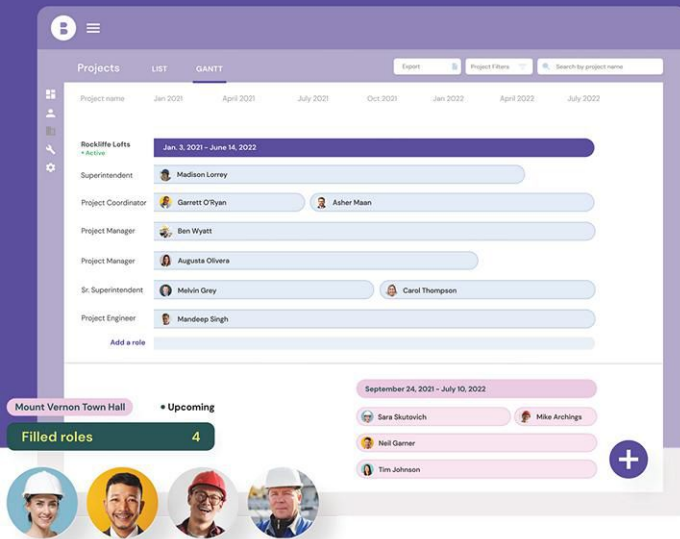
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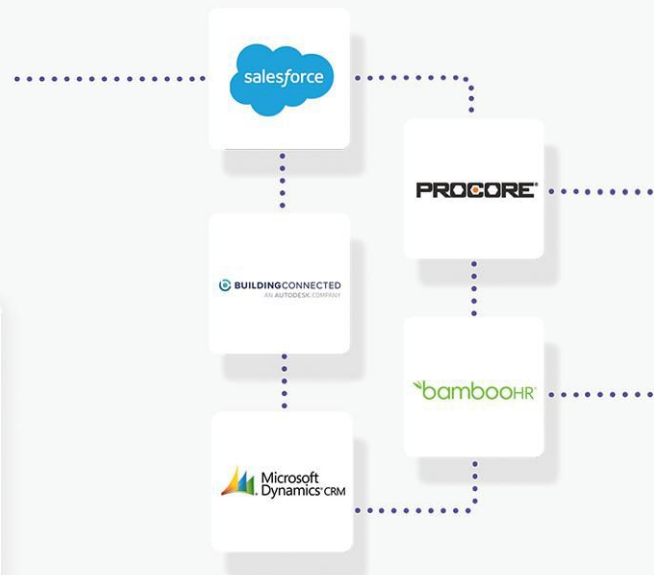
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Todd Wynne, CIO at Rogers O'Brien



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AIA Contract Documents

Real projects start with the industry standard

Before they broke ground, ESa used AIA contracts to design **CHI St. Luke's Health Hospital – Springwoods Village**, a new mixed-use healthcare campus in Spring, TX.

AIA documents used: A201®-General Conditions, B103-Owner/Architect-Complex Project, C401 Architect/Consultant Agreements and associated administrative G-forms.

Learn more at aiacontracts.org/cbo-st.lukes

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 **AIA**® Document A201
General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

► **Felling Trailers Inc. Appoints Great Lakes Regional Sales Manager**



Joel Lindmeyer

Felling Trailers Inc. has appointed Joel Lindmeyer as its Great Lakes regional sales manager.

Lindmeyer will be responsible for all sales development, activity and dealer support within Minnesota, Wisconsin, Illinois, Michigan, Indiana, Ohio and Kentucky. Lindmeyer's primary responsibilities will be to achieve region market share objectives with the existing dealer base and develop new dealers in the assigned territory, providing training and product support. Lindmeyer has over 25 years of experience in the truck and trailer industry with a strong emphasis on sales and customer service. Visit felling.com.

► **Chen Moore & Associates Acquires Fred Wilson & Associates, Inc.**

Fort Lauderdale, Florida-based Chen Moore and Associates has announced its acquisition of Fred Wilson & Associates, Inc. The 100% acquisition of the 60-year-old Jacksonville,

Chen Moore and Associate's commitment to two of its six key market sectors and the potential to expand others such as water resources, water and sewer, transportation, power, parks and recreation and land development to the Jacksonville region. Visit chenmoore.com.

► **YellowBird & NASP Announce Partnership Benefitting Safety Professionals**

YellowBird, a nationwide gig-economy marketplace that matches vetted risk and environmental, health and safety (EHS) professionals with businesses on-demand, has announced new partnership with the National Association of Safety Professionals (NASP). NASP provides training and certification in the workplace safety industry exceeding basic Occupational Safety and Health Administration (OSHA) compliance, while YellowBird's marketplace helps vet and match certified professionals with businesses seeking EHS skilled experts. YellowBird's suite of services includes OSHA incident investigations and mock audits, industrial hygiene, on-site safety manager, program and policy

the concrete products industry, has joined the company as head of business development. He will be responsible for driving commercial adoption of CarbonBuilt's technology, enabling concrete product manufacturers to improve margins through the production of low-carbon concrete. The Reversa platform includes innovations to concrete's mixture design and its curing process. Reversa formulations replace most or all the Portland cement used in concrete products with widely available materials, reducing raw materials cost and embodied carbon simultaneously. Visit carbonbuilt.com.

► **CMP Pumping Appoints Kevin Smith Safety Director**



Kevin Smith

Concrete & Materials Placement (CMP) Pumping has announced the appointment of Kevin Smith as its safety director.

Smith will ensure proper safety procedures are being followed, provide ongoing safety training to operators and continuously

services across the Southeast since 2001 and delivers services throughout commercial, residential and public construction markets. Visit cmppumping.com.

► **Caterpillar Names First Chief Sustainability & Strategy Officer**

Caterpillar Inc. is creating the position of chief sustainability and strategy officer, enhancing its environmental, social and governance (ESG)-related disclosures and tying a portion of executive compensation to ESG. These actions reflect stakeholder feedback and illustrate the company's longstanding commitment to sustainability. The company is announcing three key actions:

- Caterpillar is establishing the new leadership position of chief sustainability and strategy officer reporting directly to the chairman and CEO. Julie Lagacy, current vice president of the enterprise strategy division, will assume additional responsibilities as the chief sustainability and strategy officer, effective Nov. 1, 2021.
- The Caterpillar board of directors will incorporate ESG in the 2022 incentive plan for executive officers. More information will be disclosed in the company's 2023 proxy statement.
- Caterpillar will continue to analyze the disclosure recommendations of the task force on climate-related financial disclosures (TCFD) and begin to utilize the TCFD framework to enhance its sustainability reporting starting in 2023.

The company first introduced sustainability accounting standards board (SASB) reporting standards in 2019. Visit caterpillar.com.

**50
years**

Metabo Corporation, a German international manufacturer of professional-grade cordless and corded hand-held power tools and accessories in the United States, is celebrating its 50th Anniversary. Metabo USA's parent company was started in Germany in 1923, with its first hand-held drill developed by Albrecht Schnitzler while working in his parent's bakery. Visit metabo.com.

Florida-based engineering company expands Chen Moore and Associates' professional engineering consulting services to now include the electrical discipline, adds the Florida Department of Transportation to the firm's highway engineering project portfolio, and increases the firm's statewide team to more than 100 employees. The acquisition of Fred Wilson & Associates, Inc. reflects

development, custom projects and training. YellowBird's EHS professionals also help small businesses, schools and religious organizations develop safety protocols and training with a COVID-19 return-to-work program. Visit goyellowbird.com.

► **CarbonBuilt Names Head of Business Development**

CarbonBuilt has announced that Conor Cooper, a veteran of

maintain safety and health regulations. Smith's background in safety began in the military as a combat medic. Preventive medicine brought him to the health and safety aspect of industries before safety became a popular necessity. Smith has served in many industries, such as oil field, manufacturing, construction, production, water utilities and health care. CMP provides concrete pumping

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ASK THE EXPERTS

How are you managing COVID-19 vaccination verification?



Rod Courtney
Health, Safety & Environmental Manager
Ampirical

“Vaccine verification at work isn’t about politics or foisting an employer’s beliefs on employees. It’s about safety and the logistical process of verifying and documenting either the vaccination status of every employee and subcontractor, or that negative test results are current, without disrupting work.

To do this, we use a digital check-in web app. Employees check in to work through their smartphone and are shown the vaccination question. They only need to answer it once and the information is kept private and managed by the employer.

For businesses that are managing a vaccination verification process, here are two tips:

1. Don’t use paper-based forms or a PDF template. The process is time-consuming and makes it difficult to easily prove what percentage of the workforce has been vaccinated.
2. Verify vaccination based on authentic Centers for Disease Control and Prevention (CDC) cards. The guidance states that employee attestation is not sufficient to meet Occupational Safety and Health Administration (OSHA) requirements. To streamline the process, our digital check-in app allows employees to upload a photo of their vaccination card and securely attach it to their digital check-in record. ”



Tom Tortolani
Head of Product
Safe Site Check In

“For general contractors (GCs) who must abide by vaccine mandates, one of the biggest challenges is managing the process of verifying if a worker has been vaccinated. Many GCs have quickly learned that spreadsheets are cumbersome and difficult to keep private.

Digital check-in solutions offer an easier, lower-cost alternative. Because there are several options available, consider the following three features.

Firstly, make sure it’s easy to use, so crew can quickly update their status. Ideally, you want them to upload a picture of their vaccination card, so you can keep it on-file with limited employee access.

Secondly, because client or state mandates can and have changed, you also want to be able to easily alter the check-in questions related to vaccination status.

Thirdly, make sure that the app doesn’t store personal health information. Keeping records is important, but be sure employee data remains private and is safely stored — ideally, in a cloud environment. ”

What’s on your mind?

To submit a question for this section, email Associate Editor Alex Headley at aheadley@cahabamedia.com.

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Level Up Your Leadership, Ambition & Execution

How to cut to the chase & achieve your business goals



GEORGE HEDLEY, CSP, CPBC, is a professional construction BIZCOACH and industry speaker. He helps contractors build management teams and get their businesses to work for them. He is the bestselling author of "Get Your Construction Business To Always Make A Profit!", available on amazon.com. Email Hedley at gh@hardhatpresentations.com to sign up for his free e-newsletter, start a BIZCOACH program, attend a Wealthy Contractor BIZ-BUILDER Boot Camp or get a discount at hardhatbizschool.com online university for contractors. Visit hardhatpresentations.com for more information.

Just Ask George.

Send your questions for Hedley to
Editor Kathy Wells at
kwells@cahabamedia.com.

Stuck is the new norm. Most contractors stay stuck at the same level they have been for 2, 5 or even 10 years. These contractors work hard to maintain that level — but remain stagnant with the same salespeople, field employees, project managers, estimators, supervisors, foremen and number of crews. They get stuck in a pattern of doing the same thing over and over again.

They keep bidding on both the same project types and the same customers, somehow still hoping to land better work. They never seem to get ahead, and they continue to complain about low revenue, too many hours, lack of trained employees. They want more — more freedom, time, money, time off and wealth. The question is: How do they get it?

Many construction business owners are not happy with their personal situations and how their companies are performing.

Yes, it pays the bills and keeps them employed, but they're stuck, don't know what to do, and where to begin to properly scale their operations and move to the next level. They feel as if they are trapped in a box. Does this sound like a familiar scenario in your life?

Your business is the outcome and reflection of your actions leading and managing your company. You decide what to do — or not do — to grow. The best construction companies are led by owners and managers who want to always scale and move to a higher level.

WHAT'S HOLDING YOU BACK?

Fear is what holds most people back. They're afraid of making the wrong decisions, and want a guarantee their choices will end up being right without taking any risk. Therefore, they postpone doing what they know they must to break through to the next level. So, they delay, sometimes indefinitely, having to make the hard choices and decisions. What are you afraid of?

I recently met with 50 commercial construction business owners at one of my 2-day mastermind peer groups. Nearly every member of these groups continues to improve, scale, grow, make more money, and increase their investment portfolio.

Many have doubled their sales and net profits over the last few years. Others have increased their crew from 30 to 60 employees in 2 years, and some have changed their business model from low-bid public works to private, negotiated contracts at high margins with much success.

These contractors know that taking risks is part of business and remaining resistant to change is far worse than doing nothing.

DO OR DO NOT; THERE IS NO TRY

Unfortunately, many contractors are still stuck at the same level of size, profits and growth for many years. In fact, when you consider the effect of inflation, also factoring in price increases for materials

The time to stop kidding yourself is now. Decide to do something different & work toward upscaling your company — or stay put & do nothing.

DOES MY BUSINESS WORK FOR ME?

Consider the following statements and whether they apply to you. If your answers are marked "True" more often than "False," you may be the reason your company isn't going anywhere.

T or F

- ☐ I work more hours than my employees and have difficulty taking time off.
- ☐ I make most of the important decisions myself without the help of others.
- ☐ Employees continually ask me to make decisions for them.
- ☐ I can't find any trained, accountable or responsible help who will take charge and get things done.
- ☐ I am overworked, have too many responsibilities, and never have enough time to work on my top priorities.
- ☐ My customers call me about their most important issues.
- ☐ I have trouble letting go, trusting others to make decisions, and tend to micromanage.
- ☐ My business is crucially dependent on me and doesn't work without me there.
- ☐ I feel guilty when I come to work late or leave early.

over the last several years, growing at 10% per year is not any growth at all, given that construction costs have risen 20% over the last 5 years. Therefore, staying at the same annual revenue and profit levels is a net loss.

These stagnant contractors may talk a strong game, but never actually follow through to implement their decisions to improve. Your decisions must be "yes" or "no," and never "maybe." You must stop claiming you are "trying" — trying means you are not making progress toward or accomplishing what you need to reach your goals.

Either you do it or you don't. Stop making hollow commitments you will never keep. Now is the time to decide to do something, even if it's risky, and move to the next level. So, where do you start?

The following are a few common steps construction business owners can take to gain some ground and begin growing their businesses. Consider these action items and where you stand when it comes to

accomplishing each of them.

- Spend more time finding higher-margin customers.
- Implement new systems and processes that may save your company time and money.
- Delegate, let go and hold people accountable to achieve results and perform.
- Integrate both job-cost tracking and project management software.
- Build a great place to work that attracts and retains the best talent available.
- Spend time developing, mentoring, coaching and training your top talent.
- Promote emerging talent from within and give them a chance to excel.
- Understand your financial numbers and review them weekly.
- Sell any old equipment that hasn't been used in over a year.
- Find time to see customers to build relationships.
- Stop chasing low-bid and low-price work against too many competitors.

STOP KIDDING YOURSELF

I hear the same story every year from stuck contractors who boldly proclaim an interest in improving, growing and finally making the big decisions required to move their companies to a higher level. It's big talk with no execution. While their company's revenues and employees continue to hover around the same numbers annually.

For example, a \$3 million contractor with three crews has remained stuck at the same level for many years, and is now shrinking in annual sales — all while inflation increases their overhead and results in reduced profits. It's difficult to say they will succeed in growth without ever truly trying.

The time to stop kidding yourself is now. Decide to do something different and work toward upscaling your company — or stay put and do nothing. If you choose the latter, however, be prepared to stifle your grumbles and learn to be happy going nowhere. **CBO**

We Are Family (Except When We Aren't)

Exploring family businesses & the challenges that exist in creating success



GREGG M. SCHOPPMAN

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

For every large, multinational construction corporation, there are thousands of family-run businesses that exist in the industry. In fact, many of those same large corporations began as a small family-owned business.

Note the difference in nomenclature in the two previous sentences: family-run and family-owned. For an enterprise governed by a sole proprietor, there is undoubtedly a feeling of, "Wow, it would be so nice to have a built-in succession plan complete with sisters, brothers, cousins, in-laws, etc., to pass on this business to one day."

On the other hand, there are also leaders looking over that fence to the greener pastures of their sole proprietor neighbor thinking "Wow, that person is so lucky not to have their sisters, brothers, cousins, etc. in the business."

There are many successful family operations, so this piece is not about them. They found a way to navigate the complicated waters of family ownership and family dynamics. But, there are also countless firms that put the "fun" in dysfunctional, creating undue levels of internal stress and, in many cases, inhibitors to profitable growth. This piece is about them.

ADDRESSING BEHAVIOR

For some reason, as family members enter the workplace, it gets complicated — even when that family is otherwise cohesive and drama-free.

Consider the business whose owner has a son or daughter operating as leader. All too often, one of two scenarios materialize: either the owner micromanages their child or completely avoids interacting with them. Micromanagement happens when, in an effort to appear unbiased, the parent oppressively manages their child.

Conversely, there are also parents that turn a blind eye to their children's aberrant behavior, almost avoiding controversy at any length. Both situations reek of double standards and create high levels of dysfunction, not only for the child, but also the rest of the organization.

Imagine a nonfamily member leader within the firm. They must attempt to tiptoe the minefield of inter-firm (or inter-family) politics that resemble a soap opera. As if building projects weren't complicated enough, they now must play the role of family counselor.

As the leader of your firm, are you managing with one approach or standard? Or allowing family dynamics to play a role in your decision-making and, in turn, the strategic plan of the organization? Understand that this could be hamstringing the firm and ultimately creating an anchor to growth.

PURSUING SUCCESSION

While it may be depressing to consider, every leader is simply keeping the seat warm for the next generation. Even for that



45-year-old leader, succession should pervade every aspect of the strategic planning of the firm. However, a firm with plenty of family members provides some solace, creating a safety net of succession. Or does it?

The first question a leader must ask themselves is, “Is this person the right person to carry on the firm’s legacy?” Sharing the same last name does not mean the business is guaranteed to succeed under their leadership (or lack thereof). There are plenty of third-generation firms that will tell you they should have dipped their toes into another gene pool when addressing their succession plan. Ask yourself the following questions:

- Should this person (people) lead the business? Why?
- How are they viewed internally?
- How are they viewed externally?
- Would their ascension be viewed as entitlement or the right choice?

Additionally, many firms want only family ownership, retaining the business under the family name. There may be pride in that family name but realize that every decision has a corollary downside. How many

talented individuals could potentially lead the business but they will never ascend to the top because they don’t share a name with the current ownership.

Sure, you may have plenty of family options to run/own the business, but is the right individual(s) someone that doesn’t share an allele?

THE ORGANIZATION CROWBAR

Everyone has seen that family member that just doesn’t fit. So, rather than address it, they are shuffled around the organization like a hand-me-down set of shoes. All the while, the organization hears that they may be the future of the organization. If that doesn’t scream confidence, nothing does.

Sometimes having the same last name as the one on the door is a curse. You don’t really want to do this, but it is your family legacy. Destiny awaits, right? Ask yourself the following questions:

- If my relative was a free agent on the open market, would they be here?
- Have we talked about their future and what they really want to do long term?
- What message is it sending to have them in the business, shuffling from department to department like a ship

without a harbor?

- Are we letting succession cloud our judgment on what’s right for the health of the business?

Crowbarring any individual into a spot, leadership or ownership, creates angst, and resentment while setting a horrible precedent for the company that could have a negative impact for years to come.

Reluctance isn’t exactly a desired trait in any leadership team. It is one thing for a leader to be nervous or pensive, but it is entirely different to insert them into a role that they view as a dead end.

The phrase “it’s just business” was probably crafted before construction organizations decided to leverage family. It may just be business, but you still have to see these people on the holidays.

Having family in the business does not mean it is destined for failure. In fact, there are many upsides to family ownership and management. But just like any other challenge a firm may encounter, there is a need for thoughtful and proactive tactics to navigate them successfully. Plus, the board room would be incomplete without a kids table. **CBO**

Data-Driven Safety On-Site

Where the industry is now & the potential for the future



DONNA LAQUIDARA-CARR, Ph.D., is industry insights research director at Dodge Data & Analytics, where she provides editorial direction to the SmartMarket Report Series, covering such diverse topics as world green building trends, business value of BIM, managing risk in the construction industry, the drive toward healthier buildings, building a safety culture and lean construction. Her insights on these topics have been published in numerous industry publications, and she regularly conducts webinars and speaks about this research at events for diverse organizations, including the AIA National Conference, CMAA National Convention, AGC National Convention, the Lean Congress, Greenbuild, the inaugural WELL Conference and BOMA. Visit construction.com.

In the past few years, there has been an explosion in the types of technology available to contractors on-site. The potential to improve productivity and increase budget and schedule certainty are among the appealing benefits that these technologies have the potential to offer. However, one of the most promising areas that many of these new technologies can address is improving jobsite safety.

Certainly, immediate benefits have already been seen from deploying these technologies, such as wearable sensor systems that can warn workers when they are entering a hazardous zone.

A recent issue of Dodge Data & Analytics Civil Quarterly examining a wide swath of the new technologies available on-site on civil projects, including site capture, tracking technologies, robotics and machinery and augmented and virtual reality, found that improved safety performance is the third most frequently selected top benefit expected from using this technology, behind only increased productivity and improved project budget management.

Contractors clearly believe in and prioritize the safety improvements offered by new technologies.

ADOPTION ON THE RISE

Right now, though, the latest Safety Management in the Construction Industry SmartMarket Report, published by Dodge in partnership with CPWR and Newmetrix,

reveals that the construction industry is still in the early stages of utilizing the data provided by many kinds of technology to improve safety.

The report reveals that a data-driven approach to safety is starting to emerge but is still limited to a small set of contractors. However, using the data increasingly available from a wide range of new digital tools on-site has the potential to help the industry improve its performance in this critical area and ensure that adoption of this technology and tracking this data provides real advantages for the construction industry.

As shown in Figure 1, according to the study released in the SmartMarket Report, predictive analytics is among the top three new technologies that contractors believe will positively impact worker health and safety.

However, only 10% of contractors in the study report that they are currently using these tools. Notably, though, over half of those who are using predictive analytics report that they are using them frequently, which suggests that they are finding them useful enough to engage with on a regular basis.

USING PREDICTIVE ANALYTICS

For predictive analytics to be useful, though, it requires a lot of clean, comparable, up-to-date and accurate data on factors impacting safety on projects. This is not only a challenge for

The findings of all these recent studies by Dodge suggest that the industry is just beginning to see the safety benefits of using new on-site technologies & predictive analytics.

many contractors, but it is also one that many are not even considering yet. The study reveals that only 19% of contractors believe that making better use of the project and safety data they collect is an important way to improve their existing safety programs, and only 21% believe that the use of predictive analytics is an essential element of a world-class safety program.

This suggests that many in the industry are not yet considering the use of data to improve their safety programs, other than those on the leading edge of adoption of this approach.

Part of the challenge is that the rapid growth in technologies to be used on-site has led to a “wild west” in terms of adoption, with lots of contractors exploring different options that suit their needs, but little overall uniformity in the types of data gathered on jobsites.

GROWING OPTIONS

As technology adoption continues to grow though, the use of tools that can gather the type of data needed for predictive analytics, such as sensors and Internet of Things (IoT) devices and reality capture tools, will likely grow as well, leading to

more standardized forms of data being more accessible to a wider range of contractors.

One example of a set of tools that are seeing increasing adoption on jobsites that will help contractors seeking to have more data-driven safety programs are reality capture tools. The most recent edition of the Civil Quarterly has data from a recent study with civil contractors that shows that drones and aerial mapping are already used by over 50% of civil contractors and digital cameras are used by 42% while project site webcams are used by 22%.

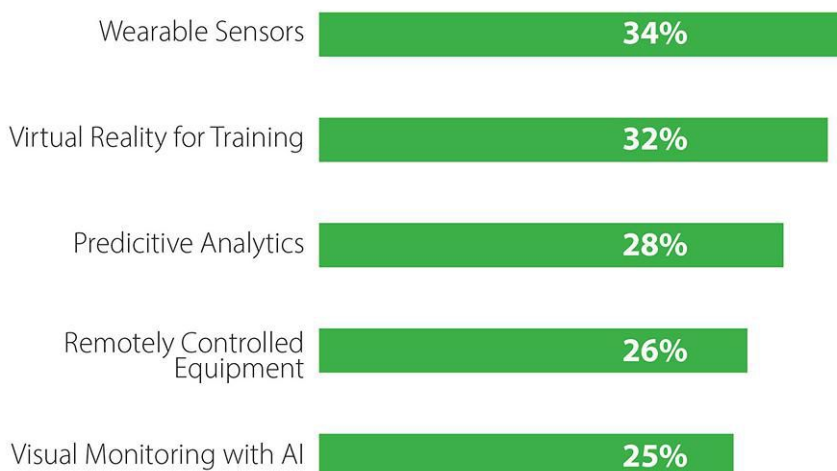
All of these can provide data that can be used to improve safety immediately on-site, and that have the potential to be compared across sites to help encourage a broader understanding of safety across the organization. Already, 31% of civil contractors report that they use reality capture tools for on-site safety preparation and management, and nearly half of those using reality capture tech (46%) report that improved safety is one of the top benefits they achieve from the use of these tools.

THE FUTURE OF JOBSITE SAFETY

The findings of all these recent studies by Dodge suggest the industry is just beginning to see the safety benefits of using new, on-site technologies and predictive analytics. It will be interesting to see how contractors use this technology and the data it delivers to improve safety in the future. And to see which technologies see mass adoption and use from general contractors, especially if things begin to pick up in the new year. **CBO**

Top Technologies That Contractors Believe Will Positively Impact Worker Health & Safety (Selected In the Top Three)

Dodge Data & Analytics, 2021



4 Ways to Build a Culture of Safety

How to prioritize staffing with onboarding & training at the forefront

BY BRANDI FORD

Nearly 80% of construction jobs eliminated during the pandemic have returned, and employers are scrambling to fill open positions. But in terms of safety, expediting the hiring process may do more harm than good.

With the supply of construction workers failing to meet demand, there are concerns that contractors will rush the onboarding and training processes for new hires. Pushing workers into projects without a clear understanding of safety training and on-site hazards increases the already-high risk of serious injuries and fatalities (SIFs). Despite the urgency to fill the employment gap, safety needs to remain at the core of the hiring and onboarding process.

EXPERIENCE & TRAINING ARE CRITICAL

Approximately 20% of workplace fatalities in the United States occur in the construction industry, making it one of the most dangerous fields in the country. The Occupational Safety and Health Administration (OSHA) identifies falls, electrocutions, caught-ins and struck-by hazards as the top four causes of jobsite injuries and fatalities.

However, most on-site fatalities — especially the 33% of all construction deaths caused by falls — are preventable

with effective management and safety training. Although OSHA provides standards for training requirements, companies often circumvent or disregard standard protocols — particularly when they need to fill job openings quickly. Despite companies raising wages and offering additional benefits, finding skilled workers remains a core issue for many organizations. Hiring unskilled or inexperienced workers for these positions poses an even greater risk for SIFs.

Failing to provide sufficient training and a safe work environment can result in financial losses, legal implications and reputational damage.

4 WAYS TO BUILD A CULTURE OF SAFETY

Providing new hires with adequate onboarding and training is paramount when a worker is hired, but it's just as important to ensure safe practices are maintained. There are four initiatives you can take to embody safety in the workplace culture while retaining top talent.

1. *Maintain client-contractor communication* — Nearly 40% of construction workers are contracted by other companies or are independent contractors. Clear communication between clients and contractors is



critical to keep these workers safe. In practice, good communication means clearly spelling out expectations in contract documents and providing accurate information about workers.

2. *Continuously evaluate workers' knowledge of safety protocols* — The initial training you provide new hires is important, but on-the-job experience and continuous knowledge assessments are vital to ensure a thorough understanding of safety protocols. Consider appointing a more senior worker to monitor the worksite throughout the day and hold daily safety meetings before the start of each workday.

3. *Adequately staff jobsites* — Striking the right balance between senior and junior workers on a jobsite — what many companies refer to as “crew mix” — can help improve safety and

productivity. Workers with more experience can act as mentors to less experienced crew members.

4. *Harness the power of data and analytics* — Companies have historically collected risk and safety data from incident management systems and observational audits to evaluate safety and performance. However, now that a large portion of construction work is performed by contracted workers, you would have to track incidents across various employers for accurate data. Data can help you understand the root causes of these incidents, and lead to improvements in processes and training.

YOU CAN'T RUSH SAFETY

While the construction industry is in dire need of workers, patience is key to

making sure your jobsites and employees are prepared and safe. And it's more important than ever to bridge the gap between policies and job performance.

Ultimately, training that could potentially save lives is far more important than staffing up quickly and hurrying to get the job done. **CBO**

Brandi Ford is a vice president at ISN, overseeing the marketing, HSE, sustainability, insurance and risk management and Monarch Consulting Teams. Since joining ISN in 2004, Ford has held various business development, management and leadership roles within the organization. Her experience includes leading teams at ISN focused on contractor management for operators in energy and manufacturing across North America, and customer service teams and products teams, including data security and development, design, testing and maintenance of ISNworld. She holds a bachelor's degree in marketing from Oklahoma State University. Visit isnworld.com.



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How Lean Gets Done

6 strategies to help reduce contractor overhead

BY MATTHEW CAMPBELL

In its early stages, the coronavirus pandemic forced dozens of major cities and even entire states to put a hold on construction to reduce the spread of COVID-19. While the moratorium has lifted, supply chain logjams in the construction market continue to drive up the cost of materials.

Adding to the volatility, we've seen many businesses table their construction projects to prepare for the likelihood of a global recession, as well as a fundamental change in the use of commercial real estate.

For many contractors, these disruptions have fueled anxiety and a tendency to overcompensate for lost contracts by pursuing projects outside their realm of expertise. During this unprecedented time, the smarter move may well be to pivot the other way — to go lean if your usual market does not present itself.

What the past 18 months can teach us is that the flip side of crisis is opportunity. The following explores six strategies contractors can employ to help get lean, avoid unnecessary risk and survive an unpredictable market.

A LEANER APPROACH & A GREENER OUTLOOK

Since March 2020, a steady decline in nonresidential construction spending has

contributed to today's depleted market, particularly in the hotels and lodging sector. It's a trend that current indices suggest will continue.

By using this time to refine practices and priorities, contractors can set themselves up for success. Rather than diving into risky projects, try taking a leaner approach focused around the following six strategies.

1. MAXIMIZE EFFICIENCY

Slow periods are a great time for

contractors to raise the level of workplace efficiency. While you have fewer commitments, take the opportunity to improve aspects of your operation.

The standard key performance indicators (KPIs) of the construction industry may be lower during the market slowdown, but it's possible to compensate for that decrease in productivity by shoring up less effective construction methods.

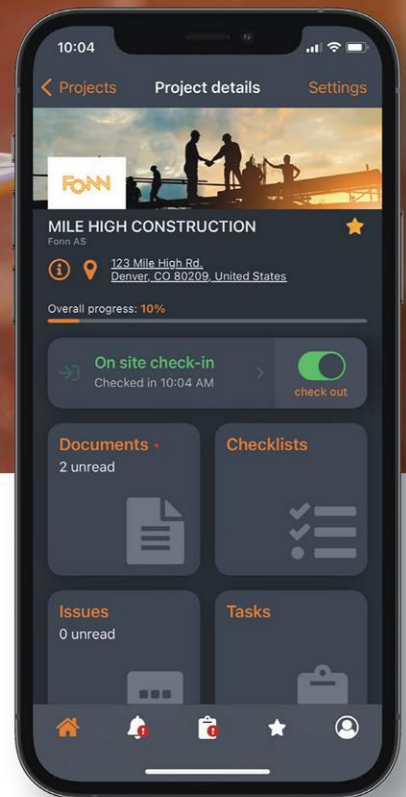
Prioritizing safety on the jobsite can also help increase the quality of work, helping increase productivity and revenue



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per hour. Take a close look at your KPIs, evaluate for the current market and prioritize achieving those goals.

2. CONSIDER COMPENSATION ALTERNATIVES

Labor costs are a huge expense for many contractors, especially if they provide healthcare and other benefits. It may make sense to explore a flexible compensation structure that will keep workers gainfully employed during slow periods and remain on your roster once business picks up.

Paying a lower base salary and rewarding employees with bonuses or incentives can help the company weather lean times, yet still provide them with commensurate wages.

If your business is really struggling, universal pay cuts may be the only option. While unpopular, it will be easier to accept if managers and leaders are included in the plan. Smart contractors should also use extended downtime to consider adjusting the size of their workforce to align with current and projected needs.

3. ELIMINATE EXCESS WASTE

Material costs have skyrocketed which means it's more important than ever for contractors to reduce waste. This involves careful planning, accountability and streamlining of end-to-end processes whenever possible.

Being capital-intensive, a construction company needs a favorable return on assets to turn a profit. When you spend more time planning a project, you are less likely to order too many supplies or lose money on excess materials during the build. Take a look at your equipment costs and pare down where you can.

4. CURB DEBT THROUGH LOWER INTEREST RATES

Debt can be a crushing burden to any enterprise. Because of the federal stimulus money pumped into the economy to support small and medium-size

businesses, commercial interest rates have decreased considerably since March 2020.

Take advantage of the fact that rates remain low to support small business growth and consider refinancing now, if you haven't already. Besides potentially saving money in the long term, a lower interest rate can reduce monthly costs.

Given the variables in the construction industry, you should investigate increasing the terms of your loan. Ideally, longer terms allow contractors to plan better, minimize payments, improve cash flow and weather the unknowns in years to come.

5. OPTIMIZE SUPPLY CHAIN INVENTORY

Hold-ups in the global supply chain have hampered many industries, and the construction business has been hit particularly hard. According to one survey, 75% of contractors reported delays or disruptions because of a shortage of materials during the pandemic.

The key to meeting this challenge is to strike a balance between keeping a stable inventory supply and reducing overhead costs associated with materials. By evaluating the level of risk in your supply chain, you'll be better able to manage inventory and cut back on lost time due to resource shortages.

It's a good idea to work with project owners to coordinate schedules with needed material prices and availability.

6. KNOW BOTH YOUR DIRECT & INDIRECT COSTS

Understanding your costs will allow you to identify further areas of improvement discussed above. It is not uncommon to hear contractors say they are making 30% gross profit, and then the net income reflects 2% to 3%. A contractor may have a 10% gross profit while net income reflects 5% to 6%. This is likely a byproduct of how each contractor allocates direct and indirect costs.

Overhead is a common dumping ground for construction expenses that contractors do not know where to place. Allocating indirect expenses such as insurance and office salaries to jobs can help a contractor understand their true costs and what margins are needed to make money while bidding. Furthermore, employees in the field tend to operate with more discipline and focus when the illusion of room for error is smaller.

Reviewing your costs from top to bottom, in the field and at home, is essential to bidding and managing projects when the construction market contracts.

DO WHAT YOU DO BEST

Before COVID-19, the construction industry experienced one of its most lucrative periods ever. Now, as we emerge from the pandemic, having a clear strategy in place can help contractors navigate a more volatile market environment. And a sound strategy starts with sticking to your best practices and refining them. In this new reality, with the potential of stimulus trickle downs, the need to address backlogs and pent-up demand and material pricing at all-time highs, there is no precedent to fall back on.

When contractors seek out work that falls outside their normal geographic territories or is beyond their typical scope, they are increasing their risk — a dangerous game in an uncertain market.

Adopting these six strategies can help you stay ahead during a difficult period for the construction industry and be better prepared for more prosperous days ahead. **CBO**

Matthew Campbell, based in Irvine, California, is a contract surety underwriter at Liberty Mutual Surety serving the needs of construction clients. With more than 10 years of industry experience, he holds an MBA from the University of Michigan's Ross School of Business and a bachelor's degree from Boston University. Visit business.libertymutual.com.





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How to Outsmart Cybersecurity Threats

4 steps to ensure the safety of your company's financial data

BY DAVID LUKIĆ

Construction work is conceptualized by many as an active line of work, far removed from the standard 9 a.m. to 5 p.m. desk job. However, most people do not consider how much of information is stored digitally. As a result, people underestimate the wealth of information that might be desirable to hackers.

Client and vendor information, financial records and intellectual property (IP) data are all valuable and susceptible to cyberattacks. Hackers can and will target anyone, using several different methods, including phishing, social engineering and data breaches.

Taking a proactive stance is the best way to protect your company from online attacks. What can you do to protect yourself and your colleagues?

HOW CAN HACKERS TARGET YOUR COMPANY?

There are several methods cybercriminals use to access valuable data. Some of the most common methods are:

- *Data breaches* — A data breach occurs when sensitive, protected or confidential data is copied, transmitted, viewed, stolen or used by an individual unauthorized to do so. This can be done through the installation of ransomware on your

computer via a phishing attack

- *Ransomware & phishing attacks* — Ransomware is harmful software that can be installed on company equipment, most often downloaded by unsuspecting employees who click on a harmful link. Why might an employee click on a harmful link? This is where social engineering and phishing come into play.
- *Social engineering* — This is a form of manipulation used by cybercriminals to get employees to help release confidential information. By imitating

a company email or an email address or format from a trusted source, cybercriminals can make their attempt convincing to those ignorant about the signs of a phishing attack.

- *Insider threat* — The above types of fraud can come from both past and current employees through inattention or carelessness.

WHAT HAPPENS TO YOUR DATA?

What does a hacker do with the information they've stolen from your company? Most often, the answer is



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Client & vendor information, financial records & intellectual property (IP) data are all valuable & susceptible to cyberattacks. Hackers can & will target anyone, using several different methods, including phishing, social engineering & data breaches.

industrial espionage. For example, in 2006, a South Korean steel and construction company fell prey to one of the largest cybersecurity attacks in recent memory, which impacted over 70 major companies across the globe.

This attack resulted in an unprecedented transfer of wealth in the form of IP and trade secrets. Credit card numbers and security codes can be used to create clone cards for making fraudulent transactions and social security numbers and home addresses can lead to identity theft or fraudulent tax returns.

Cybercriminals not only sell your data to other people, but they can also attempt to sell it back to you in the form of a ransom. They may threaten to leak client and/or vendor information and blueprints to competitors unless you send them an exorbitant sum of money to buy their silence.

All of this creates a lot of risk for you, your company and your employees. However, there are several steps you can take to ensure the safety of company data.

1. EDUCATE YOUR EMPLOYEES

The most important factor in being proactive against cyberattacks is to educate your employees. Remind them to use strong passwords when using company systems and email.

One suggested method is to skip the complicated password and opt for a simpler solution. Instead of creating a convoluted password that they're tempted to write down (which increases the chances it may get stolen), encourage employees to use a phrase from their favorite show or movie that they will remember, but will be difficult for someone

else to guess. The longer the password, the more secure it is.

Inform employees about phishing, ransomware and other forms of social engineering. This can be mandated with training videos, but it's better to make the sessions interactive.

Encourage employees to take a phishing test on their own, and reward the employees who earn the top scores. Engagement leads to better retention, which improves the safety of your company's IP and other sensitive data.

2. CREATE A CYBERSECURITY PLAN

A recent risk management report suggested that company owners create a disaster relief plan and perform mock drills to gauge employee response. The report suggests designing a cybersecurity plan that is unique to your company.

Determine your own cybersecurity goals and needs through a risk assessment. Too often, organizations are sold a plan by a vendor. However, if a breach occurs, such a plan would do little to prevent legal and technical risk.

3. BE AWARE OF EMERGING THREATS

It's important to stay current on cybersecurity trends, as well as threats affecting all different types of businesses. Northeastern University recently highlighted seven important cybersecurity trends in 2021:

1. New technology and devices
2. Increasing ransomware attacks
3. Attacks on cloud services
4. Outdated and inefficient systems
5. Remote work risks

6. Continued use of multifactor authentication

7. Increased interest in data privacy

While many of these may seem like no-brainers, it's important to dive deeper into each one if you are serious about protecting your company. Set aside time in your workday to review cybersecurity news, and in the construction industry, and pay attention to how firms are handling safety to avoid serious data breaches.

4. CONSIDER THIRD-PARTY PENETRATION TESTING

While it's important to have your own robust internal monitoring systems, it can be helpful to have an outside perspective on your cybersecurity plan. Consider hiring an outside information technology (IT) firm to perform penetration testing and a security audit to spot gaps or issues your team may have overlooked. Companies that conduct identity monitoring and provide regular credit reports and credit score checks are available, but be sure you're hiring a trustworthy source.

All companies should be concerned about cybersecurity, regardless of their goals or purpose. Act today to protect your construction company's financial data. You can do this through staff education and employing rigorous cybersecurity measures. **CBO**

David Lukić is an information privacy, security and compliance consultant at idstrong.com. Lukić has a passion for cybersecurity and shares his knowledge in order to make it accessible and interesting for businesses. Visit idstrong.com.



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EXPLORING THE PAST, PRESENT & FUTURE OF MACHINE CONTROL TECHNOLOGY

From excavators that can automatically dig to depth, to trucks that drive themselves, machine control technology is revolutionizing the construction industry. Machine control hardware and software solutions were developed to determine a machine's current position on the earth and compare it with the desired design surface.

Using data from satellites or total stations and 3D models, the technology ensures that machine operators can accurately position machinery, check grade, automate equipment functions and collect data. Using various positioning sensors and a display, machine control systems provide operators a clear reference between the position of the machine bucket or blade and the design surface.

Used by the construction industry on earthmoving equipment since the late 1990s, the technology allows decisions to be made based on data, rather than relying on the skill of the operator. As a result, machine control solutions on dozers and graders save operators time, money and fuel.

THE SKILLS GAP

The construction industry of today faces many challenges. It is no secret that there is a lack of fresh talent entering the sector and many seasoned operators have reached retirement age or have moved on to other careers. The industry has had trouble attracting younger people as well and as a result, there are fewer operators entering the profession.

Should this trend continue, the industry will be left with a shortage of experienced operators, which means that the quality and productivity of projects will be impacted by a significant skills gap. To meet targets and tackle the skills gap head-on, the industry is turning toward automated machine control to improve workflows.

AUTOMATED MACHINE CONTROL

Going beyond simply providing operators with a visual guide to bucket or blade position, automated machine control moves the blade to grade by communicating with the machine's hydraulics. Unlike regular machine control, automated machine control technology places the responsibility for accuracy and speed firmly in the hands of performance-enhancing technology. This means that using this technology, new or less-skilled operators can perform like a professional and even the most experienced operators can work better and faster.

TECH ADOPTION

With the demands for productivity increasing and a shortage of skilled operators, construction business owners should consider the benefits that investing in automated machine control can bring to their company. There is an opportunity for the industry to transform construction workflows by investing in automated excavation



systems, taking the first step toward a fully automated jobsite. For example, some manufacturers today provide options that use the same components of the original machine control system with the addition of an ultra-smooth hydraulic interface.

With easy-to-use finger-tip control, the technology is designed to provide automated depth control when digging to grade in flat, stepped or sloped applications. The system allows experienced operators to work better and faster, while new operators can perform like a professional.

Harnessing the Power of Data in Construction

Data is an incredibly important tool in the construction industry toolbox — it presents enormous opportunities and could change the way businesses and jobsites operate, making them more efficient, more profitable and more accurate. All that's missing is the consistent onboarding of data solutions.

The industry is facing a single-shot opportunity to recover from the impact of COVID-19, which has ravaged so many sectors. As countries reopen and businesses gear up for recovery, the opportunity is upon us for coronavirus to be the catalyst that accelerates digital adoption.

Data connects field and office to provide complete visibility of job progress, making construction processes more accurate, increasing productivity and generating significant cost savings. Data is knowledge — and knowledge is power.

Real-Time Data

Harnessing the power of real-time, accurate data is key to creating efficiencies in the construction process. A jobsite is a rich source of data, and that data contains insights into every single element of work. With a real-time picture of what's happening on your jobsite, project managers can make more profitable decisions.

With data, contractors can open huge parts of a project to multiple people to benefit from varied insights and expertise. Technology can interpret large amounts of data instantaneously, providing real-time feedback on a job's progress, in turn, allowing for immediate adjustments to maximize productivity and profitability.

Today's Tools

There are technology solutions available for every type and size of jobsite. Coupled with on-site instruments and machine control, data offers an extremely powerful solution that keeps stakeholders up to date with the latest data analysis from your site.

This type of software allows both the office and the field to work in tandem with complete interconnectivity, practically eliminating the potential for costly project errors and miscommunication.

The construction sector is a dynamic, forward-looking industry that is creating a modern built environment for the benefit of society. Technology and data has the potential to transform the construction industry into something truly bold and enterprising.

New machines using machine control technology allow operators to automatically control digging depth, boom elevation and the bucket angle — ensuring that they are on-grade every time. This saves both new and experienced operators time and money, through an estimated increase in productivity of around 30%. The technology also means that operators only move the earth that is required, which in turn avoids over-digging — saving additional costs of fuel and unnecessary transportation of materials and rework.

Automated 3D machine control systems also provide onsite safety benefits. By using the most advanced and precise GPS positioning technology and sensors, operators receive real-time, dynamic, on-screen bucket location and design views. Access to real-time designs means that operators can cut more accurately and check against complex designs in the cab.

Thanks to onboard connectivity, automated machine control systems like these can also be used alongside software to give teams remote access to the excavators while generating can from each machine and communicated to a central point. Reports, data and even designs can be shared between the office and the in-cab display to ensure operators are being updated when changes are made in real time — reducing the need for rework if plans change.

THE FUTURE OF AUTOMATED MACHINE CONTROL

Automation is just the first step for machine control. Looking forward, not only will automation control machine angle and depth, but the whole excavation process is likely to become automated — increasing productivity across the entire construction workflow.

Using automated machine control technology, machines will be able to act as sensors — monitoring the progress of projects and sharing accurate reports on productivity. For the wider construction workflow, these reports will then be used to synchronize with other functions and equipment — such as trucks — to further streamline processes and avoid unnecessary downtime.

In the future, fully automated construction workflows will allow project managers to accurately assess the rate of progress and resource the operation appropriately. Business owners should ensure that they are upskilling their workforce through this technology and embracing the benefits it brings to projects as fully automated construction workflows continue to be utilized to address future infrastructure targets. **CBO**

Ron Oberlander is the vice president of global professional services for Topcon Positioning Group. He has held multiple roles at Topcon, including support, systems integration testing and product management for construction products. The focus of his current role is the continued development of educational programs for users of Topcon technology through his leadership of the global professional services team, based out of the corporate headquarters in Livermore, California. He is a licensed professional land surveyor with more than 25 years of experience in the surveying and construction industry. Visit topconpositioning.com.



INSIDE THE COST SAVINGS, INCREASED EFFICIENCIES & INFORMED DECISION-MAKING OF BIM

Digital transformation may seem like the buzzword of the hour, but its benefits are real, especially in sectors with high-dollar projects and multiple stakeholders.

In the construction industry, building information modeling (BIM) plays a central role in leveraging data from both building models and company processes to dramatically improve decision-making capabilities, establish more efficient workflows and reduce design and building errors and cost overruns.

“BIM is the foundation of the digital transformation of the [construction] industry, from design through operations,” said Amy Bunszel, executive vice president, AEC Design Solutions at Autodesk. She adds that the more companies use BIM, the greater returns they see on investment in the technology.

In a recent report, “Accelerating Digital Transformation Through BIM,” Dodge Data & Analytics, in partnership with Autodesk, reviews how the architecture, engineering and construction (AEC) sector is transforming into a data-driven industry.

WHO'S USING BIM?

According to the Dodge report, nearly half of heavy BIM users surveyed say they have achieved (or are close to achieving) company digital transformation goals. Architects are the most intense users of BIM — 89% of those surveyed employ BIM on at least 50% of their projects.

Mechanical, electrical and plumbing (MEP) and structural engineers are the next most prominent users (80%), followed by civil engineers (72%) and contractors (69%). When it comes to data-related activities in BIM, usage is highest among architects, structural engineers and MEPs.

More than half of BIM users have come to the technology and its benefits only in the last

5 years. Architects, unsurprisingly, have been the earliest adopters and users of BIM, with 14% of firms reporting use of BIM prior to 2008. Dodge's research shows that the firms that have been using BIM for longer report the greatest benefits and ROI.

IS BIM WORTH THE INVESTMENT?

Among BIM's earliest users is United Kingdom-based Anglian Water, which first began adopting building information modeling on its construction projects in 2010. Since then, BIM has become a critical component when designing and building new water infrastructure projects.

Recently, the firm created a digital twin in conjunction with construction of a vast greenfield pipeline project known as the Strategic Pipeline Alliance (SPA). A digital twin is essentially a digital version of an existing asset that is powered by real-time data. In Anglian Water's case, the digital twin established a virtual “representation of the company's assets, systems and treatment

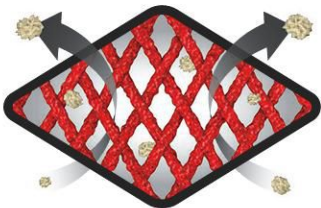




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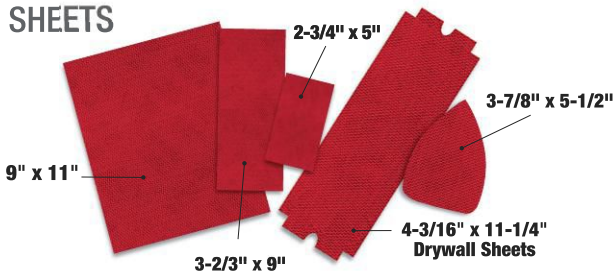
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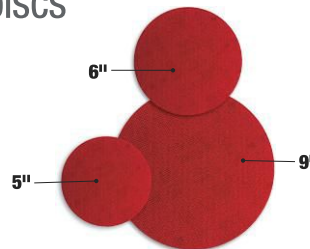
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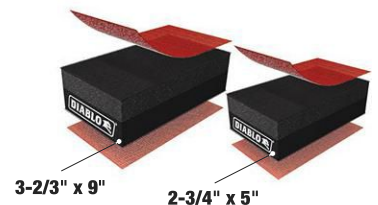
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processes” in one of the driest regions of the country, according to asset data lead Guy Gregory. As a result, Anglian Water was able to design the SPA project with smaller-diameter pipe than they anticipated, ultimately saving the company \$6,840,000. Anglian Water is only one among thousands of companies that have reaped financial benefits and costs savings through digital transformation with BIM.

Dodge’s study regions included North America, Scandinavia, Australia/New Zealand, Japan, Germany, U.K./Ireland and France. For example, according to the Dodge survey, designers, whether architects or engineers, who use BIM in 75% or more of their projects report higher design quality and an increased ability to meet client expectations — 70% of designers also report major project sustainability benefits from BIM, the biggest one being regularly exceeding project performance goals and standards.

Meanwhile, 70% of building contractors report significant cost control benefits to using BIM. Builders also indicate BIM promotes an array of schedule control benefits, including greater likelihood of project completion within anticipated timelines and more efficient resource planning.

While North American contractors report fewer business growth and cost benefits from using BIM than their European and Japanese counterparts, they remain enthusiastic about quality control gains.

CAN BIM SAVE TIME ON CONSTRUCTION PROJECTS?

BIM proved crucial to helping design firm Lombardini22 meet project goals and timelines for renovation of commercial office space in a densely populated, historic area of Milan, Italy, in 2020. With a tight developer timeline that also included design approval by the local historical review board, Lombardini22 found BIM technology critical to its completion of the project by the end of 2021.

“[BIM allowed] a more proactive approach to design,” said Andrea Meneghelli, project architect and BIM coordinator for Lombardini22. “We could fix issues earlier.”

Among the benefits of BIM was the team’s ability to create two potential designs for the historical review board and replace one with the other quickly when the first was not approved. The firm was also able to quickly tweak the building’s design to accommodate a new client goal of gaining LEED Platinum certification for the structure rather than LEED Gold and being able to maintain efficient, real-time team communications via a cloud platform.

“We could all work together, which is a big savings from a design point of view,” Meneghelli explained. He adds that Lombardini22’s BIM strategy allowed the team to be “adaptable to different scenarios without having to throw anything away.”

He says BIM also allowed the firm to quickly leverage a detailed model and make or change decisions quickly during the permitting and approval processes.

WHAT KIND OF ROI WILL BIM OFFER?

While there is currently no global standard for measuring the return on investment (ROI) for BIM use, Dodge’s study of BIM system users over the last 12 years shows substantial self-reported ROI — 51% of BIM users claim a 25% or higher return on investment.

Interestingly, North American building industry professionals reported the lowest ROI from BIM usage. Only 29% of North American users indicated that they saw a ROI of 25% or more, and 31% claimed they either broke even or lost money on their BIM investment. Given that France and the UK and Ireland reported no loss of earnings in BIM investment, the Dodge study suggests North American architects, engineers and builders need more training in engagement with BIM tools.

Since 2018, the government of Hong Kong has mandated that all state-funded projects valued over \$30 million employ BIM as part of the design and construction process. To that end, the Hong Kong Construction Industry Council has created BIM technical standards as well as training and support services to encourage private sector adoption of digitization as well.

“We have seen that governments can play an important role in encouraging the digitization of the construction sector,” said Adam Matthews, chair of the Global BIM Network. “They can signal the way ahead with policy ... [and offer] confidence to the sector to invest in digital upskilling, process improvements and technology.”

THE DIGITAL FUTURE OF CONSTRUCTION

Digital transformation has an industrywide impact, whether individual companies are using BIM or not. Those who use it heavily are increasingly outpacing those who don’t in project completion timelines, cost savings and gains for clients.

“This study demonstrates that the data revolution is already underway in design and construction,” said Steve Jones, senior director, industry insights at Dodge Data & Analytics.

BIM represents “the first intensive digitization of AEC information” that hasn’t been designed to create a physical artifact, like a drawing per se, according to Phillip Bernstein, FAIA, RIBA, LEED AP, associate dean and adjunct professor at Yale University. Rather, BIM helps designers, engineers and builders establish a comprehensive visualization of all the complex pieces that go into representing a project before construction even begins.

“It is my hope,” Bernstein said, “as the industry faces its next set of existential challenges — climate change, social inequity, labor shortages, broken supply chains — it will deploy tools like BIM, and eventually artificial intelligence (AI), in the service of optimizing the entire delivery process.” **CBO**

Deborah R. Huso is a creative director and founding partner of Write Well Media (WWM), a content marketing and strategic communications firm focused on the construction, design and real estate industries.

How Improved Change Order Communication Can Reduce Risk for all Stakeholders

Put your most valuable employees back to work by automating manual change order processes



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Despite so many other advancements in the construction industry, the traditional change order process is still one of the biggest headaches in commercial construction.

Project teams are managing 10% of employee time and 25% of a project's total cost on outdated methods including spreadsheets, email inboxes and paper-based time and material tags.

The results of an outdated change order process include wasted time for all project team members, increased financial risk, lack of real-time statuses and uncaptured valuable data and insights. And with larger projects being completed with new delivery methods like design-build and integrated project delivery (IPD), updates to your process and technology stack tools are required to stay on time and on budget.

Fortunately, new tools are available to make project teams more collaborative, reduce wasted change order processing time, and capture lost revenue related to extra work.

In this webinar, Extracker CEO Cameron Page and Director of Sales Greg Seldon bring their decades of construction experience and software leadership to highlight the new channels of change order communication between subcontractors, general contractors and owners. Webinar attendees will walk away with a clear understanding of why change orders add risk to the project, four ways to process change orders faster, and benefits of real-time collaboration that you and your teams can start using right away, even midproject.

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HOW ROBOTIC PROCESS AUTOMATION CAN DECREASE COSTS & IMPROVE EFFICIENCY & PRODUCTIVITY

Despite its simple appearance, the financial equation of “revenue - expenses = profit” is so complex, there are few who truly understand it. Many factors contribute to revenue and expenses. Common expenses for operating a construction business include labor, materials, insurance, permits, office space, vehicles, trailers and other incidentals. Furthermore, some company expenses are not negotiable and are often the largest portion of mandatory expenses, such as labor costs. Fortunately, there is a way to decrease or even eliminate these expenses. Robotic process automation (RPA) can decrease overhead labor costs by improving efficiency, productivity and automating menial tasks that do not require a trained employee.

WHAT IS RPA?

RPA is a technology that utilizes software “robots” to complete manual and frequent tasks more accurately than most humans — constantly and without fatigue.

Think of a process in your company that is frustrating to employees because it is time-consuming, mindless or requires limited skills to complete. These types of processes can be outsourced to an RPA engine.

HOW CAN RPA SERVE THE CONSTRUCTION INDUSTRY?

While software robots do not lay brick, operate cranes or perform earthwork, they can automate repetitive digital processes that usually require an employee’s time and attention. RPAs can increase employee’s value to the company by transforming a mere “number cruncher” into a data analyst with the bandwidth to review input or reports generated by an RPA bot.

Process automation does not always require a programmed RPA bot, and often, it is available via modern software programs. More software hits the market every year, purpose-built for automating manual tasks such as recording field time, collecting documents from subcontractors then analyzing against business or project requirements, routing invoices internally and more.

Most construction office staff members are likely to already be using some form of RPA. A simple example of an automated workflow is setting up an out-of-office email reply. The user provides instructions to the software to reply to incoming emails with a simple response — this way, there is no need to manually reply to each email or leave colleagues and clients wondering why no one is responding.

WHY IMPLEMENT RPA?

RPA is more cost effective than custom software. If businesses want to automate a process that an existing piece of software has not yet been created to address, the choice is to continue with the manual



process or commission custom software to handle that specialized task. RPA doesn't usually replace your existing software, but allows you to use the tools you have more effectively data to be manually transferred between systems. With an RPA, companies don't have to copy and paste or export data from one application, manipulate it to fit into another, upload it or reconcile any errors. RPAs can quickly pull information from one system to another without errors.

Software robots don't get tired or distracted, or suffer from human error. RPA provides greater accuracy in data transfer than a human could provide. A company can start with one RPA bot dedicated to a specific task on a specific project, or they can implement hundreds of different robots automating separate tasks across their organization. RPA has unmatched scalability when compared to hiring new employees, developing custom software or purchasing enterprise software.

3 THINGS TO CONSIDER

1. *The process* — Implementing RPA bots properly requires process review and analysis, so companies are not deploying multiple bots where one could do the job.
2. *Development strategy and cost* — RPA development and deployment training takes time. In most cases, construction

companies outsource the task to a firm specialized in RPA development. Make sure your company has the time and financial resources to invest in a project like this.

3. *Off-the-shelf software* — Custom development is more expensive than an off-the-shelf software solution. Before committing to RPA development, consider the existing options on the market.

RPA provides companies the opportunity to automate some of their most mundane and repetitive tasks, while elevating the value of the worker and the business — every business owner wants to increase the value of their business.

Technology and standard processes allow businesses to increase their production by increasing the amount of work they can deliver with less overhead costs. Continue learning about RPAs and software to discover how to maximize profitability for your business. **CBO**

David Sombrio started serving the construction industry in 2016 as a consultant for JBKnowledge. As a consultant, he worked with over 50 construction companies to evaluate their businesses, identify issues and inefficiencies and recommend software or process improvements. He is now a business development manager for SmartCompliance and manages strategic partnerships for the brand in the construction industry. Visit smartcompliance.co.



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The Inevitable, Connected Future of Construction

A look ahead at tomorrow's technology-driven operations

BY JOEL HONEYMAN

It can be hard to keep up with the heavy equipment industry these days — new excavators and wheel loader models with new options, gadgets and updated features are popping up at a more frequent pace than they once did. It can be easy to lose track of these developments, and some new machine options may go unnoticed by the contractors who might ultimately benefit from them.

It's no secret that emerging technologies have improved the compact equipment industry. But what's next?

Keep in mind that this future is one in which innovation will coexist side by side with conventional machine and technology offerings. Ultimately, business owners and contractors will have a variety of choices for which types of solutions they incorporate into their operations, and at what time they do so.

Today, the industry is in the connection phase. One-way telematics, remote operating capabilities and software-as-a-service (SaaS) dealer offerings have become commonplace, and these solutions continue to improve over time. Business owners have become comfortable with telematics and using data to make smarter, more efficient decisions for their operation.

Within 3 to 5 years, the industry is expected to enter an engagement phase,

where semiautonomous equipment operation becomes the norm. The growth of augmented reality (AR) technology in the consumer and automotive sectors will also increase in popularity and provide more opportunities for owners to grow their return on investment (ROI) and expand their geographic footprint. Advances in machine sustainability and green power will start to become the norm, and business owners will have learned to manage a mixed fleet of equipment.

Finally, within a decade, an integration phase for fully electric, autonomous equipment will be our inevitable future. Business owners will be able to capitalize

on opportunities they never could before, thanks to full-machine electrification, virtual reality (VR) or gamified work and an interconnected cloud ecosystem of information that will provide incredible opportunities for multiple-machine coordination and connectivity.

Throughout each of these phases, operators and business owners will see continued improved performance and better oversight into the inner workings of their companies. In addition, this movement toward deeper connection and autonomy will transform how the industry thinks about jobs, recruits and retains employees, and how construction





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operations are scaled. While the unknown can sometimes feel uncertain, this as an exciting opportunity — a true transformation of the industry.

CONNECTION PHASE: HARDWARE

Business owners can't be on every jobsite 24/7 and need an easier and more precise view of what's going on across their operations. They want to anticipate future needs instead of reacting to current demands. And within the next 3 years, there will be an increased amount of technology to do that.

With advents in remote operation, increased hardware platform sophistication helps owners track equipment and jobsite happenings. Fleet management systems will use telematics to send up-to-the-moment machine and component stats to the owner's cellphone.

The fleet management systems of the near future will also immediately notify dealerships about equipment issues. Gone will be the days of calling a dealer and scheduling a technician to come, diagnose and repair equipment. The dealer will be able to remotely diagnose many machine issues in minutes by accessing the diagnostics.

As a result, businesses will need fewer on-site mechanics, and leasing equipment rather than owning it will become a more favorable and cost-effective option. Leasing offers certainty of costs, as well as full warranty and maintenance coverage. With machine and operator performance characteristics in hand, business owners will save significant time and money on equipment, logistics and labor.

The industry is seeing some of this take place already, with the increased incorporation of more telematics platforms and cellular connectivity. While the last 18+ months have certainly created global challenges on multiple levels, the resiliency of the industry will regain momentum as it always has during times of abnormality. If anything, the need for connectivity has

never been greater, as remote work has become the new normal.

ENGAGEMENT PHASE: SOFTWARE

With a movement toward semi-autonomous operation, business owners can optimize their operations. The engagement phase — the second technology evolution — will help business owners increase business intelligence by making it easier to estimate jobs and evaluate efficiency.

For example, this engagement phase will put a focus on how much work has been done. This provides an opportunity between manufacturers and business owners to monetize output, not just a piece of equipment. This more connected performance also allows savvy business owners to estimate jobs more easily, as actual work is translated to an actual cost. This innovation will also help business owners plan with greater specificity over time since they will have historical data and trends at their fingertips.

INTEGRATION PHASE: ARTIFICIAL INTELLIGENCE

Finally, within a decade the integration phase will allow business owners to become true job experts, with all their assets combined for seamless connectivity and versatility.

The advent and normalization of smart equipment and an integrated artificial intelligence platform will advance to create specific competitive advantages to complete complex tasks the most efficiently and at the lowest cost. Business owners will be able to make more predictive decisions about what jobs they could take on that present real ROI opportunities for their organization.

A key enabler for this to happen is artificial intelligence, and a move toward fully autonomous operations. Fleet owners, if they choose, will be able to assign operatorless equipment to complete repetitive tasks like basic material

movement while reserving their skilled operators for the most complex tasks to complete. Because the need for operators — and skilled workers in general — will continue to be in high demand, equipment manufacturers are designing and building equipment that maximizes their productivity without having to make trade-offs in performance. In addition, assigning autonomous operations to those repetitive tasks will allow your team to tackle larger, more complex jobs that may not have been a reality before.

For jobs with complicated tasks that require an operator, such as final grading and finish landscaping, design plans will now appear on the front windows of the operator's machine via virtual and augmented reality. Features, elevations and grade data are easily accessible to operators, allowing them to accurately orchestrate each project.

Operations that were once estimated and varied will become precise and measured. Specialization will increase, and the businesses that can orchestrate and coordinate a project's distinct pieces will meet the most success going forward.

Connectivity is about information. If businesses know more — more about the machines, their operations, the jobsite, the operators — they can do more and can do it better, improving efficiency and — most importantly — profitably.

Again, there is room in this inevitable future for all ways of working — for contractors who are ready to jump headfirst into fully autonomous machines and interconnected fleets to owners who wish to maintain their current business models. **CBO**

Joel Honeyman is vice president of global innovation for Doosan Bobcat North America. He is responsible for driving a culture of innovation, partnering with leading global technology firms and demonstrating the value of applying advanced technologies to current and new products, processes and services. Visit bobcat.com.





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Maximizing Mixed-Fleet Operations

How broader equipment options can bring more advantages

BY TROY DAHLIN

While many manufacturers promote brand loyalty (the idea of using one brand for every piece of equipment on the jobsite), this way of doing business is often no longer practical on the modern jobsite.

Contractors' needs have shifted with time and the jobs they complete. And no single manufacturer makes the best piece of every type of equipment.

With the right selection and deployment of technology, midsize general contractors are no longer beholden to a single manufacturer, opening endless potential opportunities.

The modern jobsite is more complex than ever, and contractors face pressure like they never have before as they struggle to find the skilled labor they need. As the world continues to evolve into a post-pandemic landscape, general contractors (GC) will place a renewed focus on functionality over brand loyalty to remain flexible and to find an advantage in a tight market.

To maintain the most efficient jobsite, contractors demand options in their machinery, technology and technology integration. Incompatible technology or forced brand loyalty no longer makes sense as companies grow their strengths in different areas. Frankly, business owners take this approach because it gives them

more opportunities to deploy solutions that precisely meet their needs rather than making their needs fit the offering.

WHAT TO CONSIDER WHEN DEPLOYING A MIXED FLEET?

Almost no contractor operates with a fleet comprised of a single brand; instead, they rely on various original equipment manufacturer (OEM) equipment, especially when it comes to specialized equipment. Doing so allows contractors to deploy the best (and most cost-effective) solutions in the marketplace, instead of only utilizing a solution offered by one brand.

Traditionally, using a mixed fleet has brought integration challenges and a lack of visibility across brands. However, there are significant benefits to operating with a mixed fleet, including cost savings, acquiring the exact equipment and solutions needed for a job so they can readily integrate into their existing fleets.

Many contractors make purchasing decisions on varied factors other than the brand, such as price or functionality. These decisions lead to a healthy mix of brands and machinery on any jobsite.

A mixed-fleet telematics standard earned ISO approval in 2016, opening the door to increased interoperability



and data sharing between different companies' equipment. However, not every manufacturer has fully embraced interoperability, so mid-sized general contractors must verify that every solution they deploy will integrate with their fleet.

THE CURRENT LANDSCAPE

As the cost of doing business continues to increase, the ongoing labor shortage and the COVID-19 pandemic exacerbate the problem.

According to the October 2021 issue of "The Civil Quarterly" from Dodge Data & Analytics, an overwhelming majority (92%) of civil contractors say they have had projects impacted by the fluctuations in the cost of construction materials.

This builds on an earlier finding from "The Civil Quarterly," which found more than a third (35%) of companies planned to spend more on construction equipment

(either leased or purchased pieces) in the coming months.

Amid the ongoing COVID-19 pandemic and other market forces, mainly the skilled labor shortage and concerns about inflation, many contractors are reevaluating their approach to the jobsite and their use of technology. Their goal is to find new ways to implement solutions and avoid unnecessary investments that do not benefit their bottom line while meeting the ongoing shortage of skilled labor.

Integrating and using technology makes it possible to have fewer people on-site, particularly important during the pandemic. According to an earlier finding from "The Civil Quarterly," nearly one in four (23%) contractors reported specifically adopting technology to support social distancing.

But the adoption of the right technology will have implications that outlast the current pandemic, allowing contractors

to increase their level of productivity and complete more work with fewer people.

A MIXED FLEET OFFERS ANOTHER ADVANTAGE

While OEMs traditionally promote equipment with their technology embedded, some technology companies have been less inclined to enable cross-brand compatibility.

However, a shift has taken place in recent years, and contractors want options in the solutions they choose. They want to mix and match the tools and the equipment that works best for their needs on the jobsite. Further, using a mixed fleet allows contractors to overlay new technologies without investing in new equipment or replacing large sections of their fleet at once to keep up.

An agnostic approach to equipment on the jobsite provides the most significant



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opportunities for contractors. This approach enables contractors to capture standardized machine and equipment data for aggregation, regardless of brand.

Interoperability enables contractors to add new technology and new solutions (such as machine control) without replacing their entire fleet. Such solutions offer real-time insights into usage and performance data.

Consider GPS localization as an example. Every technology provider has a proprietary way of converting latitudes and longitudes into local coordinates, resulting in various potential formats. But contractors may have to convert other localization formats into their own, which is a potential problem depending on what manufacturers they are integrating.

An application that reads all files used by major brands and automatically converts them for use with any OEM

equipment also eliminates the potential for error.

TANGIBLE RESULTS

As the world works to emerge from the pandemic, contractors will double down on deploying the solutions that help them meet their bottom lines and daily objectives — a reality that can easily result in savings of millions of dollars annually.

No one should have to settle for offerings they don't like or that don't work for their needs. Doing so will only make an already complicated jobsite even more complex. Contractors love options and the freedom to use the equipment they want, so suppliers should give them as many as possible.

A mixed fleet can save contractors added investment costs, allowing them to spread their investment across more machines to build a more extensive fleet

or the freedom to invest in other aspects of their business. It also allows them to future-proof their investments, knowing they can invest more today, and their purchase will be compatible with new technology offerings as they hit the market.

There are enough headwinds on the jobsite today. Operating with a mixed fleet should no longer be among them. Compatible equipment is a win for the contractor. When contractors win, everyone wins. That's a goal everyone should support. It leads to quicker project completion and the potential for cost savings, benefits everyone should readily embrace. **CBO**

Troy Dahlin is vice president, heavy construction segment US/CAN at Leica Geosystems, part of Hexagon. Visit leica-geosystems.com.



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Reshaping Supplier Relationships in the Technology Age

3 considerations for your move toward more digital tools

BY MITCHELL ROSE

The construction industry has been built on longstanding buyer and supplier relationships formed over years — in some cases, spanning generations — which, in many ways, have become the lifeblood of the industry. However, in today's complex environment, it's crucial that construction business owners don't let this tradition keep them from doing what it takes to succeed.

Many suppliers are already taking the necessary steps to adapt to the needs of today's buyers. However, the construction world still has ground to make up. For example, a recent study from Billtrust found that only 34% of building and construction suppliers say that they plan to invest in or trial e-commerce capabilities in the next 12 to 36 months. Meanwhile, past research has found that for 80% of equipment rental companies, an online transaction isn't even possible.

As business owners and contractors look to pave a path to success in this online world, here are three reasons why they should focus on building relationships that cater to today's digital demands.

1. IMPROVE PROJECT MANAGEMENT

Shopping for equipment and materials online is more efficient than traditional methods. For one, e-commerce gives

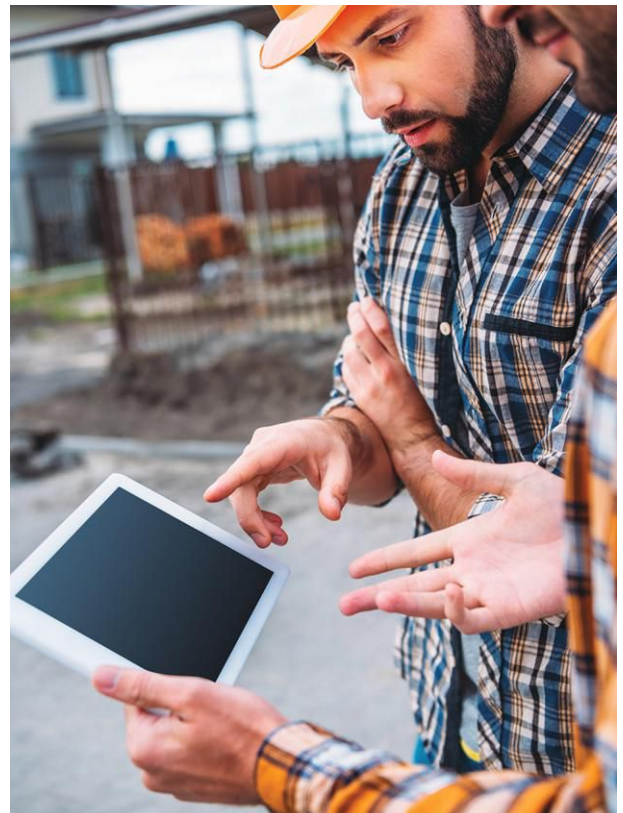
buyers a clear picture of inventory, providing them with immediate insights into what's available, something that's especially important as supply chain issues continue to plague the industry. Ultimately, buying online enables contractors to manage their jobs more efficiently and effectively, and frees them up to concentrate on skill-based responsibilities.

When you consider the impact that lengthy delivery times and unavailable materials have on a team's ability to complete a project on time and at cost, the benefits of adopting an e-commerce buying strategy is again evident. Leveraging e-commerce, organizations can mitigate these risks by eliminating friction and extracting unnecessary manual processes from the buying experience. Thanks to the power of artificial intelligence and machine learning, business-to-business (B2B) e-commerce experiences can

not only give buyers a clear picture of what options are available to them, but also offer personalized recommendations based on past purchases and searches.

2. DO MORE WITH LESS

Contractors have always had to wear many hats. However, with the COVID-19



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pandemic leading to worker shortages and the need to reconfigure operations around health and safety concerns, bandwidth is even more scarce today. Compounding things further, persistent global supply chain issues and rising material costs are forcing many teams into a situation where they are having to do more with less. McKinsey research finds that 70% of B2B decision makers say they are open to making new, fully self-serve or remote purchases in excess of \$50,000, and 27% would spend more than \$500,000. A significant amount of time is saved for teams who need to be on a project site, at the office or somewhere in between.

3. KEEP UP WITH COMPETITORS

The United States construction market is expected to grow by 15.6% in 2021. While this growth is a much-welcomed sign, it also signals an inevitable increase in competition. As such, the need to finish projects faster, more cost effectively and in a way that reduces strain on teams is more important than ever. Part of what will fuel this competition in the industry is the makeup of today's buyers, which is skewing more and more towards the younger generations. In fact, Amazon research found that nearly three-quarters of business buyers today are millennials. This generation of digital natives are heavily entrenched in the construction workforce and transforming B2B sales, meaning that if you're not evolving your buying process and embracing digitization, your competition likely is. **CBO**

Mitchell Rose is senior vice president and general manager, corporate segment at Billtrust. He has worked with hundreds of businesses to help them automate their order-to-cash process. Before Billtrust, he held senior-level marketing positions with Coca-Cola, Mattel and Warner Lambert. Rose holds an MBA in marketing from Columbia University and a bachelor's degree in applied economics from Cornell University. Visit billtrust.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.



◀ GEAR KEEPER

T11-3024 fixed Loop 3/4-inch Super Coil

Released: 10/3/21

Availability: U.S. market

What's new? The new 3/4-inch Super Coil is a flexible, low profile coil system that provides up to 48 inches of reach and safely retracts to only 27 inches for added security when climbing or working in cramped quarters.

Specs: The fixed loop tool attachment feature of the tether permits tethering of tools that have no other attachment point.

[Check 201 on index.](#)



▲ BRASS KNUCKLE

Red Warrior SmartFlex Gloves [BK504]

Released: 10/21/21

Availability: U.S. market

What's new? Gloves that provide spongelike slip resistance with a proprietary polyurethane foam coating process and are 20% thinner than comparable 15-gauge coated gloves.

Specs: These gloves deliver excellent grip without being sticky and even perform against oils, fats and greases, making them an ideal choice for both dry and light oil applications. Polyurethane coatings improve tactile sensitivity relative to other coatings, improve slip resistance particularly in wet applications, and are more breathable than flat glove coatings.

[Check 200 on index.](#)

BROKK ▶

C20 Rock Splitter

Released: 10/13/21

Availability: Global market

What's new? In tunneling and underground operations, this series provides contractors with a safe and quiet alternative to explosives and hydraulic breakers.

Specs: Using a rock splitter, with up to 1,800 tons of force, is quieter, safer and produces fewer vibrations and dust than breakers and explosives. It gives contractors a productive alternative in areas where potentially disruptive demolition techniques are not allowed.

[Check 202 on index.](#)





▲ HAVER & BOECKER NIAGARA

Scarabaeus Pelletizing Disc

Released: 10/19/21

Availability: Global markets

What's new? This technology effortlessly pelletizes fine materials to improve their storage and transportation properties, while increasing their market value. The machine seamlessly fits into an operation by offering adjustable inclination, speed and side wall height to best fit applicational requirements.

Specs: The machine applies a rotating movement combined with water as a liquid-binding agent on the surface of the disc. The selected material enters the surface of the disc and is pulled along the uppermost side to eventually collect in pellet form in a material bed.

[Check 203 on index.](#)



▲ CASE

CASE TV620B

Released: 9/28/21

Availability: Global markets

What's new? The 114-horsepower, 6,200-pound rated operating capacity CTL delivers best-in-class breakout forces — as well as more standardized features than previously available on any CASE CTL.

Specs: Includes standard adjustable electro-hydraulic controls, high-flow hydraulics, auto ride control, one-way self-leveling, a hydraulic coupler, an auto-reversing fan, LED lights and a one-year subscription to CASE SiteWatch telematics. It also comes with a new 1.25 cubic yard heavy duty bucket designed specifically for the TV620B.

[Check 204 on index.](#)



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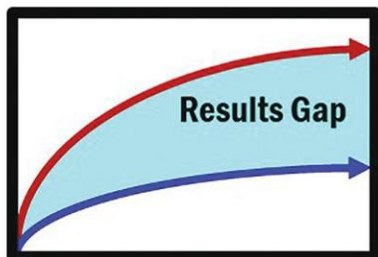
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▲ THUNDER CREEK

The Service and Lube Upfit (SLU)

Released: 9/28/21

Availability: U.S. market

What's new? Equipped for performance in tight, urban environments and compressed jobsites, and can be configured to carry up to eight oils or maintenance fluids, plus diesel, diesel exhaust fluid (DEF), grease and compressed air.

Specs: The entire SLU pneumatic pumping system is powered by a built-in, under-hood VMAC air compressor, providing more storage in the truck body for filters, tools and an optional grease keg.

[Check 205 on index.](#)



▲ OTR WHEEL ENGINEERING

NDX Tire and Wheel System

Released: 10/22/21

Availability: U.S. market

What's new? Developed to solve the recurring problem of flat tires for vehicles operating on rough terrain, NDX minimizes loss of productivity and revenue for fleets and owner-operators, while increasing ride quality.

Specs: NDX uses premium rubber compounds and a deflection management system that optimizes energy absorption and load distribution, resulting in a ride equal to or better than pneumatic tires. Other benefits of this system include less jarring and bouncing as well as reduced operator fatigue.

[Check 206 on index.](#)

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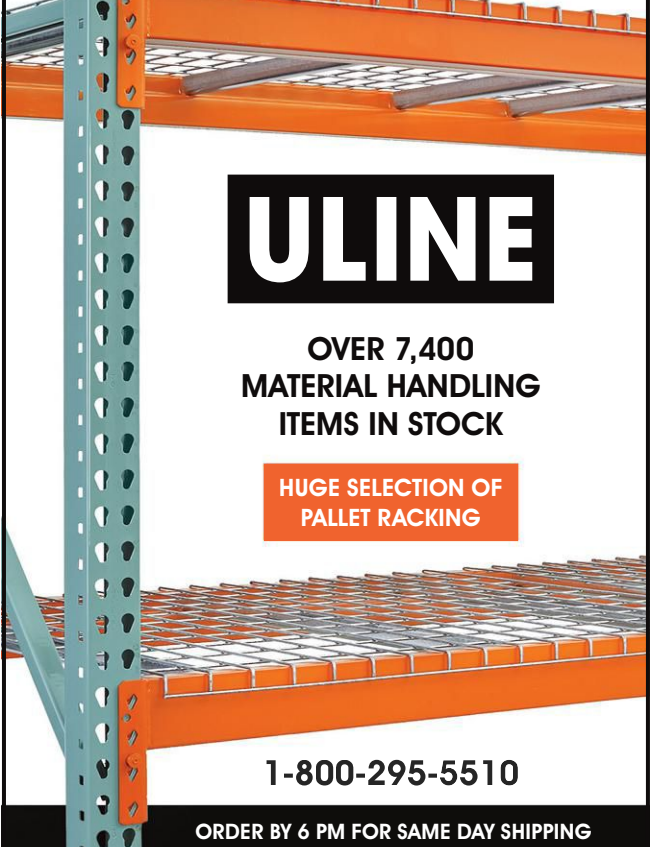
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1. Your company's primary business is:

(Check Only One)

- ☐ 12 General Contractor – Commercial
- ☐ 02 General Contractor – Residential
- ☐ 10 Construction – Special Trade Contractors
- ☐ 03 Highway and Street Construction
- ☐ 04 Water, Sewer and Utility Construction
- ☐ 05 Heavy Construction
- ☐ 06 Concrete Work
- ☐ 07 Excavation Work
- ☐ 08 Wrecking and Demolition Work
- ☐ 13 Architecture, Engineering and Construction Management Services
- ☐ 11 Consulting Contractor
- ☐ 99 Other (please specify) _____

2. Your primary job title is: (Check Only One)

- ☐ 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
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- ☐ 14 Telecommunications
- ☐ 16 Greases, Lubricants and Filters
- ☐ 17 Jobsite Lighting
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Annual Value of Construction Put in Place

September 2019/2020/2021 Annual Rate Comparison

This chart compares the two previous years' total value of construction put in place to an annual forecast based on September 2021 figures. (Millions of dollars. Totals may not add up perfectly due to rounding.)

	2019*	2020*	2021
Total Private Construction	961,670	1,074,925	1,229,915
Residential	517,977	619,761	782,459
Nonresidential	775,637	794,266	791,151
Total Public Construction	331,944	339,102	343,695
Residential	6,558	8,890	8,923
Nonresidential	325,386	330,212	334,772
TOTAL Construction	1,293,614	1,414,027	1,573,610

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

\$1,573,610

SEPTEMBER 2021 TOTAL ANNUAL VALUE OF
CONSTRUCTION PUT IN PLACE

“The ABI scores over the last 8 months continue to be among **the highest ever seen** in the immediate post-recession periods that have been captured throughout the index’s history,” said AIA Chief Economist Kermit Baker, Hon. AIA, Ph.D. “However, **it’s unlikely that revenue increases at architecture firms can sustain this pace**. Given that growth in both new design contracts & project inquiries have moderated in recent months, we expect to see a similar path for the ABI.”

AIA Architectural Billings Index (ABI)

National			*Regional - Billings				*Sectors - Billings			
Month	Billings	Inquiries	Northeast	Midwest	South	West	Multifamily Residential	Commercial/Industrial	Institutional	Mixed
Apr-21	57.9	70.8	55.0	60.6	58.3	52.4	56.9	59.1	56.7	55.0
May-21	58.5	69.2	54.2	63.4	59	57.4	59.5	60.6	57.1	57.9
Jun-21	58.9	71.8	53.2	62.0	57.3	59.7	57.9	61.0	57.3	56.4
Jul-21	58.0	65.0	54.1	58.3	54.6	56.0	54.7	58.4	55.4	54.4
Aug-21	55.6	64.7	51.7	55.2	52.5	57.2	54.3	54.7	54.4	56.0
Sep-21	56.6	61.8	51.5	57.7	57.0	56.0	56.1	58.1	53.5	58.8

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 3-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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